



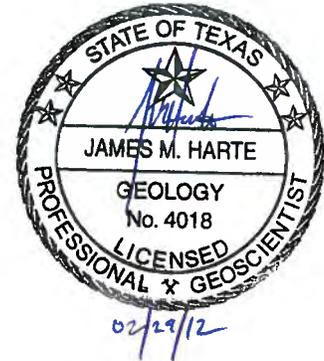
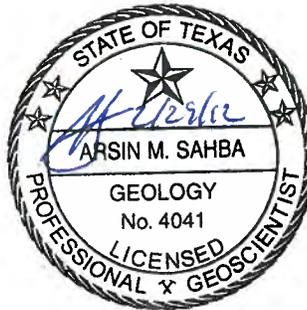
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February 29, 2012

Mr. Bill Renfro, P.G.  
Senior Technical Coordinator  
Railroad Commission of Texas  
1701 North Congress  
Austin, Texas 78711-2967



**Re: Ballinger Seep 2011 BMP Monitoring Event Results, Upper Colorado River Segment 1426, Downstream of E.V. Spence Reservoir, Runnels County, Texas**

Dear Mr. Renfro:

The purpose of this report is to present the results of the Best Management Practice (BMP) monitoring activities conducted during December 2011 at the Ballinger Seep Site located in Runnels County, Texas. The Railroad Commission of Texas (RRC) requested that TRC perform sampling of groundwater and surface water around the Ballinger Seep to monitor the effect of the implemented BMP and obtain additional data for temporal evaluation.

## INTRODUCTION

The Ballinger Seep site is located along the Upper Colorado River Segment 1426 and downstream of Spence Reservoir as depicted in Figure 1. The Texas Commission on Environmental Quality (TCEQ) placed Segment 1426 on the State of Texas 303(d) list due to poor water quality. The RRC and TCEQ have contracted several investigations in order to identify sources of high salinity in the drainage basin of Segment 1426 to mitigate their impact to the water quality of the Segment. Investigation and abatement of high salinity sources in the area of Segment 1426 have been conducted through a non-point source grant from the U.S. Environmental Protection Agency (USEPA), of which the management of funds was through the TCEQ.

Investigations conducted by the RRC identified M.H. Wolverton, C.H. Willingham Lease, Well No. 1 (Wolverton Well No. 1) as a potential high salinity source of the Ballinger Seep. Historic records of this well indicate it was an uncased cable tool dry hole drilled in 1935. During plugging activities of another well suspected of being a high salinity source in the vicinity, the

RRC identified salt crystals covering a 15 by 150 foot area on the ground surface, which appeared to emanate from the Wolverton Well No. 1 well head. Field observations by RRC personnel during the 1990s identified water flowing from the Wolverton Well No. 1 onto the ground surface. RRC data collected prior to 1998 from the upper seep closest to the Wolverton Well No. 1 have also indicated high chloride concentrations (58,000 mg/L). Based on the culmination of this information, the RRC considered this well a potential high salinity source and plugged the Wolverton Well No. 1 in 1998. During these plugging activities, the RRC encountered difficulty drilling through debris and junk in the wellbore, which complicated plugging and abandonment of the well. The well was eventually plugged by pumping 210 sacks of cement into a four and a half-inch casing to 164 feet below ground surface.

Comprehensive site investigations were completed between July 2005 and August 2008 around the Ballinger Seep to determine the identification of the potential source (or sources) and hydraulic connection to the Ballinger Seep, identify the hydraulic connection of the seep to the tributary, evaluate salinity loading to the unnamed tributary and the Colorado River, and identify methods to abate salinity contributions of the seep. Through these investigations the main lithologic units identified at the Site consist of alluvium and the Leuders Formation (Terracon, 2008).

Despite being plugged in 1998, the distribution of salinity determined by laboratory analysis suggested that the Wolverton Well No. 1 continued to be a source of saline loading to the groundwater-bearing units (GWBUs), the seeps, and the tributary to Segment 1426 of the Upper Colorado River. The BMP designed to mitigate salinity loading of groundwater, the seeps, and surface water involved the re-entry and re-plugging of Wolverton Well No. 1. In June 2008, this BMP was implemented and the Wolverton Well No. 1 was successfully re-plugged with cement. During plugging activities, saltwater flow was observed within the borehole, which confirmed that the well remained a salinity source prior to the 2008 re-plugging.

Analytical results from the December 2009 monitoring event indicated that chloride concentrations of samples collected from monitoring wells screened in all three GWBUs across the Site were elevated and generally higher than chloride concentrations detected during previous sampling events. The objective of the December 2011 monitoring event was to collect updated data on the distribution of salinity in groundwater and surface water to supplement the previous site investigation results and determine the effects of the BMP (plugging of Wolverton Well No. 1) on water quality at the Site. This letter report presents the data collected from the December 2011 monitoring event.

## **GROUNDWATER AND SURFACE WATER MONITORING**

TRC conducted groundwater monitoring activities at the Site from December 12 through December 14, 2011. TRC personnel coordinated field activities with the RRC San Angelo District 7C Office to obtain access to sample locations, which are located on private property.

Field activities during this monitoring event were performed in accordance with the Field Sampling Plan (FSP) dated December 2011. Completed field activities included synoptic well gauging, surface water sampling, groundwater sampling, seep water sampling, Quality Assurance/Quality Control (QA/QC) sampling, and management of investigation-derived waste (IDW). These activities were completed in accordance with the FSP and QAPP with the following variances:

- Groundwater samples were not collected from monitoring wells MW-6, MW-10, MW-11, MW-12, and MW-15. The gauging measurements at monitoring well MW-6 indicated there was 0.67 feet of water present, which was an inadequate volume of groundwater to sample. Monitoring wells MW-10 through MW-12 were dry; therefore, no sample could be collected. Due to sand pack present in the well casing, a sample could not be collected at MW-15. A significant amount of sand pack filled the bottom of the bailer during well purging and would prevent the bailer from sealing shut to collect water.
- Water samples were not collected from the six tributary surface water locations (Trib-1 through Trib-6) because these locations were dry.
- Gauging measurements could not be collected from the following locations: tributary at seep, seep monitor point, and Colorado River (at the confluence of the unnamed tributary and Colorado River), as the elevation benchmark or measuring point could not be located. Based on this information, these locations are not depicted on the figures. These locations were previously gauged by Terracon in August 2006, April and May 2007, and July and August 2008.

A summary of the seasonal sample locations, sample identifications, sample dates, and laboratory analyses are provided in Table 1. The surface water, groundwater, and seep water sample locations are depicted in Figure 2.

A synoptic groundwater gauging event was conducted prior to groundwater sampling. The wells were purged and sampled using: 1) a disposable polyvinyl chloride (PVC) bailer to remove at least three well casing volumes of groundwater or three consecutive readings of stabilized field parameters including temperature, conductivity, pH, total dissolved solids (TDS), and oxidation-reduction potential (ORP). These field parameters were collected during well purging and from each water sample location. The field parameter information was recorded on Sampling Field Forms provided in Attachment 1. Monitoring wells MW-1, MW-4, MW-8, MW-14, MW-16, and MW-17 had considerable amounts of mesquite roots that were removed by TRC personnel prior to the synoptic gauging event.

Water samples collected from surface water, groundwater, and Lower Seep location (Seep 1) were submitted for the following laboratory analyses:

- Anions (chloride, sulfate, and bromide) by EPA Method E300

- TDS by EPA Method M2540C

Copies of the DHL Laboratory analytical reports and chain-of-custody forms are provided in Attachment 2.

## **MONITORING RESULTS**

Previous investigations at the Site have identified the presence of three groundwater zones, as indicated by lithology and groundwater data obtained during the previous investigations: (1) A shallow zone associated with the unnamed tributary and intercepted by monitoring wells MW-1, MW-3, MW-4, MW-6, and MW-12; (2) a deep zone intercepted by monitoring wells MW-2, MW-5, MW-10, MW-11, MW-13, and MW-15; and (3) an alluvial zone located adjacent to the Colorado River and intercepted by monitoring wells MW-7, MW-8, MW-9, MW-14, MW-16, and MW-17. The estimated extent of the river alluvium unit present along the bank of the Colorado River is depicted in Figure 3.

Based on data collected from previous investigations, the deeper zone and the alluvial zone are considered hydraulically connected as groundwater in the deeper zone discharges into the alluvium unit. It is also suspected, based on investigation data, that water from the shallow zone discharges via the Ballinger Seep onto ground surface and flows down the unnamed tributary to the alluvium unit located adjacent to the Colorado River during periods of low precipitation. This surface water then infiltrates downward into the Colorado River alluvium contacts in the tributary bed (Terracon, 2008).

Field observations during the December 2011 event observed minimal flow (relative to observations during the December 2009 event) discharging from the Lower Seep. No surface water was present at Trib-1 through Trib-6 locations within the unnamed tributary.

### **Groundwater Level Measurements**

Seventeen monitoring wells were synoptically gauged on December 13, 2011. Table 2 presents the monitoring well gauging data including ground elevation, top of well casing elevation, depth-to-water level measurements from top of casing, and calculated water elevation. The groundwater potentiometric map for December 2011 is presented as Figure 3.

The December 2011 groundwater elevation data suggest that the flow pattern in each groundwater zone is generally to the north and northeast toward the Colorado River and consistent with flow patterns identified in previous investigations. A brief discussion of the December 2011 groundwater flow within each zone is provided below:

- Groundwater in the shallow zone appears to be localized to the area around the unnamed tributary. Gauging data indicates a lack of groundwater in the shallow zone as MW-6 and MW-12 are dry, and the December 2011 groundwater elevation in MW-3 has decreased by

approximately 1.8 feet. The apparent flow direction in this zone is to the north towards the Colorado River with a groundwater gradient of approximately 0.045 feet per foot (ft/ft).

- Within the deeper zone, groundwater also flows north and northeast towards the Colorado River with a groundwater gradient of 0.018 ft/ft. Groundwater from the deeper zone appears to discharge into the alluvial unit in the vicinity of monitoring wells MW-7, MW-8, MW-9, MW-14, and MW-17.
- Groundwater in the alluvial zone appears to flow to the north/northeast towards the Colorado River. The groundwater gradient between monitoring wells MW-8 and MW-17 is estimated to be 0.0007 ft/ft.

### **Surface Water and Seep Results**

During the December 2011 monitoring event, surface water samples were collected from the following locations:

- Four stations (CR-50' Up, CR-250' Up, CR-1,000' Up, and CR-2,500' Up) along the Colorado River located 50 feet, 250 feet, 1,000 feet, and 2,500 feet upstream of the mouth of the unnamed tributary, respectively. The sample container for CR-250' Up opened during transportation to the laboratory and the contents spilled into the quart sized zip top bag. Upon arrival, laboratory personnel were able to retrieve the sample water from within the zip top bag and conduct analysis of the sample. A review of the analytical results of this sample indicates that melted wet ice likely mixed into the surface water sample causing dilution of the sample. The sample results are presented, however; they are not used to discuss trends or analysis.
- Five stations (CR-50' Down, CR-500' Down, CR-900' Down, CR-1,500' Down, and CR-2,500' Down) located 50 feet, 500 feet, 900 feet, 1,500 feet, and 2,500 feet downstream of the mouth of the unnamed tributary, respectively.
- One surface water sample was collected from Elm Creek (EC-2,500' Up) at the confluence with the Colorado River.
- One seep sample (Lower Seep-1) was collected from the unnamed tributary.

Water samples were not collected from the tributary or Upper Seep because these locations were dry.

The chloride data from surface water and seep water samples are depicted in Figure 4. The surface water and seep analytical results are summarized in Table 3. A brief discussion of the trends observed in the surface water in the Colorado River and Elm Creek and the surface and seep water along the unnamed tributary is provided below. The discussion only includes locations that were sampled during the December 2011 sampling event, unless otherwise noted.

### ***Colorado River and Elm Creek Surface Water Samples***

December 2011 surface water chloride concentrations along the Colorado River ranged from 403 milligrams per liter (mg/L) to 478 mg/L. Upstream of the confluence with the unnamed tributary, surface water concentrations along the Colorado River ranged from 473 mg/L to 478 mg/L; downstream concentrations ranged from 455 mg/L to 470 mg/L. The chloride concentration of the surface water sample collected from Elm Creek (EC-2500' Up) was 403 mg/L.

Prior to the December 2011 sampling event, surface water data from the Colorado River and Elm Creek sample locations were last collected in December 2009. The majority of surface water sampling were conducted during July 2006, May 2007, July 2008, August 2008 at locations CR-50' Up and CR-50' Down, which are both located close to the confluence of the unnamed tributary and the Colorado River. A comparison of the December 2009 and December 2011 chloride concentration data indicates that the chloride concentrations have generally remained within the same range concentrations between the two events.

### ***Tributary Surface Water and Seep Results***

Surface water samples could only be collected from the Lower Seep (sample location Lower Seep-1) during the December 2011 monitoring event, as the remaining locations were dry. The December 2011 chloride concentration in the sample collected from the Lower Seep was 7,810 mg/L, which indicates an increase in chloride concentrations since the December 2009 monitoring event, which was 2,730 mg/L. The increase in chloride concentrations from the Lower Seep may be the result of lack of precipitation in the area, evaporation in the tributary, or a greater presence of groundwater base flow from the shallow zone near the tributary since the chloride concentrations of 6,480 mg/L and 8,700 mg/L in nearby monitoring wells MW-1 and MW-4, respectively, are similar to the concentrations at the Lower Seep. The December 2009 and December 2011 chloride concentration data at the Lower Seep indicate chloride concentrations have increased since the implementation of the BMP in June 2008.

### **Groundwater Results**

During the December 2011 monitoring event, groundwater samples were collected from 12 monitoring wells (MW-1 through MW-5, MW-7 though MW-9, MW-13, MW-14, MW-16, and MW-17). As previously stated, samples were not collected from monitoring wells MW-6, MW-10, MW-11, MW-12, and MW-15 because the wells were either dry, had a limited amount of water for sample collection, or damaged. The groundwater analytical results are summarized in Table 4. The chloride distribution in groundwater is depicted in Figure 5. For locations with duplicate sample data, the higher of the two concentrations is reported.

Chloride concentrations in the December 2011 samples ranged from 1,180 mg/L to 26,600 mg/L at MW-13 and MW-3, respectively. Overall, the December 2011 groundwater chloride

concentrations were generally higher as compared to July and August 2006, May 2007, July 2008, August 2008, and December 2009 results.

Background chloride concentrations for the Lueders Formation (the deeper groundwater zone) are known to range from 87 mg/L to 1,450 mg/L, with an average of 315 mg/L (Terracon, 2008). The lowest chloride concentrations detected during the December 2011 event were identified at monitoring wells MW-13 (1,180 mg/L) and MW-17 (1,190 mg/L).

A brief discussion of chloride trends observed in the shallow groundwater zones followed by a discussion of chloride trends in the deep and alluvial zones is provided below. Chloride trends in the deep and the alluvial zones are discussed together based on their hydraulic connection. Chloride concentration trends over time in selected monitoring wells are presented in Graphs 1 through 12. Identified chloride trends since the implementation of the BMP in June 2008 are also discussed. Unless otherwise noted, the discussion only includes monitoring wells that were sampled during the December 2011 sampling event.

### ***Shallow Groundwater Zone***

Chloride concentrations within the shallow groundwater zone have increased from July 2006 to December 2011 in monitoring wells MW-1 (1,550 mg/L to 6,480 mg/L, respectively), MW-3 (3,050 mg/L to 26,600 mg/L, respectively), and MW-4 (2,440 mg/L to 8,700 mg/L, respectively), as shown in Graphs 1 through 3. Chloride concentration data could not be collected from monitoring well MW-6 as this well contained an inadequate volume of water for sample collection. Chloride concentration data was not collected from MW-12 as this location was dry during the December 2011 monitoring event. Chloride concentrations in monitoring wells MW-1 and MW-4 have consistently increased between July 2006 and December 2011. Since the implementation of the BMP in June 2008, the largest increases in chloride concentrations in the shallow groundwater zone were observed in monitoring well MW-3. Chloride concentrations in MW-3 over the two most recent sampling events indicate a plateau in chloride concentration trend.

### ***Deeper and Alluvial Groundwater Zones***

Chloride concentrations in monitoring well MW-5 which is located approximately 100 feet from the Wolverton Well No.1 have continuously increased from July 2006 (5,920 mg/L) to December 2011 (23,200 mg/L) as shown in Graph 4. Chloride concentrations in monitoring well MW-2, which is located approximately 550 feet from the Wolverton Well No. 1, over this same period of time have fluctuated from July 2006 (3,860 mg/L), increasing in May 2007 (6,750 mg/L), stabilizing from July 2008 (4,330 mg/L) to December 2009 (4,540 mg/L), and increasing in December 2011 (7,940 mg/L) as shown in Graph 5. Chloride concentrations in monitoring well MW-13 (upgradient of the Wolverton Well No. 1) remained relatively stable between August 2008 (2,330 mg/L) and December 2009 (2,060 mg/L), and slightly decreased in

December 2011 (1,180 mg/L) as shown in Graph 6. Based on these data, chloride concentrations in MW-5 and MW-2 have continued to increase since the implementation of the BMP in June 2008.

In the alluvial zone, chloride concentrations have generally increased since the initiation of groundwater monitoring activities at this site. Chloride concentration increases have occurred in monitoring wells MW-7 (1,880 mg/L in August 2006 to 16,600 mg/L in December 2011), MW-8 (1,750 mg/L in May 2007 to 12,300 mg/L in December 2011), and MW-14 (793 mg/L in May 2007 to 10,800 mg/L in December 2011). Decreases in chloride concentrations occurred in monitoring wells MW-16 (11,000 mg/L in December 2009 to 10,900 mg/L in December 2011), and MW-17 (2,700 mg/L in December 2009 to 1,910 mg/L in December 2011), as shown in Graphs 7 through 10, respectively. The largest increase in chloride concentration is found in monitoring wells MW-7 and MW-8. Since the implementation of the BMP in June 2008, chloride concentrations in monitoring wells MW-7, MW-8, and MW-14 have increased. A comparison of the December 2009 and December 2011 chloride concentrations in monitoring wells MW-7, MW-8, MW-14, and MW-17 indicates the eastern edge of the chloride plume in the deeper zone is expanding farther west towards the Colorado River as presented in Figure 5. Chloride concentrations in MW-9 between December 2009 and December 2011 have remained relatively stable (6,280 mg/L and 6,750 mg/L, respectively), whereas chloride concentrations in MW-16 have increased during the same period of time (4,930 mg/L and 11,000 mg/L, respectively). Chloride concentrations with respect to time in MW-9 and MW-16 are plotted in Graphs 11 and 12. Since the implementation of the BMP in June 2008, chloride concentrations in MW-16 have practically doubled, whereas chloride concentrations in MW-9 have remained relatively stable.

### **Quality Assurance Project Plan**

The analytical results were reviewed for compliance with the QA/QC criteria established in the QAPP for this site. The QA/QC analytical data review is presented in Attachment 3. QA/QC data associated with laboratory measurements indicate that measurement data are defensible and that measurement data reliability is generally within expected limits of sampling and analytical error given the data interpretation issues identified in the evaluation.

The sample container for CR-250' Up opened during transportation to the laboratory and the contents spilled into the quart sized zip top bag. Upon arrival, laboratory personnel were able to retrieve the sample water from within the zip top bag and return to the sample container for analysis. The analytical results indicate that melted wet ice likely mixed with the sealed sip top bag to dilute the sample. As a result, the sample results are presented, however; they are not used to discuss trends or analysis.

## **INVESTIGATION-DERIVED WASTE MANAGEMENT**

The December 2011 sampling event generated approximately 55 gallons of investigation-derived waste (IDW) purge and decontamination water. The IDW water was temporarily stored in a 55-gallon drum that was staged near the Site entrance gate. The IDW water was removed from near the Site entrance gate on December 20, 2011, and disposed of at a facility permitted to accept RRC exempt waste. TRC coordinated with the RRC San Angelo District 7C Office for the removal of the IDW from the site.

## **CONCLUSIONS**

The following conclusions are made based on the data collected in December 2011, as well as historical data provided by the RRC:

- Groundwater flow in the shallow groundwater zone appears to be localized with flow to the north along the unnamed tributary. Groundwater flow in the deep groundwater zone and alluvial groundwater zone also flows to the north towards the river. Groundwater flow directions observed in all three groundwater zones is consistent with historical data.
- December 2011 field observations appear to corroborate observations from previous investigations that seep water discharging from the Lower Seep appears to flow along the surface of the tributary and then infiltrates downward into the alluvium, somewhere between locations Trib-2 and Trib-3 (both Trib-2 and Trib-3 were dry), prior to discharging into the Colorado River.
- A comparison of the December 2009 and December 2011 chloride concentration data for surface water from sample locations along Elm Creek and Colorado River indicates that chloride concentrations remained relatively consistent between the December 2009 and December 2011 monitoring events.
- In the unnamed tributary, surface water samples could only be collected from the Lower Seep location during the December 2011 monitoring event, as the remaining locations were dry. Chloride concentration at the Lower Seep location increased between December 2009 and December 2011. The increase of the chloride concentration at the Lower Seep may be due to its downgradient and directional groundwater flow path from MW-3. The area experienced exceptionally low rainfall in 2011. A drought of this magnitude can affect chloride concentrations found in surface water bodies and shallow groundwater. Chloride concentrations have increased since the implementation of the BMP in June 2008.
- Overall, chloride concentrations in groundwater across the Site show elevated chloride concentrations in monitoring wells within all three of the groundwater zones. Slight decreases in chloride concentrations were noted in monitoring well MW-3 (shallow zone), and two alluvial zone monitoring wells MW-16 and MW-17. Overall, December 2011

chloride concentrations were generally higher than chloride concentrations detected during previous sampling events.

- Since the implementation of the BMP in June 2008, the largest increase in chloride concentration was observed in monitoring well MW-3, which is located closest to the BMP. The largest increase in chloride concentration since the monitoring event in December 2009 occurred in monitoring well MW-8. The data suggests that the implementation of the BMP may not have been adequate.
- Chloride concentrations in deep zone monitoring well MW-5, located approximately 100 feet from the Wolverton Well No. 1, have continuously increased from July 2006 through December 2011. Since implementation of the BMP in June 2008, chloride concentrations detected in MW-5 have increased based on data from July 2008, August 2008, December 2009, and December 2011.
- December 2011 chloride concentrations in alluvial zone monitoring wells MW-8, MW-14, and MW-17 indicate the northern (downgradient) edge of the chloride plume of the deep and alluvial zones is expanding toward the Colorado River. Previous investigation reports indicate that the groundwater velocity is relatively low. Based on this low groundwater velocity, the short-term effect of the BMP may only be reflected in concentration changes at MW-5 (located 100 feet from Wolverton Well No. 1) which shows chloride concentrations stabilizing over the two most recent sampling events. Additional time may be required to see the effects on monitoring wells located further downgradient.
- Based on a review of oil and gas well records, the former well Pan American Petroleum Corporation, Barr Gas Unit Lease Well No.1 (American Petroleum Institute [API] Number 399-02543) was identified upgradient of the Site. This well was reportedly plugged in 1966; however, Terracon could not locate a copy of the well plugging report. Other potential sources of salinity may include: (1) the mobilization of residual salinity in soils due to historic releases from the Wolverton Well No.1, (2) other potentially leaking oil and gas wells in the area, or (3) fractures in the Lueders Formation that may provide secondary pathways for upward migration of saline water from the Coleman Junction Formation.
- Historical data indicate that chloride concentrations in monitoring well MW-16 have consistently increased from May 2007 to December 2009; however, the December 2011 analytical results indicate that chloride concentrations have since remained relatively stable in the well. The historic elevated chloride concentrations in MW-16 are suspected to be from a separate source than the Ballinger Seep based on MW-16 being upgradient of the Ballinger Seep. A review of the RRC Public GIS Viewer for Oil & Gas Well, Pipeline Data, and LP Gas Site identified two plugged wells located upgradient of MW-16: (1) API Number 399-31590, and (2) API Number 399-30292 that may potentially be alternate salinity sources in the area.

Mr. Bill Renfro, P.G.

February 29, 2012

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- The extent of salinity impacts in the deeper groundwater zone have not been delineated in the upgradient and crossgradient (i.e., to the south and east) directions from the Wolverton Well No.1.

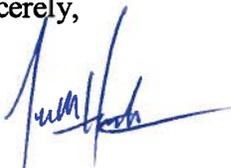
## RECOMMENDATIONS

Based on the data collected in December 2011 and previous investigations, the following actions are recommended:

- Continue surface water and groundwater monitoring to better define salinity distribution, evaluate temporal trends, and monitor the effectiveness of the BMP.
- Reinstallation or routine maintenance of the current monitoring wells is recommended if long-term monitoring is expected at the site due to the poor condition of the flush mounts and mesquite root masses that continue to deteriorate the PVC piping.
- Investigate potential sources located west and southwest of monitoring well MW-16 through the installation and sampling of two monitoring wells; one in the alluvial groundwater zone upstream of MW-16, and the second well in the deeper groundwater zone upgradient from MW-16 (i.e., approximately 300 feet to the south).
- Install and sample one monitoring well in the alluvium between MW-16 and MW-9 in order to determine whether the chloride plumes are connected.
- Investigate other potentially leaking oil and gas wells in the area.
- Investigate fractures in the Lueders Formation that may provide secondary pathways for upward migration of saline water from the Coleman Junction Formation.

Please do not hesitate to contact us at 512-329-6080 regarding questions or comments.

Sincerely,



James Harte, P.G.  
Project Manager/Senior Geologist



Daniel Stine, EIT  
Project Manager/Staff Engineer

cc: Ike Ramirez, Railroad Commission of Texas, San Angelo, Texas

## FIGURES

Figure 1	Site Location Map
Figure 2	Site Map
Figure 3	Potentiometric Surface Map, December 2011
Figure 4	Chloride Concentrations in Surface Water and Seeps, December 2011
Figure 5	Chloride Concentrations in Groundwater, December 2011

## TABLES

Table 1	Summary of Seasonal Sample Locations
Table 2	Groundwater and Surface Water Elevation Data
Table 3	Surface Water Data Summary
Table 4	Groundwater Data Summary

## GRAPHS

Graph 1	Chloride Concentrations in MW-1, Shallow Groundwater Zone
Graph 2	Chloride Concentrations in MW-3, Shallow Groundwater Zone
Graph 3	Chloride Concentrations in MW-4, Shallow Groundwater Zone
Graph 4	Chloride Concentrations in MW-5, Deeper Groundwater Zone
Graph 5	Chloride Concentrations in MW-2, Deeper Groundwater Zone
Graph 6	Chloride Concentrations in MW-13, Deeper Groundwater Zone
Graph 7	Chloride Concentrations in MW-7, Alluvial Groundwater Zone
Graph 8	Chloride Concentrations in MW-8, Alluvial Groundwater Zone
Graph 9	Chloride Concentrations in MW-14, Alluvial Groundwater Zone
Graph 10	Chloride Concentrations in MW-17, Alluvial Groundwater Zone
Graph 11	Chloride Concentrations in MW-9, Alluvial Groundwater Zone
Graph 12	Chloride Concentrations in MW-16, Alluvial Groundwater Zone

## ATTACHMENTS

Attachment 1	Field Forms
Attachment 2	Laboratory Analytical Data Reports
Attachment 3	Analytical Data Review/Data Validation Checklist

## REFERENCES

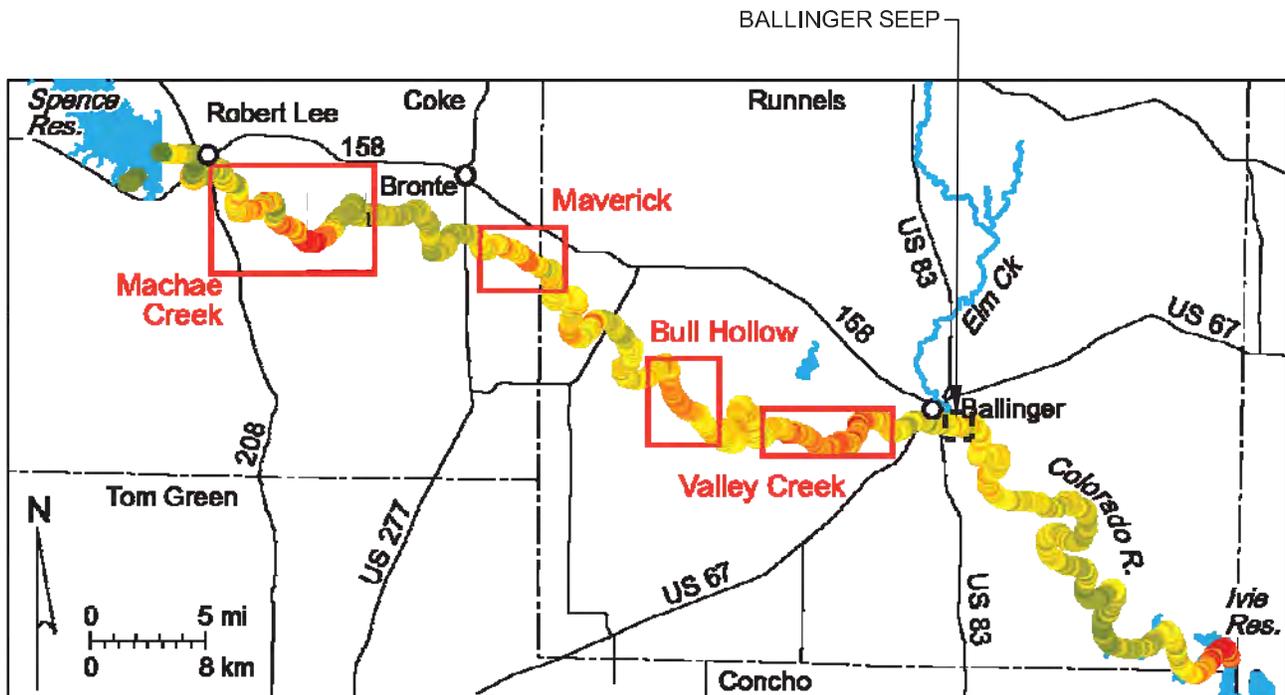
Railroad Commission of Texas, 2008. *Investigations and Abatement of Produced Water Impacts and Seeps to Surface Water in the Upper Colorado River Basin Downstream of Spence Reservoir (Segment 1426) Quality Assurance Project Plan*. The Railroad Commission of Texas, March 19, 2008.

Terracon, 2007. *Limited Site Investigation, Ballinger Seep, Ballinger, Runnels County, Texas. Terracon Project 94057272B*. Terracon Consultants, Inc., August 28, 2007.

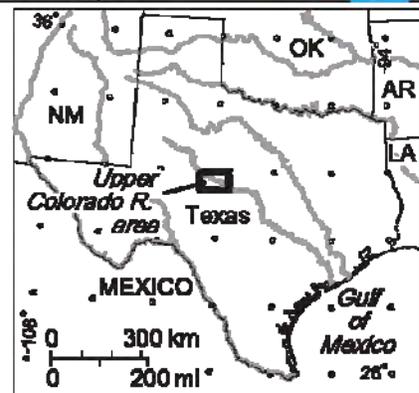
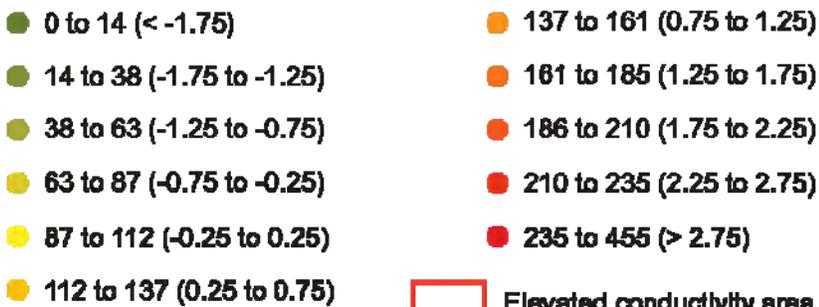
Terracon, 2008. *Summary Report, Ballinger Seep, Ballinger, Runnels County, Texas, Terracon Project No. 94057272C*. Terracon Consultants, Inc., September 12, 2008.

TRC, 2011. *Field Sampling Plan, Ballinger Seep Site, 2011 Sampling Event, Runnels County, Texas*. TRC Environmental Corporation (TRC), December 2011.

## FIGURES



Apparent conductivity at 1350 Hz, mS/m (standard deviation)



**NOTE:**

APPARENT CONDUCTIVITY MEASURED AT 1350 Hz ALONG THE AXIS OF THE COLORADO RIVER DURING THE BEG AIRBORNE GEOPHYSICAL SURVEY IN FEBRUARY 2005. ELEVATED CONDUCTIVITY SEGMENTS INDICATING LOCATIONS OF POSSIBLE SALINE-WATER INFLOW ARE BOUNDED BY RED RECTANGLES. THE DASHED BOX NEAR BALLINGER IDENTIFIES THE BALLINGER SEEP.

**SOURCE:**

SURFACE AND BOREHOLE GEOPHYSICAL INVESTIGATIONS IN THE WENDKIRK OIL FIELD AREA, COKE COUNTY, TEXAS (BEG, 2006).

**SITE LOCATION MAP**

RAILROAD COMMISSION OF TEXAS  
BALLINGER SEEP  
BALLINGER, TEXAS

PROJECT NO. 173291 DWG FILE 173291-1

DRAWN BY. CL DATE 1/15/10



505 EAST HUNTLAND DRIVE  
SUITE 250  
AUSTIN, TEXAS 78752  
(512) 329-6080

FIGURE

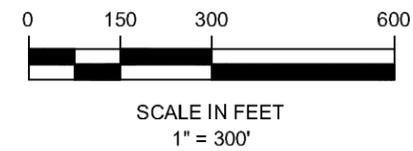
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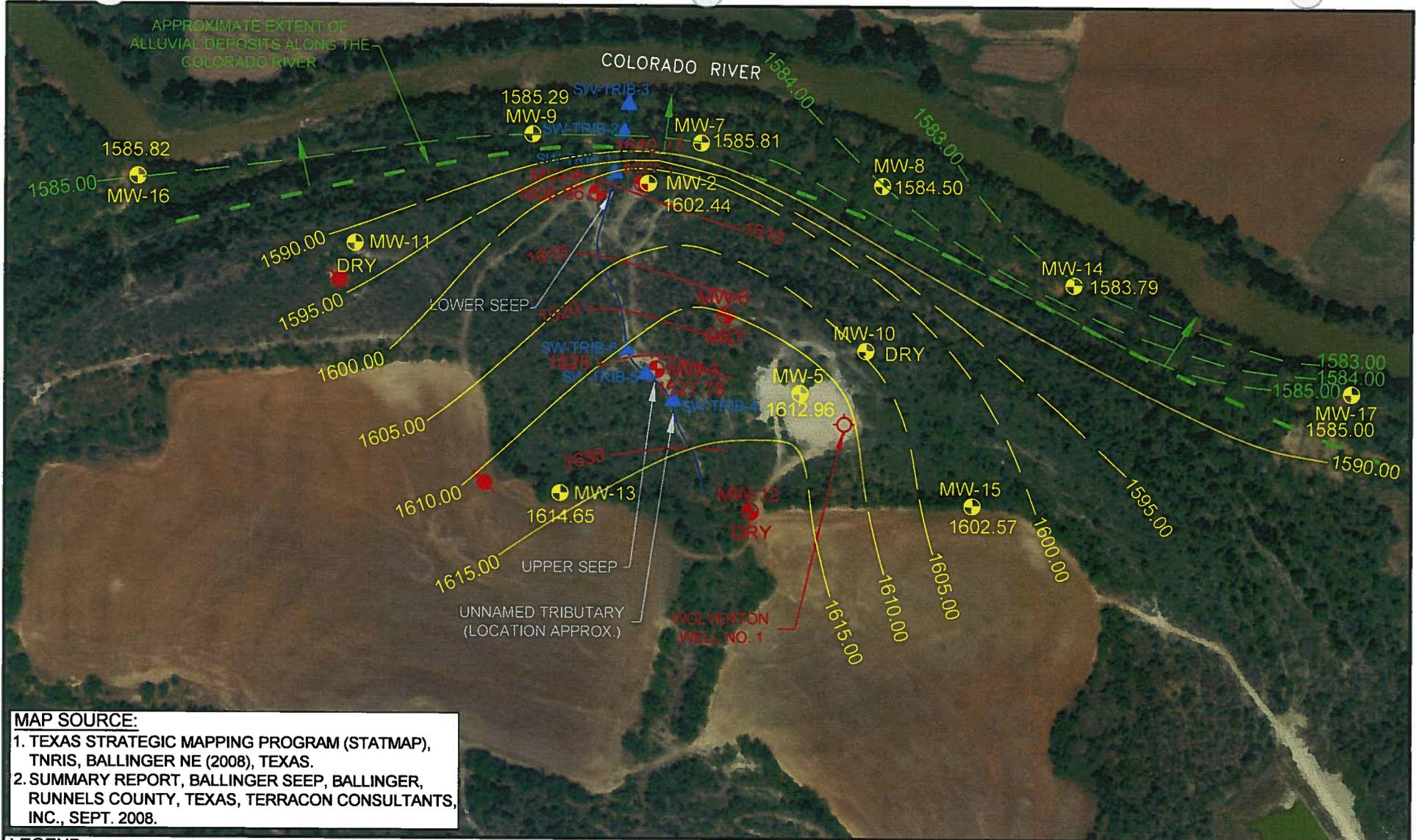
**LEGEND**

- ⊕ DEEP ZONE / ALLUVIAL ZONE MONITORING WELL
- ⊕ SHALLOW ZONE MONITORING WELL
- ⊙ DRY HOLE
- ★ PLUGGED OIL WELL
- ★ PLUGGED OIL / GAS WELL
- ▲ SURFACE WATER SAMPLE LOCATION (LOCATIONS ARE APPROXIMATE)
- ~ UNNAMED TRIBUTARY (LOCATION IS APPROXIMATE)

**MAP SOURCE:**  
 1. TEXAS STRATEGIC MAPPING PROGRAM (STATMAP), TNRS, BALLINGER NE (2008), TEXAS.  
 2. SUMMARY REPORT, BALLINGER SEEP, BALLINGER, RUNNELS COUNTY, TEXAS, TERRACON CONSULTANTS, INC., SEPT. 2008.



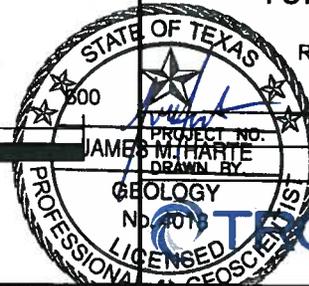
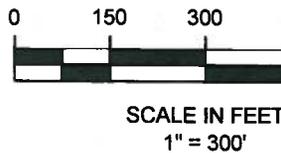
<b>SITE MAP</b>			
RAILROAD COMMISSION OF TEXAS BALLINGER SEEP BALLINGER, TEXAS			
PROJECT NO.	188155	DWG FILE	188155-2
DRAWN BY.	CL	DATE	12/23/11
505 EAST HUNTLAND DRIVE SUITE 250 AUSTIN, TEXAS 78752 (512) 329-6080			FIGURE <b>2</b>



**MAP SOURCE:**  
 1. TEXAS STRATEGIC MAPPING PROGRAM (STATMAP), TNRI, BALLINGER NE (2008), TEXAS.  
 2. SUMMARY REPORT, BALLINGER SEEP, BALLINGER, RUNNELS COUNTY, TEXAS, TERRACON CONSULTANTS, INC., SEPT. 2008.

**LEGEND**

- DEEP MONITORING WELL
- SHALLOW MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (DEEP WATER ZONE)
- GROUNDWATER ELEVATION CONTOUR (SHALLOW WATER ZONE)
- GROUNDWATER ELEVATION CONTOUR (ALLUVIUM)
- 1586.41 GROUNDWATER ELEVATION (FEET ABOVE SEA LEVEL)
- DRY HOLE
- PLUGGED OIL WELL
- PLUGGED OIL / GAS WELL
- DRY WELL DRY DURING DECEMBER 2011 MONITORING EVENT
- SURFACE WATER SAMPLE (LOCATIONS ARE APPROXIMATE)



**POTENTIOMETRIC SURFACE MAP**

**DECEMBER 2011**

RAILROAD COMMISSION OF TEXAS  
 BALLINGER SEEP  
 BALLINGER, TEXAS

PROJECT NO.	188155	DWG FILE	188155-3
CL		DATE	12/23/11

505 EAST HUNTLAND DRIVE  
 SUITE 250  
 AUSTIN, TEXAS 78752  
 (512) 329-6080

FIGURE  
**3**

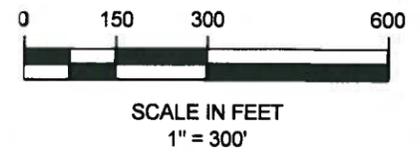
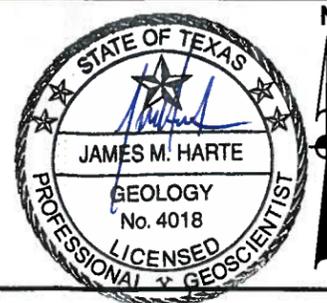


**LEGEND**

- DEEP ZONE / ALLUVIAL ZONE MONITORING WELL
- SHALLOW ZONE MONITORING WELL
- DRY HOLE
- PLUGGED OIL WELL
- PLUGGED OIL / GAS WELL
- ▲ SURFACE WATER SAMPLE LOCATION (LOCATIONS ARE APPROXIMATE)
- 475 CHLORIDE CONCENTRATION (mg/L)
- ~ UNNAMED TRIBUTARY (LOCATION IS APPROXIMATE)
- DRY LOCATION DRY DURING MONITORING EVENT
- \* SAMPLE SW-CR-250' UP COMROMISED DURING SHIPMENT

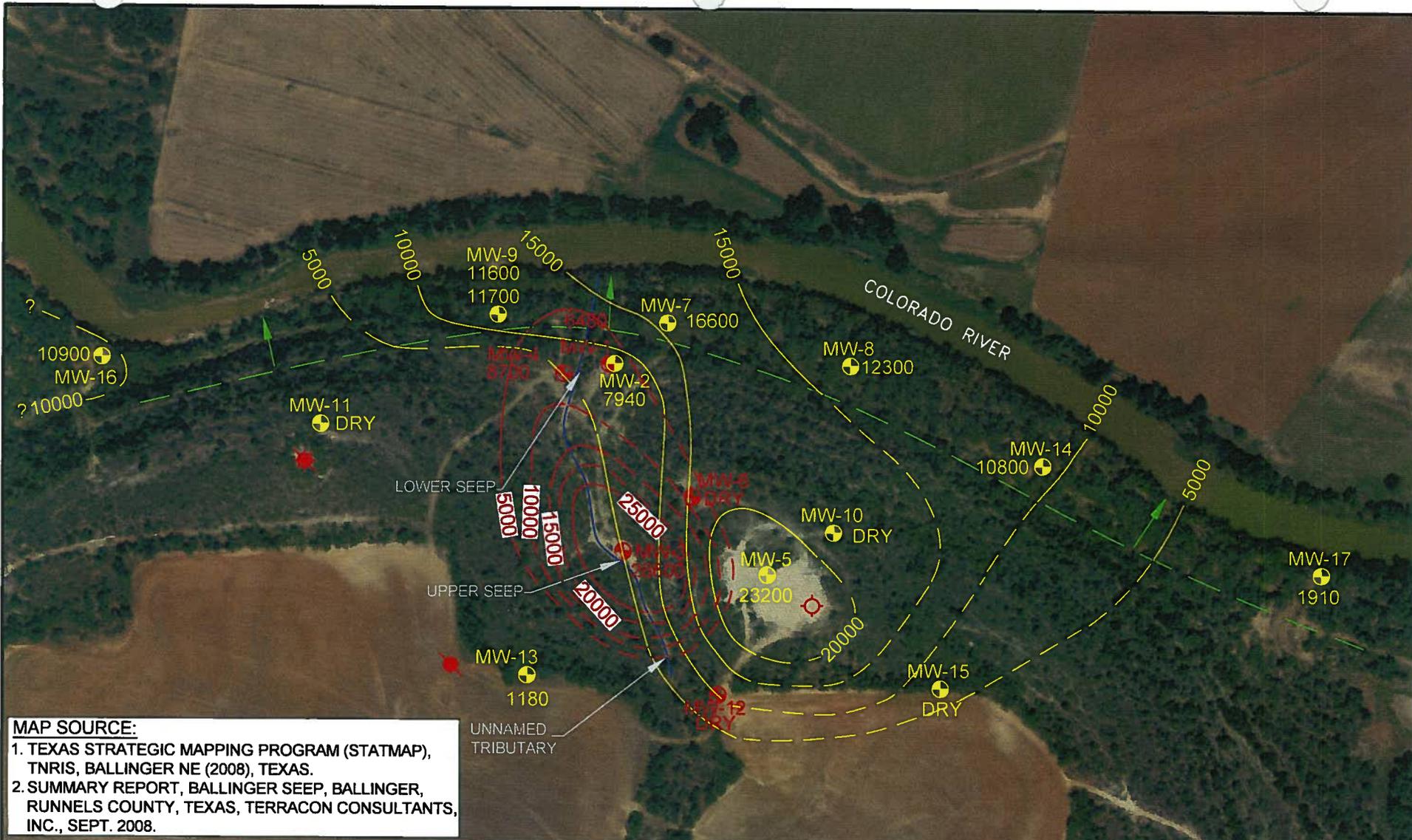
**MAP SOURCE:**

1. TEXAS STRATEGIC MAPPING PROGRAM (STATMAP), TNRIS, BALLINGER NE (2008), TEXAS.
2. SUMMARY REPORT, BALLINGER SEEP, BALLINGER, RUNNELS COUNTY, TEXAS, TERRACON CONSULTANTS, INC., SEPT. 2008.



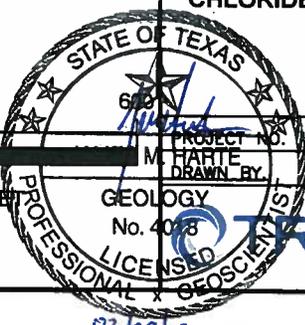
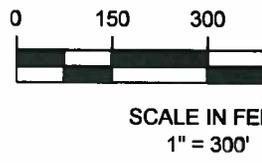
CHLORIDE CONCENTRATIONS IN SURFACE WATER AND SEEPS - DECEMBER 2011			
RAILROAD COMMISSION OF TEXAS			
BALLINGER SEEP			
BALLINGER, TEXAS			
PROJECT NO.	188155	DWG FILE	188155-4
DRAWN BY.	CL	DATE	1/13/12
505 EAST HUNTLAND DRIVE SUITE 250 AUSTIN, TEXAS 78752 (512) 329-6080			FIGURE 4

02/28/12



**MAP SOURCE:**  
 1. TEXAS STRATEGIC MAPPING PROGRAM (STATMAP), TNRIS, BALLINGER NE (2008), TEXAS.  
 2. SUMMARY REPORT, BALLINGER SEEP, BALLINGER, RUNNELS COUNTY, TEXAS, TERRACON CONSULTANTS, INC., SEPT. 2008.

- LEGEND**
- DEEP MONITORING WELL
  - SHALLOW MONITORING WELL
  - CHLORIDE CONCENTRATION CONTOUR LINE (DEEP WATER ZONE)
  - CHLORIDE CONCENTRATION CONTOUR LINE (SHALLOW WATER ZONE)
  - - - APPROXIMATE EXTENT OF ALLUVIAL DEPOSITS ALONG THE COLORADO RIVER
  - 6480 CHLORIDE CONCENTRATION (mg/L)
  - ◇ DRY HOLE
  - ★ PLUGGED OIL WELL
  - ★ PLUGGED OIL / GAS WELL
  - ★ DRY WELL DRY DURING MONITORING EVENT



**CHLORIDE CONCENTRATIONS IN GROUNDWATER**

**DECEMBER 2011**

RAILROAD COMMISSION OF TEXAS  
 BALLINGER SEEP  
 BALLINGER, TEXAS

PROJECT NO.	188155	DWG FILE	188155-5
CL		DATE	1/13/12

505 EAST HUNTLAND DRIVE  
 SUITE 250  
 AUSTIN, TEXAS 78752  
 (512) 329-6080

FIGURE  
**5**

## **TABLES**

**Table 1. Summary of Seasonal Sample Locations  
Railroad Commission of Texas  
Ballinger Seep, Ballinger Texas**

Sample Areas	Sample Location	Sample ID	Sample Date(s)	Laboratory Analysis
Colorado River	Location-50' Up* Location-50' Down*	SW-CR-50' Up SW-CR-50' Down	July 2006, May 2007, July 2008, August 2008, December 2009, December 2011	Alkalinity, Anions (Bromide, Chloride, Nitrate, Sulfate), Cations (Calcium, Magnesium, Potassium, Sodium), Conductivity (or Specific Conductance), Total Dissolved Solids (TDS). Anions (Bromide, Chloride, Sulfate) and TDS only during December 2011 monitoring event.
	Location-250' Up* Location-1,000' Up* Location-2,500' Up* Location-500' Down* Location-900' Down* Location-1,500' Down* Location-2,500' Down*	SW-CR-250' Up SW-CR-1,000' Up SW-CR-2,500' Up SW-CR-500' Down SW-CR-900' Down SW-CR-1,500' Down SW-CR-2,500' Down	May 2007, December 2009, December 2011	
Elm Creek	Location-2,500' Up <sup>+</sup>	SW-EC-2,500-Up	May 2007, December 2009, December 2011	
Surface Water in Unnamed Tributary	Tributary Location-1	SW-Trib-1	July 2006, May 2007, July 2008, August 2008, December 2009	
	Tributary Location-2	SW-Trib-2	July 2006, May 2007, December 2009	
	Tributary Location-3 Tributary Location-4 Tributary Location-5 Tributary Location-6	SW-Trib-3 SW-Trib-4 SW-Trib-5 SW-Trib-6	May 2007	
	Seeps	Lower Seep	Seep 1/ Lower Seep-1 /PVC-1	

**Table 1. Summary of Seasonal Sample Locations  
Railroad Commission of Texas  
Ballinger Seep, Ballinger Texas**

Sample Areas	Sample Location	Sample ID	Sample Date(s)	Laboratory Analysis
Groundwater	MW-1 MW-2 MW-3 MW-4 MW-5	MW-1 MW-2 MW-3 MW-4 MW-5	July 2006, May 2007, July 2008, August 2008, December 2009, December 2011	Alkalinity, Anions (Bromide, Chloride, Nitrate, Sulfate), Cations (Calcium, Magnesium, Potassium, Sodium), Conductivity (or Specific Conductance), Total Dissolved Solids (TDS).  Anions (Bromide, Chloride, Sulfate) and TDS only during December 2011 monitoring event.
	MW-7	B-MW-7	August 2006, May 2007, July 2008, August 2008, December 2009, December 2011	
	MW-8 MW-9 MW-16	MW-8 MW-9 MW-16	May 2007, July 2008, August 2008, December 2009, December 2011	
	MW-6 MW-10 MW-11 MW-12 MW-15 MW-17	MW-6 MW-10 MW-11 MW-12 MW-15 MW-17	May 2007	
	MW-13 MW-14	MW-13 MW-14	May 2007, December 2009, December 2011	

Notes:

\* - Colorado River sample locations are based on distance (in feet) upstream (Up) and downstream (Down) of the confluence of the unnamed tributary and the Colorado River.

+ - Elm Creek sample location is based on distance (in feet) upstream of the confluence of the unnamed tributary and the Colorado River.

Surface Water in Unnamed Tributary and MW-6, MW-10, MW-11, MW-12, and MW-15 were dry during the December 2011 monitoring event

**Table 2**  
**Groundwater and Surface Water Elevation Data**  
**Railroad Commission of Texas**  
**Ballinger Seep, Ballinger Texas**

Sample Location	Gauging Date	Total Depth (feet btoc)	Ground Surface Elevation (feet asl)	Top of Casing Elevation (feet asl)	Depth to Groundwater (feet btoc)	Column Height (feet)	Groundwater Elevation (feet asl)
MW-1	7/21/2006	25.24	1621.40	1620.88	9.54	15.70	1611.34
	8/15/2006				9.51	15.73	1611.37
	8/21/2006				9.69	15.55	1611.19
	4/23/2007				9.34	15.90	1611.54
	5/21/2007				8.09	17.15	1612.79
	5/24/2007				8.61	16.63	1612.27
	5/30/2007				7.93	17.31	1612.95
	7/7/2008				9.86	15.38	1611.02
	8/4/2008				9.83	15.41	1611.05
	12/14/2009				9.41	15.83	1611.47
	12/13/2011**	14.24			10.11	4.13	1610.77
MW-2	7/21/2006	50.05	1621.60	1621.58	21.40	28.65	1600.18
	8/15/2006				18.79	31.26	1602.79
	4/23/2007				18.18	31.87	1603.40
	5/21/2007				17.11	32.94	1604.47
	5/24/2007				17.42	32.63	1604.16
	5/30/2007				16.31	33.74	1605.27
	7/7/2008				17.04	33.01	1604.54
	8/4/2008				16.69	33.36	1604.89
	12/14/2009				17.43	32.62	1604.15
	12/13/2011				50.70		
	MW-3	7/21/2006	14.92	1636.60	1636.28	14.33	0.59
8/15/2006		5.39				9.53	1630.89
8/21/2006		7.13				7.79	1629.15
4/23/2007		3.18				11.74	1633.10
5/21/2007		2.06				12.86	1634.22
5/24/2007		2.11				12.81	1634.17
5/30/2007		2.82				12.10	1633.46
7/7/2008		4.95				9.97	1631.33
8/4/2008		5.30				9.62	1630.98
12/14/2009		6.63				8.29	1629.65
12/13/2011		14.83			8.50	6.33	1627.78
MW-4	7/21/2006	25.13	1621.10	1620.68	20.59	4.54	1600.09
	8/15/2006				10.59	14.54	1610.09
	8/21/2006				10.68	14.45	1610.00
	4/23/2007				10.54	14.59	1610.14
	5/21/2007				8.96	16.17	1611.72
	5/24/2007				9.39	15.74	1611.29
	5/30/2007				9.08	16.05	1611.60
	7/7/2008				10.58	14.55	1610.10
	8/4/2008				10.42	14.71	1610.26
	12/14/2009				10.58	14.55	1610.10
	12/13/2011**	17.70			11.02	6.68	1609.66
MW-5	7/21/2006	55.11	1666.40	1665.96	52.50	2.61	1613.46
	8/15/2006				52.54	2.57	1613.42
	8/21/2006				52.62	2.49	1613.34
	4/23/2007				51.99	3.12	1613.97
	5/21/2007				49.33	5.78	1616.63
	5/24/2007				49.75	5.36	1616.21
	5/30/2007				49.44	5.67	1616.52
	7/7/2008				52.60	2.51	1613.36
	8/4/2008				52.61	2.50	1613.35
	12/14/2009				52.92	2.19	1613.04
	12/13/2011	55.96			53.00	2.96	1612.96

**Table 2**  
**Groundwater and Surface Water Elevation Data**  
**Railroad Commission of Texas**  
**Ballinger Seep, Ballinger Texas**

Sample Location	Gauging Date	Total Depth (feet btoc)	Ground Surface Elevation (feet asl)	Top of Casing Elevation (feet asl)	Depth to Groundwater (feet btoc)	Column Height (feet)	Groundwater Elevation (feet asl)
MW-6	7/21/2006	40.29	1659.30	1658.89	DRY		
	8/15/2006				DRY		
	8/21/2006				DRY		
	4/23/2007				DRY		
	5/21/2007				18.16	22.13	1640.73
	5/24/2007				18.58	21.71	1640.31
	5/30/2007				17.89	22.40	1641.00
	7/7/2008	DRY					
	8/4/2008	39.88			0.41	1619.01	
	12/14/2009	39.95			0.34	1618.94	
	12/13/2011	40.80			40.13	0.67	1618.76
MW-7	7/21/2006	30.23	1609.00	1608.62	DRY		
	8/15/2006				24.80	5.43	1583.82
	8/21/2006				27.45	2.78	1581.17
	4/23/2007				20.15	10.08	1588.47
	5/21/2007				17.11	13.12	1591.51
	5/24/2007				17.23	13.00	1591.39
	5/30/2007				17.58	12.65	1591.04
	7/7/2008				21.43	8.80	1587.19
	8/4/2008				21.32	8.91	1587.30
	12/14/2009				21.75	8.48	1586.87
	12/13/2011				30.37	22.81	7.56
MW-8	4/27/2007	29.65	1607.00	1606.50	DRY		
	5/21/2007				14.35	15.30	1592.15
	5/24/2007				14.45	15.20	1592.05
	5/30/2007				14.45	15.20	1592.05
	7/7/2008				19.39	10.26	1587.11
	8/4/2008				19.72	9.93	1586.78
	12/14/2009				20.90	8.75	1585.60
	12/13/2011				29.84	22.00	7.84
MW-9	4/27/2007	31.57	1610.60	1610.30	29.42	2.15	1580.88
	5/21/2007				21.22	10.35	1589.08
	5/24/2007				21.56	10.01	1588.74
	5/30/2007				21.65	9.92	1588.65
	7/7/2008				23.54	8.03	1586.76
	8/4/2008				24.35	7.22	1585.95
	12/14/2009				24.02	7.55	1586.28
	12/13/2011				31.96	25.01	6.95
MW-10	4/27/2007	59.78	1664.20	1664.00	DRY		
	5/21/2007				59.62	0.16	1604.38
	5/24/2007				46.99	12.79	1617.01
	5/30/2007				59.78	0.00	1604.22
	7/7/2008				DRY		
	8/4/2008				DRY		
	12/14/2009				DRY		
	12/13/2011				60.96	DRY	

**Table 2**  
**Groundwater and Surface Water Elevation Data**  
**Railroad Commission of Texas**  
**Ballinger Seep, Ballinger Texas**

Sample Location	Gauging Date	Total Depth (feet btoc)	Ground Surface Elevation (feet asl)	Top of Casing Elevation (feet asl)	Depth to Groundwater (feet btoc)	Column Height (feet)	Groundwater Elevation (feet asl)
MW-11	4/27/2007	69.75	1664.70	1664.50	DRY		
	5/21/2007				45.70	24.05	1618.80
	5/24/2007				49.08	20.67	1615.42
	5/30/2007				57.29	12.46	1607.21
	7/7/2008	67.50			DRY		
	8/4/2008				DRY		
	12/14/2009				DRY		
	12/13/2011				DRY		
MW-12	4/27/2007	40.01	1664.40	1664.20	DRY		
	5/21/2007				38.51	1.50	1625.69
	5/24/2007				36.21	3.80	1627.99
	5/30/2007				38.47	1.54	1625.73
	7/7/2008	39.67			39.51	0.50	1624.69
	8/4/2008				DRY		
	12/14/2009				DRY		
	12/13/2011				39.66	0.01	1624.54
MW-13	4/27/2007	69.96	1664.70	1664.50	DRY		
	5/21/2007				DRY		
	5/24/2007				DRY		
	5/30/2007				DRY		
	7/7/2008	72.23			DRY		
	8/4/2008				48.43	21.53	1616.07
	12/14/2009				49.64	20.32	1614.86
	12/13/2011				49.85	22.38	1614.65
MW-14	4/27/2007	30.05	1605.80	1605.50	DRY		
	5/21/2007				23.39	6.66	1582.11
	5/24/2007				25.00	5.05	1580.50
	5/30/2007				18.70	11.35	1586.80
	7/7/2008	29.84			19.96	10.09	1585.54
	8/4/2008				20.36	9.69	1585.14
	12/14/2009				21.72	8.33	1583.78
	12/13/2011**				21.71	8.13	1583.79
MW-15	4/27/2007	71.45	1671.80	1671.50	68.67	2.78	1602.83
	5/21/2007				67.01	4.44	1604.49
	5/24/2007				67.31	4.14	1604.19
	5/30/2007				67.35	4.10	1604.15
	7/7/2008	69.95*			68.42	3.03	1603.08
	8/4/2008				68.59	2.86	1602.91
	12/14/2009				68.78	1.17	1602.72
	12/13/2011				68.93	2.54	1602.57
MW-16	4/27/2007	23.79	1601.60	1601.50	15.10	8.69	1586.40
	5/21/2007				13.25	10.54	1588.25
	5/24/2007				13.37	10.42	1588.13
	5/30/2007				13.42	10.37	1588.08
	7/7/2008	23.64			14.56	9.23	1586.94
	8/4/2008				14.84	8.95	1586.66
	12/14/2009				15.09	8.70	1586.41
	12/13/2011				15.68	7.96	1585.82
MW-17	4/27/2007	29.74	1606.20	1606.00	21.44	8.30	1584.56
	5/21/2007				17.20	12.54	1588.80
	5/24/2007				17.40	12.34	1588.60
	5/30/2007				17.42	12.32	1588.58
	7/7/2008	25.02			20.19	9.55	1585.81
	8/4/2008				20.71	9.03	1585.29
	12/14/2009				20.75	8.99	1585.25
	12/13/2011**				21.00	4.02	1585

**Table 2**  
**Groundwater and Surface Water Elevation Data**  
**Railroad Commission of Texas**  
**Ballinger Seep, Ballinger Texas**

Sample Location	Gauging Date	Total Depth (feet btoc)	Ground Surface Elevation (feet asl)	Top of Casing Elevation (feet asl)	Depth to Groundwater (feet btoc)	Column Height (feet)	Groundwater Elevation (feet asl)
Tributary at Seep	8/21/2006	NA	NA	1610.10	2.14	NA	1607.96
	4/23/2007				1.95	NA	1608.15
	5/21/2007				1.95	NA	1608.15
	5/30/2007				1.90	NA	1608.20
	7/7/2008				2.01	NA	1608.09
	8/4/2008				2.01	NA	1608.09
	12/14/2009				NM	NA	NA
Seep Monitor Point	4/23/2007	NA	NA	1611.90	2.80	NA	1609.10
	5/30/2007				2.34	NA	1609.56
	7/7/2008				3.57	NA	1608.33
	8/4/2008				4.51	NA	1607.40
	12/14/2009				NM	NA	NA
Colorado River	8/21/2006	NA	NA	1585.50	0.38	NA	1585.12
	4/23/2007				0.21	NA	1585.29
	5/30/2007			1590.30	4.43	NA	1585.87
	7/7/2008				4.64	NA	1585.66
	8/4/2008				4.53	NA	1585.70
	12/14/2009				NM	NA	NA

Notes:

- NA No Data Available
- NM Field Personnel were unable to locate benchmark/measuring point for locations Tributary at Seep, Seep Monitor Point, and Colorado River. These locations are not depicted on Figures 2, 3, and 4.
- \* Bottom of monitoring well filled in with sediment. Total depth measured in MW-15 during December 2009 was 69.95
- \*\* Total depth gauged to top of root mass inside well casing
- asl above sea level
- DRY Location was dry
- btoc below top of casing

**Table 3  
Surface Water Data Summary  
Railroad Commission of Texas  
Ballinger Seep, Ballinger Texas**

Sample Location	Sample ID	Date	Anions					Cations				Conductivity Result / Rerun (umho/cm)	Total Dissolved Solids (mg/L)	
			Alkalinity, Carbonate (mg/L)	Alkalinity, Bicarbonate (mg/L)	Bromide (mg/L)	Chloride (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)			Sodium (mg/L)
Lower Seep	Seep 1/ Lower Seep 1/PVC-1	7/19/2006	<2	2,400	<2	1,060	<0.5	320	130	38	13	1,000	4,300	2,430
		5/22/2007	<10	308	1.44	1,620	<0.1	321	262	59.6	7.49	778	5,580	3,560
		7/9/2008	<10	264	12.9	2,140	3.5	858	274	66.3	7.09	1,330	8,330	4,660
		12/15/2009	<10	350	3.66	2,730	0.291J	539	419	111	12.1	1,470	9,420	5,840
		12/14/2011	NA	NA	<3.0	7,810	NA	939	NA	NA	NA	NA	NA	NA
Trib-1	SW-Trib-1	7/19/2006	<2	110	<2	1520 / 2,220*	<0.5	599	250	81	15	1,800	7,400	7,410
	SW-Trib-1	5/22/2007	<10	298	2.22	1,920	0.191J	394	396	74.6	5.9	833	6,660	4,060
	SW-Trib-1	7/9/2008	<10	302	6.22	2,240	<0.1	631	371	89.5	10.5	1,030	7,880	5,400
	SW-Trib-1 DUP	7/9/2008	<10	306	5.49J	2,210	<0.1	633	363	92.1	10.2	1,020	7,970	5,440
	SW-Trib-1	8/5/2008	<10	283	5.89	2,440	0.242J	632	399	99.9	10.4	1,070	8,510	5,460
	SW-Trib-1	12/15/2009	<10	330	4.48	3,380	0.316J	630	467	127	13.6	1,700	11,200	7,050
	SW-Trib-2	12/14/2011	DRY											
Trib-2	SW-Trib-2	7/19/2006	<2	140	<2	1,570	<0.5	621	260	88	17	1,900	7,700	4,840
	SW-Trib-2 DUP	7/19/2006	<2	150	<2	1,580	<0.5	631	260	87	16	1,900	7,700	4,840
	SW-Trib-2	5/22/2007	<10	213	2.52	2,130	<0.1	482	317	77.4	7.48	1,000	7,140	4,660
	SW-Trib-2	12/15/2009	<10	229	4.4	3,420	<0.1	682	446	131	11.8	1,740	11,200	7,240
	SW-Trib-3	12/14/2011	DRY											
Trib-3	SW-Trib-3	5/22/2007	<10	223	2.96	2,370	0.175J	507	466	130	11.1	1,950	8,250	5,410
	SW-Trib-3	12/15/2009	DRY											
	SW-Trib-3	12/14/2011	DRY											
Trib-4	SW-Trib-4	5/22/2007	<10	303	6.38	5,290	<0.1	604	494	117	19.2	3,140	15,600	10,200
	SW-Trib-4	12/15/2009	DRY											
	SW-Trib-4	12/14/2011	DRY											
Trib-5	SW-Trib-5	5/22/2007	<10	248	5.56	4,180	<0.1	548	355	97.6	17.2	2,760	13,600	8,820
	SW-Trib-5	12/15/2009	DRY											
	SW-Trib-5	12/14/2011	DRY											
Trib-6	SW-Trib-6	5/22/2007	<10	186	6.15	5,300	0.641	575	399	108	11.1	2,940	15,300	9,600
	SW-Trib-6	12/15/2009	DRY											
	SW-Trib-6	12/14/2011	DRY											
CR-50'-UP	SW-CR-Up/SW-CR-50' Up	7/20/2006	<2	140	<2	621	<0.5	1,570	370	140	9.1	380	3,600	3,590
	SW-CR-Up/SW-CR-50' Up	5/22/2007	<10	188	0.656J	222	0.852	319	131	55.2	7.5	130	1,520	1,030
	SW-CR-Up/SW-CR-50' Up	7/9/2008	<10	125	6.77	793	1.66	1,210	311	138	10.1	400	4,300	3,140
	SW-CR-Up/SW-CR-50' Up	8/5/2008	<10	127	1.68	468	1.79	1,370	380	138	6.08	234	3,530	2,970
	SW-CR-Up/SW-CR-50' Up DUP	8/5/2008	<10	128	1.69	478	1.79	1,380	375	137	5.94	230	3,540	2,960
	SW-CR-50' Up	12/15/2009	<10	159	1.26	462	4.76	1,410	460	153	5.55	253	3,720	3,050
CR-250' Up	SW-CR-50' Up	12/14/2011	NA	NA	<0.30	478	NA	1,530	NA	NA	NA	NA	NA	2,940
	SW-CR-250' Up	5/22/2007	<10	189	0.636J	228	0.854	331	128	56.5	6.66	127	1,500	1,000
	SW-CR-250' Up	12/15/2009	<10	159	1.26	458	4.67	1,400	458	150	5.5	249	3,750	3,020
CR-1,000' Up	SW-CR-250' Up**	12/14/2011	NA	NA	<0.30	174	NA	528	NA	NA	NA	NA	NA	1,060
	SW-CR-1,000' Up	5/22/2007	<10	190	0.655J	229	0.874	336	134	57.8	7.25	138	1,520	1,030
	SW-CR-1,000' Up	12/15/2009	<10	170	1.3	473	4.8	1,440	465	154	5.58	252	3,720	3,040
CR-2,500' Up	SW-CR-1,000' Up	12/14/2011	NA	NA	<0.30	473	NA	1,510	NA	NA	NA	NA	NA	2,980
	SW-CR-2,500' Up	5/23/2007	<10	206	0.809J	351	1.57	629	223	79.9	8.19	191	2,350	1,610
	SW-CR-2,500' Up	12/15/2009	<10	170	1.7	456	5.25	1,440	483	150	5.47	246	3,690	3,090
SW-CR-2,500' Up	12/14/2011	NA	NA	<0.30	475	NA	1,540	NA	NA	NA	NA	NA	3,000	

**Table 3  
Surface Water Data Summary  
Railroad Commission of Texas  
Ballinger Seep, Ballinger Texas**

Sample Location	Sample ID	Date	Anions					Cations				Conductivity Result / Rerun (umho/cm)	Total Dissolved Solids (mg/L)	
			Alkalinity, Carbonate (mg/L)	Alkalinity, Bicarbonate (mg/L)	Bromide (mg/L)	Chloride (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)			Sodium (mg/L)
EC-2,500' Up	SW-EC-2,500' Up	5/23/2007	<2	188	0.551J	158	0.463J	161	84.2	43.2	7.56	87	1,100	676
	SW-EC-2,500' Up	12/15/2009	<10	268	2.21	563	5.06	1,350	331.0	208	6.61	386	4,020	3,180
	SW-EC-2,500' Up	12/14/2011	NA	NA	<0.30	403	NA	1,020	NA	NA	NA	NA	NA	2,350
CR-50' Down	SW-CR-Down/SW-CR-50' Down	7/20/2006	<2	140	<2	626 / 620*	0.878	1,560	350	140	10	380	3,700	2,580
	SW-CR-Down/SW-CR-50' Down	5/22/2007	<10	189	0.633J	226	<0.5	323	127	54.2	7.08	130	1,520	1,010
	SW-CR-Down/SW-CR-50' Down	7/9/2008	<10	123	7.11	787	1.81	1,200	305	133	10.1	391	4,290	3,220
	SW-CR-Down/SW-CR-50' Down	8/5/2008	<10	127	1.69	478	1.79	1,540	373	137	6.09	235	3,510	2,960
	SW-CR-Down/SW-CR-50' Down	12/15/2009	<10	157	1.27	457	4.69	1,400	444	147	5.77	242	3,710	3,070
	SW-CR-Down/SW-CR-50' Down	12/14/2011	NA	NA	<0.30	470	NA	1,510	NA	NA	NA	NA	NA	2,870
CR-500' Down	SW-CR-500' Down	5/23/2007	<10	194	0.639J	240	0.866	355	143	59	7.84	132	1,660	1,100
	SW-CR-500' Down DUP	5/23/2007	<10	195	0.609J	240	0.876	351	142	59.7	8.12	136	1,660	1,100
	SW-CR-500' Down	12/15/2009	<10	164	1.27	463	4.58	1,390	456	153	5.51	253	3,780	3,060
	SW-CR-500' Down	12/14/2011	NA	NA	<0.30	462	NA	1,500	NA	NA	NA	NA	NA	2,930
CR-900' Down	SW-CR-900' Down	5/22/2007	<10	189	0.611J	218	0.835	346	128	55.9	7.12	135	1,500	1,030
	SW-CR-900' Down	12/15/2009	<10	166	1.26	481	4.74	1,440	457	157	5.61	254	3,720	3,060
	SW-CR-900' Down	12/14/2011	NA	NA	<0.30	469	NA	1,490	NA	NA	NA	NA	NA	2,870
CR-1,500' Down	SW-CR-1,500' Down	5/23/2007	<10	195	0.634J	233	0.894	340	136	55.6	7.67	126	1,610	1,050
	SW-CR-1,500' Down	12/15/2009	<10	166	1.67	471	4.84	1,430	403	134	5.52	218	3,740	3,040
	SW-CR-1,500' Down	12/14/2011	NA	NA	<0.30	465	NA	1,470	NA	NA	NA	NA	NA	2,860
CR-2,500' Down	SW-CR-2,500' Down	5/23/2007	<10	195	0.627J	234	0.879	340	138	57.2	7.89	127	1,610	1,050
	SW-CR-2,500' Down	12/15/2009	<10	172	1.76	470	4.85	1,430	448	151	5.43	244	3,760	3,090
	SW-CR-2,500' Down	12/14/2011	NA	NA	<0.30	455	NA	1,440	NA	NA	NA	NA	NA	2,820

Notes:  
mg/L milligrams per liter  
-- Not Analyzed  
< Not Detected at or above listed value (mg/L)  
J Estimated Detection  
DRY Sample station dry during December 2011 sampling event. No sample collected.  
DUP Duplicate Sample  
\* Water sample collected July 2007 analyzed for chlorides using Method 300.0 and Method 4500B  
umhos/cm micromhos per centimeter  
\*\* sample damaged during shipping on 12/17/2011, sample should be considered estimated with a likely low bias

**Table 4**  
**Groundwater Data Summary**  
**Railroad Commission of Texas**  
**Ballinger Seep, Ballinger Texas**

Sample Location	Sample	Date	Anions						Cations				Conductivity Result / Rerun (umho/cm)	Total Dissolved Solids (mg/L)
			Alkalinity, Carbonate	Alkalinity, Bicarbonate	Bromide	Chloride	Nitrate	Sulfate	Calcium	Magnesium	Potassium	Sodium		
			(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)		
MW-1	MW-1	7/19/2006	<2	380	<2	1,550	<0.5	657	330	83	15	1,700	7,500	4,980
	MW-1 DUP	7/19/2006	<2	380	<2	1,530	2.6	657	330	82	14	1,700	7,300	4,790
	MW-1	5/24/2007	<10	293	2.52	2,290	0.456J	470	478	85.2	5.84	970	7,650	5,260
	MW-1 DUP	5/24/2007	<10	291	2.59	2,260	0.467J	473	466	86.6	5.59	944	7,610	4,850
	MW-1	7/8/2008	<10	320	12.7	3,020	2.92	876	512	132	10.6	1,500	10,400	7,080
	MW-1	8/5/2008	<10	300	8.58	3,330	1.18	744	521	135	13.1	1,440	11,100	7,380
	MW-1	12/14/2009	<10	321	5.36	4,260	0.347J	663	725	154	16.8	2,030	14,700	8,990
MW-1	12/15/2011	NA	NA	<3.0	6,480	NA	865	NA	NA	NA	NA	NA	12,500	
MW-2	MW-2	7/20/2006	<2	310	<2	3,860	13	734	1,300	550	59	9,100	3200 / 4930	23,300
	MW-2	5/24/2007	<10	291	7.88	6,750	<0.1	736	936	257	14.2	2,960	19,000	13,100
	MW-2	7/9/2008	<10	291	34.5	4,330	<0.1	816	596	177	9.9	1,850	15,700	9,680
	MW-2	8/5/2008	<10	299	6.33	4,110	<0.1	786	588	162	9.91	1,730	14,600	8,970
	MW-2	12/14/2009	<10	290	<3	4,540	<0.1	853	731	211	13	2,140	15,300	9,510
	MW-2	12/14/2011	NA	NA	<3.0	7,940	NA	1,420	NA	NA	NA	NA	NA	15,700
MW-3	MW-3	7/20/2006	<2	150	<2	3,050	19	1,020	820	220	44	5,600	2000 / 2000	14,600
	MW-3	5/24/2007	<10	268	12.4	13,300	<0.1	1,250	957	229	22.3	6,370	35,000	23,500
	MW-3	7/8/2008	<10	265	38.9J	18,200	<0.2	1,790	1,720	487	17.2	8,890	56,800	37,600
	MW-3	8/5/2008	<10	237	32.8	21,200	<0.1	1,750	2,180	622	17.8	8,320	61,700	38,000
	MW-3	12/15/2009	<10	187	33.7	27,100	<1	2,110	3,010	830	20.7	12,800	86,300	50,700
	MW-3-DUP	12/15/2009	<10	186	34.8	27,300	<1	2,120	2,910	803	20.5	12,400	84,100	50,300
	MW-3	12/14/2011	NA	NA	<3.0	26,600	NA	1,980	NA	NA	NA	NA	NA	48,000
MW-4	MW-4	7/20/2006	<2	190	<2	2,440	16	1,410	920	320	45	3,000	15,000	11,700
	MW-4	5/24/2007	<10	310	2.35	2,160	0.222J	463	592	138	5.85	1,180	7,340	4,860
	MW-4	7/9/2008	<10	321	7.4	4,680	<0.1	1,100	916	243	7.4	1,750	17,300	11,700
	MW-4	8/5/2008	<10	332	7.29	4,650	<0.1	1,170J	996	260	8.32	1,820	17,400	11,100
	MW-4	12/14/2009	<10	392	6.25J	5,180	<1	1,250	1,320	285	12.1	2,280	18,800	11,800
	MW-4	12/14/2011	NA	NA	<3.0	8,700	NA	1,560	NA	NA	NA	NA	NA	18,000
MW-5	MW-5	7/20/2006	<2	300	<2	5,920	1,900	554	1,200	510	240	21,000	57,000	38,900
	MW-5	5/25/2007	<10	246	13	10,500	1.15	839	1,040	455	27.3	4,890	25,400	17,000
	MW-5	7/8/2008	<10	263	39.8J	18,400	2.67	1,310	1,830	980	53.8	7,620	56,600	39,100
	MW-5 DUP	7/8/2008	<10	264	41.6J	19,800	2.16	1,360	1,920	1,000	55.1	7,850	56,300	38,800
	MW-5	8/6/2008	<10	255	30	19,000	1.87J	1,440	1,780	878	63	8,850	58,400	37,000
	MW-5 DUP	8/6/2008	<10	259	80.2	18,500	16.8	1,360	1,820	894	58.2	8,520	59,800	37,800
	MW-5	12/15/2009	<10	280	28.2	22,700	1.17J	1,390	2,180	1,140	68	9,660	69,800	42,500
MW-5	12/14/2011	NA	NA	<3.0	23,200	NA	1,250	NA	NA	NA	NA	NA	40,300	

**Table 4**  
**Groundwater Data Summary**  
**Railroad Commission of Texas**  
**Ballinger Seep, Ballinger Texas**

Sample Location	Sample	Date	Anions						Cations				Conductivity Result / Rerun (umho/cm)	Total Dissolved Solids (mg/L)
			Alkalinity, Carbonate (mg/L)	Alkalinity, Bicarbonate (mg/L)	Bromide (mg/L)	Chloride (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)		
MW-6	MW-6	5/25/2007	<10	280	14.3	10,600	6	785	1,360	303	25.6	4,840	29,300	20,300
	MW-6	12/15/2009	DRY											
	MW-6	12/14/2011	DRY											
MW-7	MW-7	8/15/2006	<2	290	<2	1,880	<0.5	1,840	1,000	530	19	990	110000 / 4350	54600 / 8600
	MW-7	5/23/2007	<10	449	2.78	2,350	0.26J	404	427	124	5.82	1,100	7,860	5,180
	MW-7	7/8/2008	<10	257	10.1	6,140	<0.1	1,520	1,450	652	14.5	1,520	21,800	16,400
	MW-7	8/5/2008	<10	253	9.25	6,700	0.181J	1,390	1,350	603	14.3	1,440	22,600	15,400
	MW-7	12/14/2009	<10	261	13.3	12,000	<1	1,700	2,620	1,420	21.4	2,720	38,400	26,000
	MW-7	12/14/2011	NA	NA	<3.0	16,600	NA	1,740	NA	NA	NA	NA	NA	34,600
MW-8	MW-8	5/23/2007	<10	482	2.03	1,750	0.672	301	271	69.2	2.97	917	6,190	3,940
	MW-8	7/9/2008	<10	410	11	1,930	1.55	409	374	130	5	742	6,820	4,800
	MW-8	8/5/2008	<10	401	3.04	1,750	0.208J	420	358	129	5.36	702	6,290	4,170
	MW-8	12/14/2009	<10	354	6.61J	5,300	<1	1,930	1,520	749	15.5	1,640	19,400	13,400
	MW-8	12/14/2011	NA	NA	<3.0	12,300	NA	2,380	NA	NA	NA	NA	NA	25,000
MW-9	MW-9	5/25/2007	<10	213	7.21	6,280	<0.1	1,520	1,350	612	29.7	1,880	17,300	12,500
	MW-9	7/8/2008	<10	245	10	6,540	0.14J	1,690	1,310	561	22.1	1,810	23,600	15,700
	MW-9	8/5/2008	<10	247	9.34	6,320	0.156J	1,590	1,300	552	22	1,790	22,400	15,000
	MW-9	12/14/2009	<10	228	7.2J	6,750	<1	1,750	1,720	663	23.7	1,970	22,900	15,700
	MW-9 DUP	12/14/2009	<10	230	6.99J	6,680	<1	1,710	1,710	655	23.8	1,920	22,800	15,000
	MW-9	12/14/2011	NA	NA	<3.0	11,600	NA	2,150	NA	NA	NA	NA	NA	23,000
	MW-9 DUP	12/14/2011	NA	NA	<3.0	11,700	NA	2,170	NA	NA	NA	NA	NA	24,000
MW-10	MW-10	5/25/2007	<10	344	2.3	670	0.345J	41	193	19.1	1.44	270	2,400	1,450
	MW-10	12/15/2009	DRY											
	MW-10	12/14/2011	DRY											
MW-11	MW-11	5/25/2007	<10	321	0.699J	516	<0.1	229	258	69.6	6.31	157	2,380	1,480
	MW-11	12/15/2009	DRY											
	MW-11	12/14/2011	DRY											
MW-12	MW-12	5/22/2007	<10	293	6.18	4,610	0.79	376	662	271	11	1,810	14,000	9,090
	MW-12	5/25/2007	<10	397	3.42	1,000	1.74	91.7	223	62.9	3.79	483	3,450	2,100
	MW-12	12/15/2009	DRY											
	MW-12	12/14/2011	DRY											
MW-13	MW-13	8/6/2008	<10	213	7.33	2,330	0.852	1,280	500	360	10.8	850	8,870	6,030
	MW-13	12/15/2009	<10	145	3.43	2,060	<0.1	1,620	459	345	10.6	941	8,390	5,920
	MW-13	12/14/2011	NA	NA	<0.30	1,180	NA	2,010	NA	NA	NA	NA	NA	4,990
MW-14	MW-14	5/23/2007	<10	227	0.798J	793	<0.1	1,400	433	194	11.5	328	4,440	3,380
	MW-14	12/14/2009	<10	562	11.4	8,570	<1	3,290	2,790	1540	20.4	2,950	31,800	19,800
	MW-14	12/14/2011	NA	NA	<3.0	10,800	NA	4,160	NA	NA	NA	NA	NA	23,100
MW-15	MW-15	5/25/2007	<10	239	0.964J	484	<0.1	1,280	234	146	8.04	375	3,490	2,690
	MW-15	12/15/2009	DRY											
	MW-15	12/14/2011	DRY											

**Table 4**  
**Groundwater Data Summary**  
**Railroad Commission of Texas**  
**Ballinger Seep, Ballinger Texas**

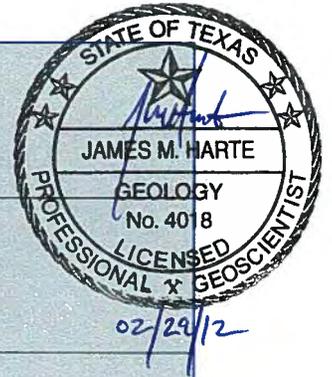
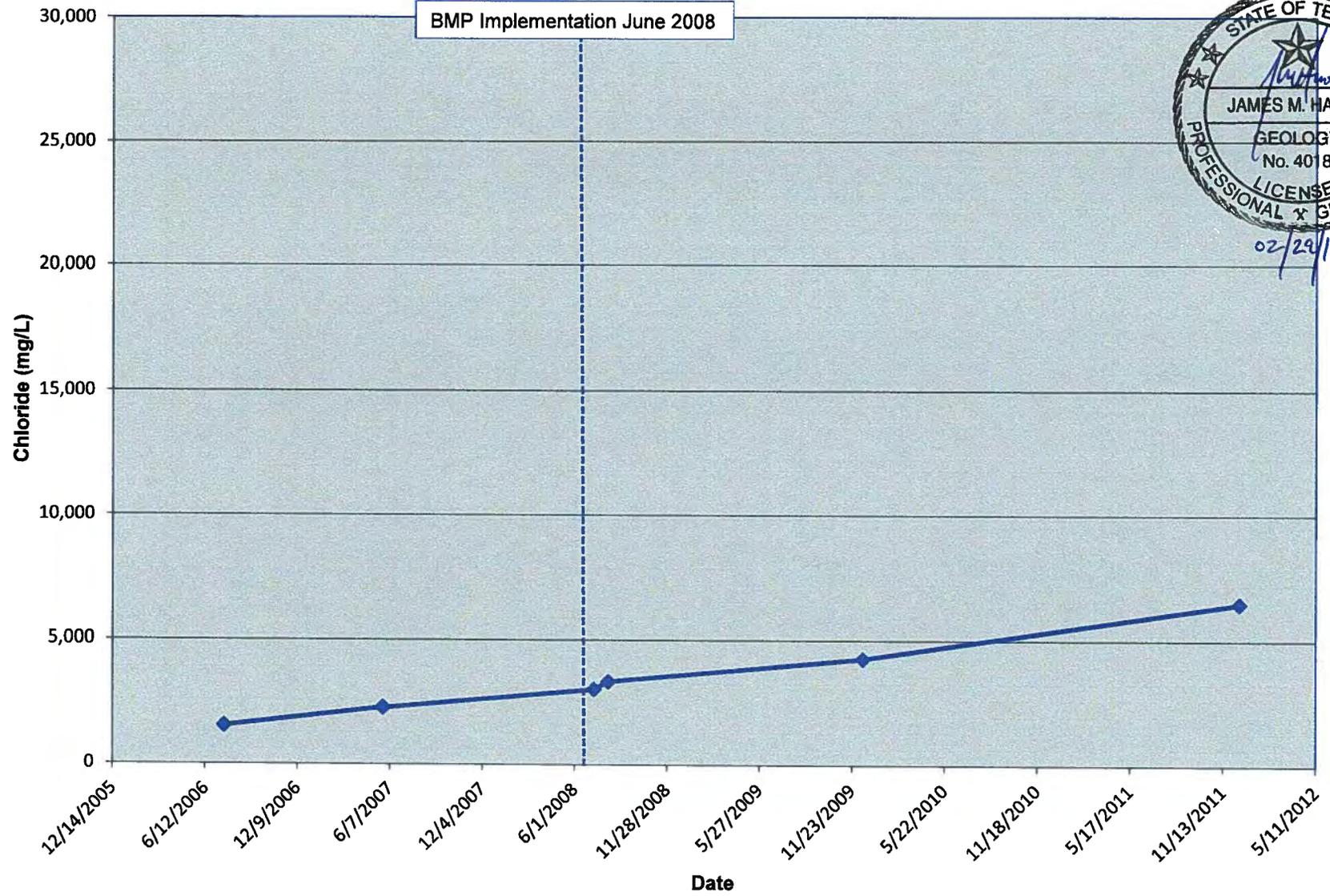
Sample Location	Sample	Date	Anions						Cations				Conductivity Result / Rerun (umho/cm)	Total Dissolved Solids (mg/L)
			Alkalinity, Carbonate	Alkalinity, Bicarbonate	Bromide	Chloride	Nitrate	Sulfate	Calcium	Magnesium	Potassium	Sodium		
			(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)		
MW-16	MW-16	5/24/2007	<10	179	5.32	4,930	<0.1	1,120	888	381	25.6	1,630	14,800	11,300
	MW-16	7/9/2008	<10	264	6.37	8,630	<0.1	1,500	1,630	623	11	2,910	30,000	21,100
	MW-16	8/6/2008	<10	248	11.6	7,990	0.252J	1,410	1,480	614	12.1	2,620	26,900	16,800
	MW-16	12/15/2009	<10	237	10.8	11,000	<1	2,220	2,380	1,170	19	2,980	34,600	22,800
	MW-16	12/14/2011	NA	NA	<3.0	10,900	NA	1,730	NA	NA	NA	NA	NA	23,700
MW-17	MW-17	5/24/2007	<10	313	<0.3	36.6	0.876	272	80.3	47.1	1.32	98.3	1,130	740
	MW-17	12/15/2009	<10	341	<3	2,700	<1	2,650	2,240	522	13.7	1,320	10,900	8,030
	MW-17	12/14/2011	NA	NA	<0.30	1,910	NA	2,400	NA	NA	NA	NA	NA	6,940

Notes:

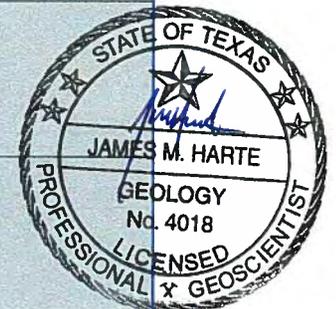
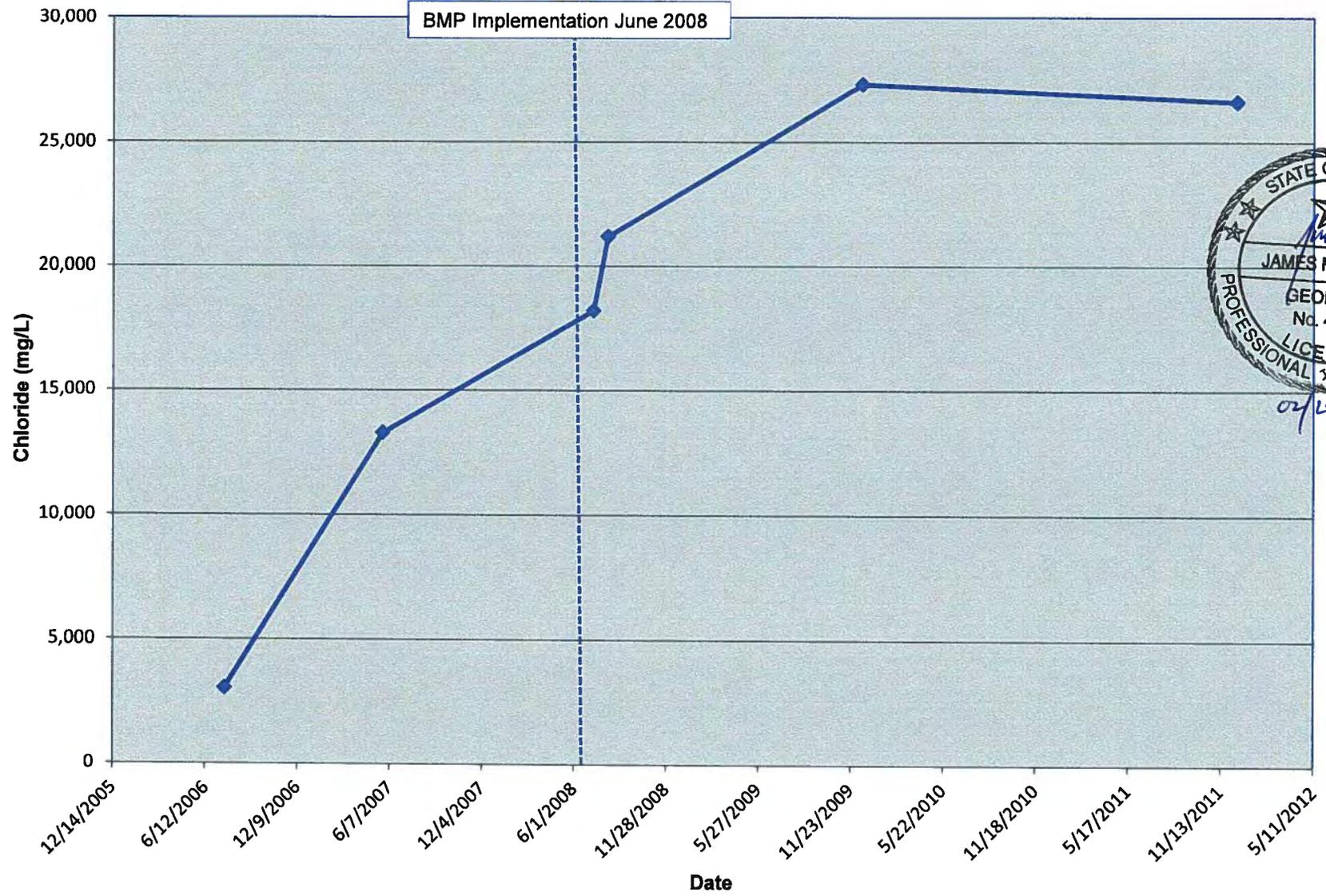
- mg/L milligrams per liter
- < Not Detected at or above listed value (mg/L)
- J Estimated Detection
- DRY Sample station dry during December 2009 sampling event. No sample collected.
- DUP Duplicate Sample
- \* Water sample collected July 2007 analyzed for chlorides using Method 300.0 and Method 4500B
- umhos/cm micromhos per centimeter

## GRAPHS

**GRAPH 1. Chloride Concentrations in MW-1  
Shallow Groundwater Zone**

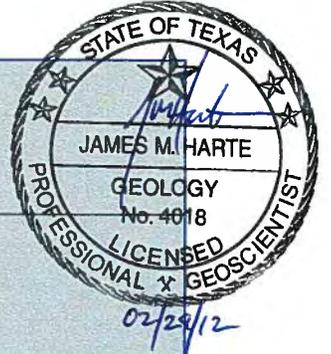
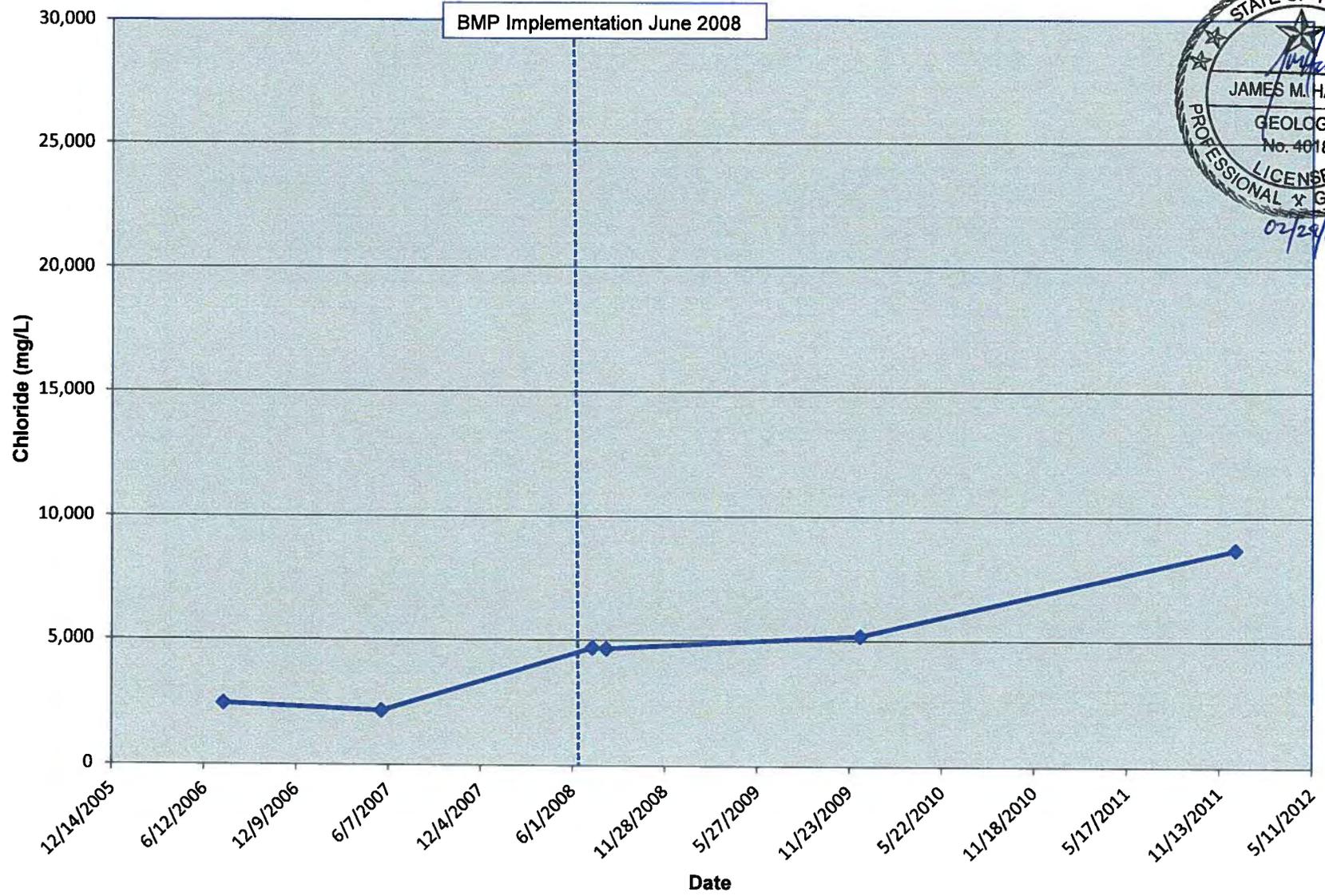


**GRAPH 2. Chloride Concentrations in MW-3  
Shallow Groundwater Zone**

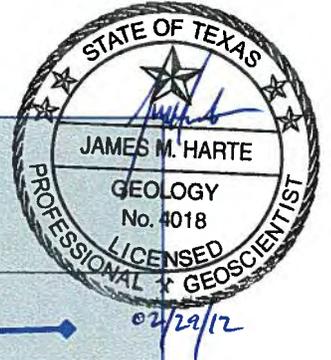
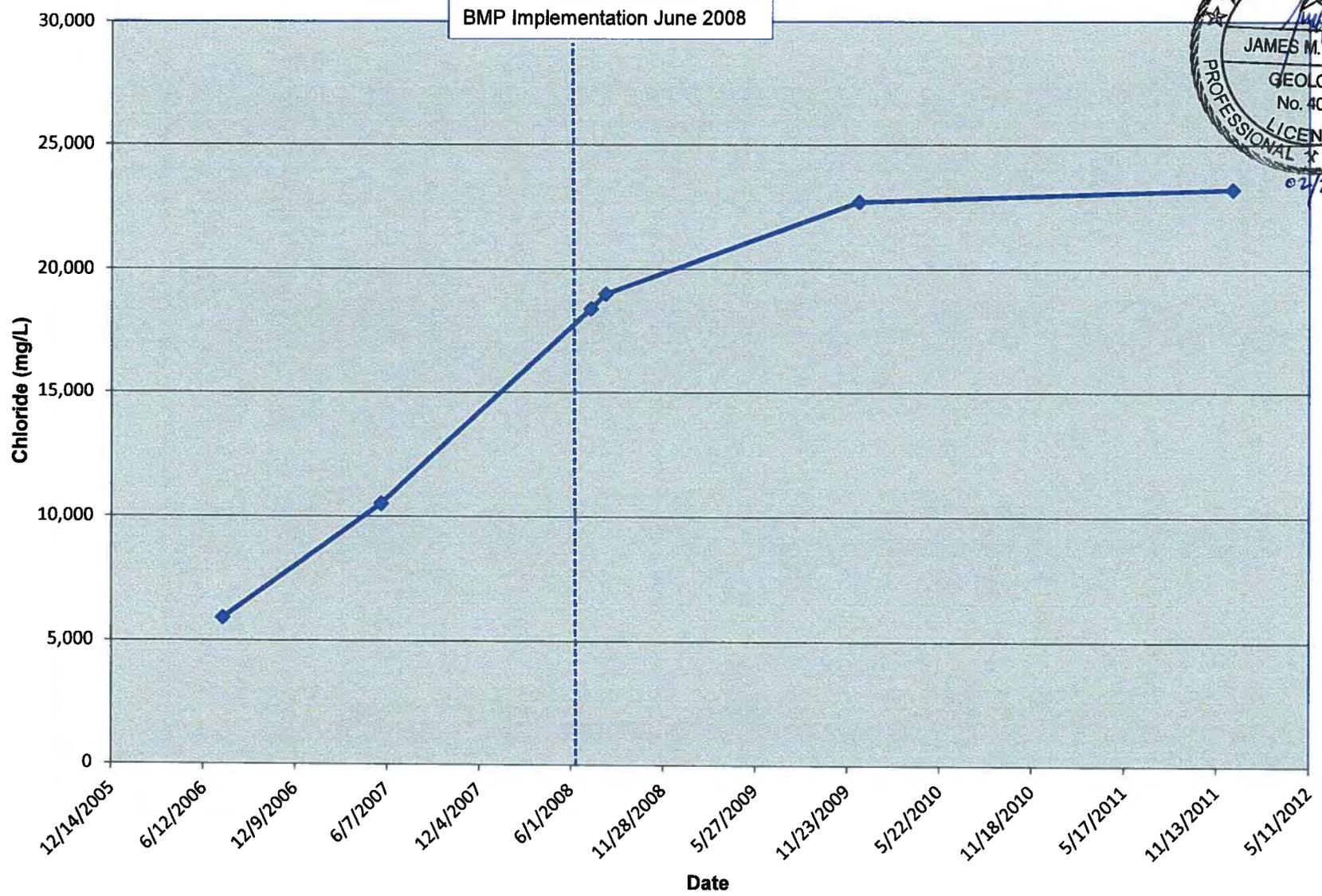


02/29/12

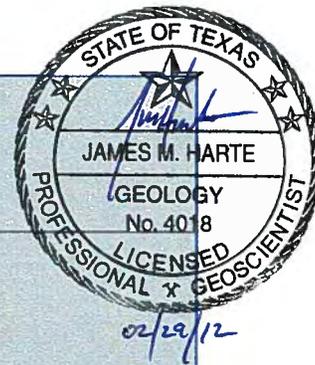
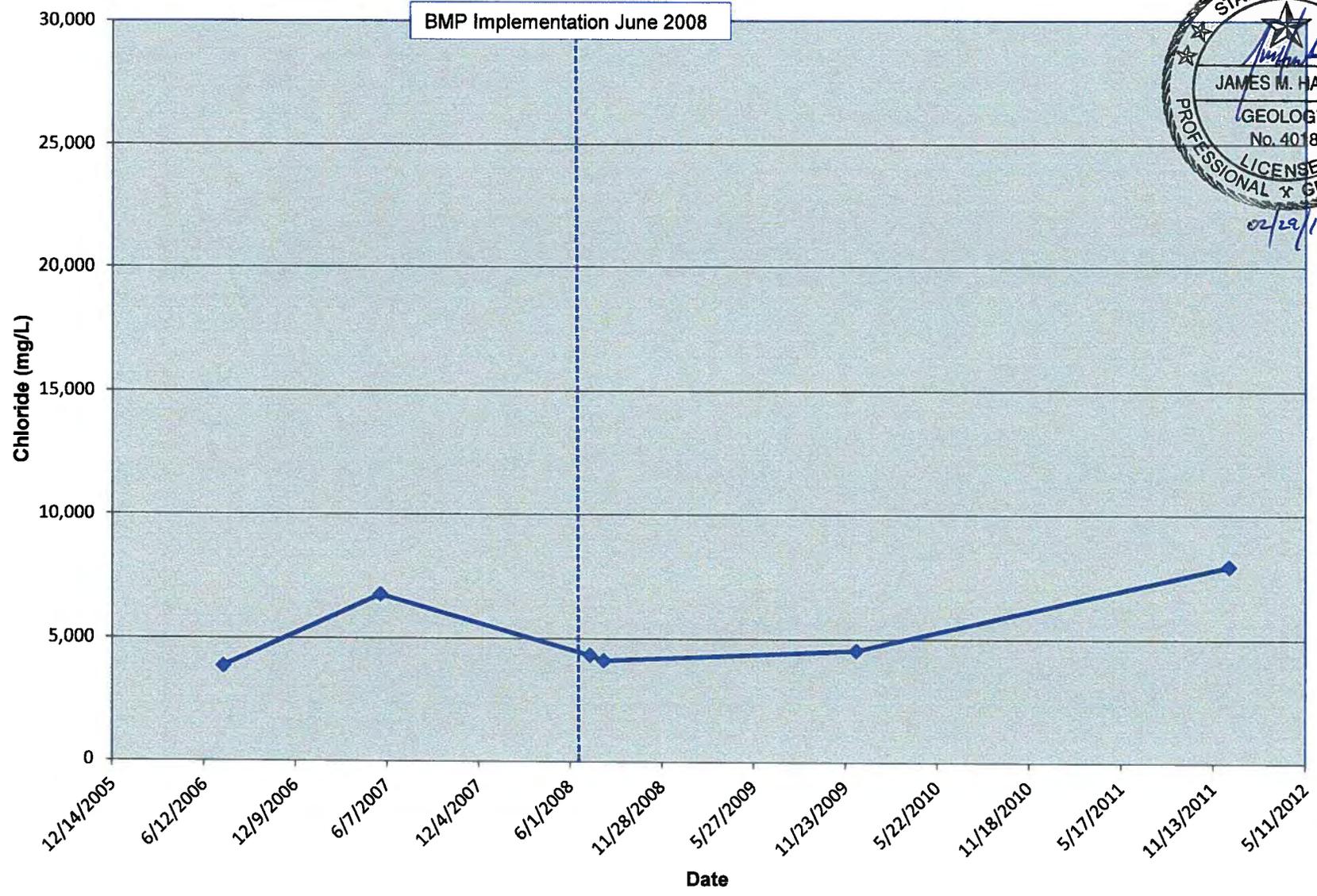
**GRAPH 3. Chloride Concentrations in MW-4  
Shallow Groundwater Zone**



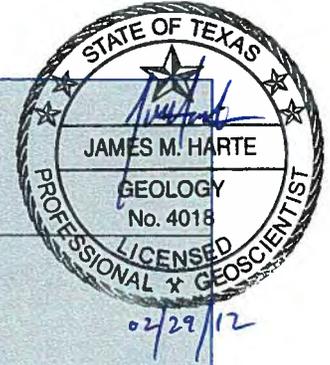
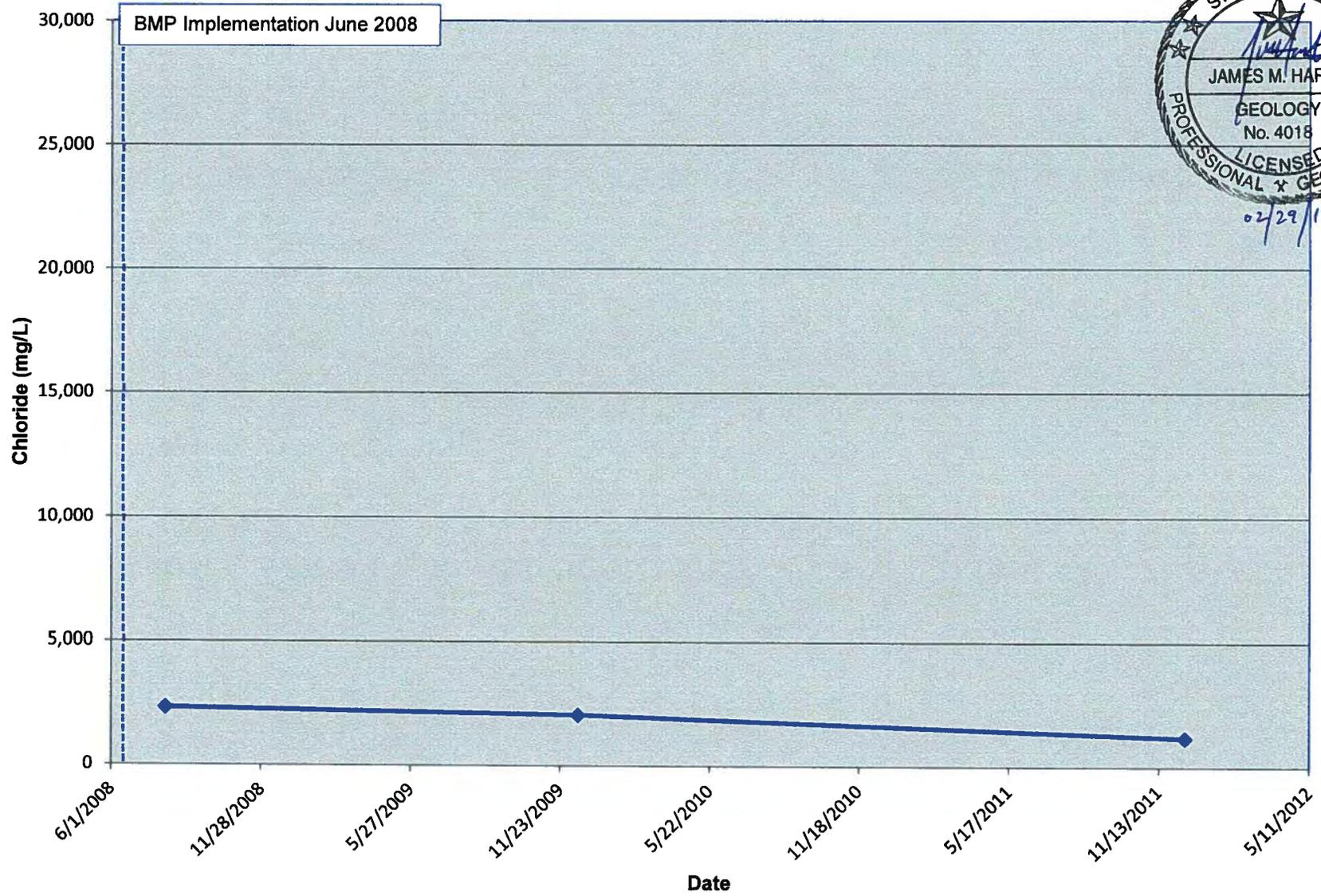
**GRAPH 4. Chloride Concentrations in MW-5  
Deeper Groundwater Zone**



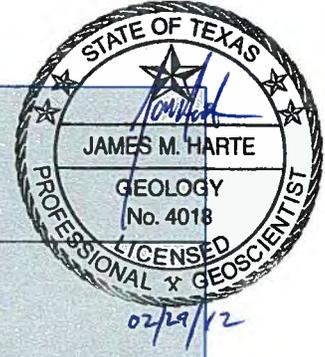
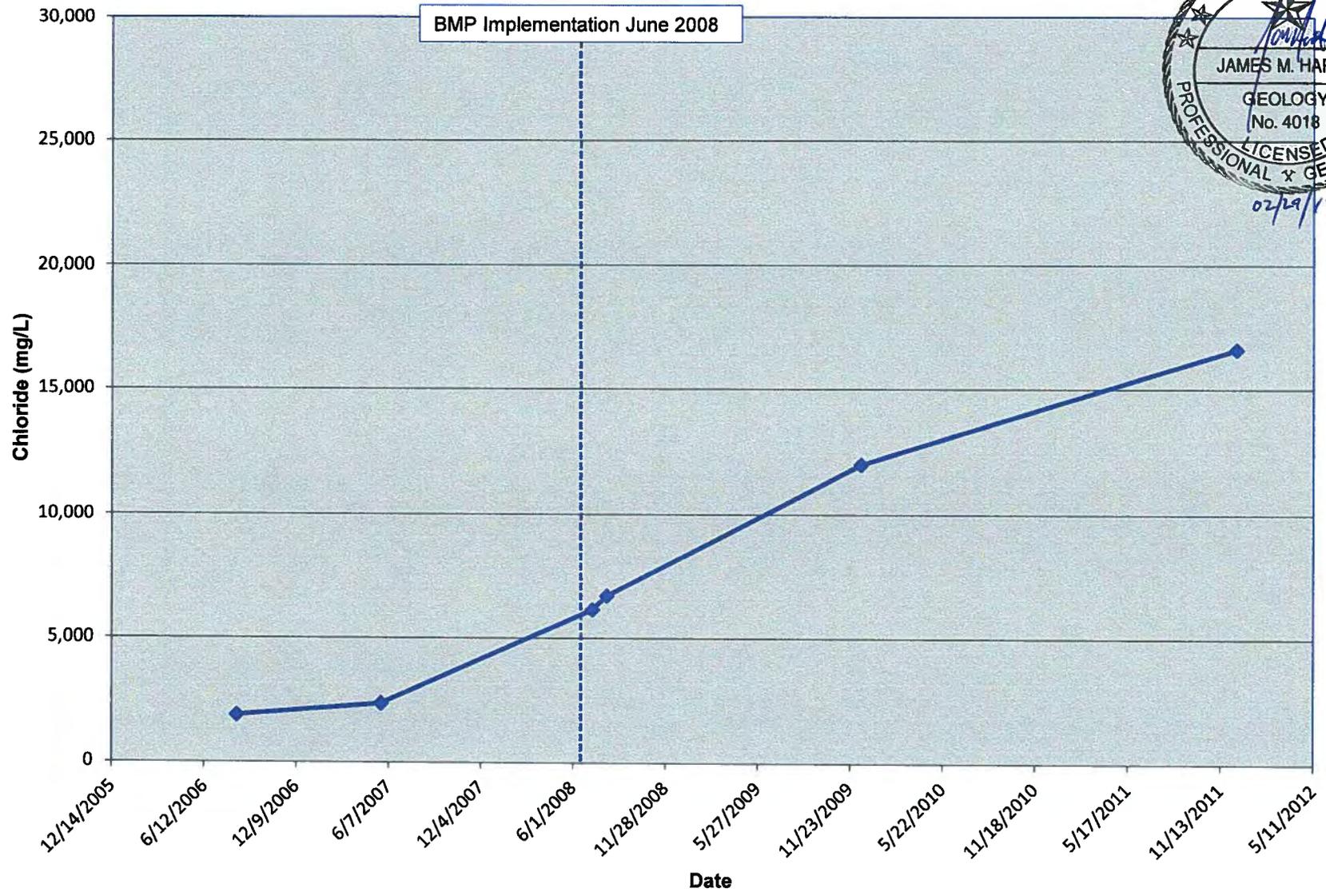
**GRAPH 5. Chloride Concentrations in MW-2  
Deeper Groundwater Zone**



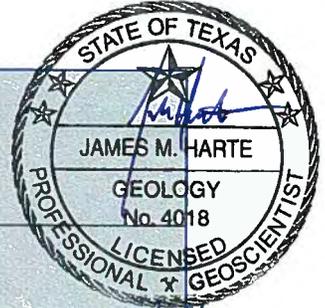
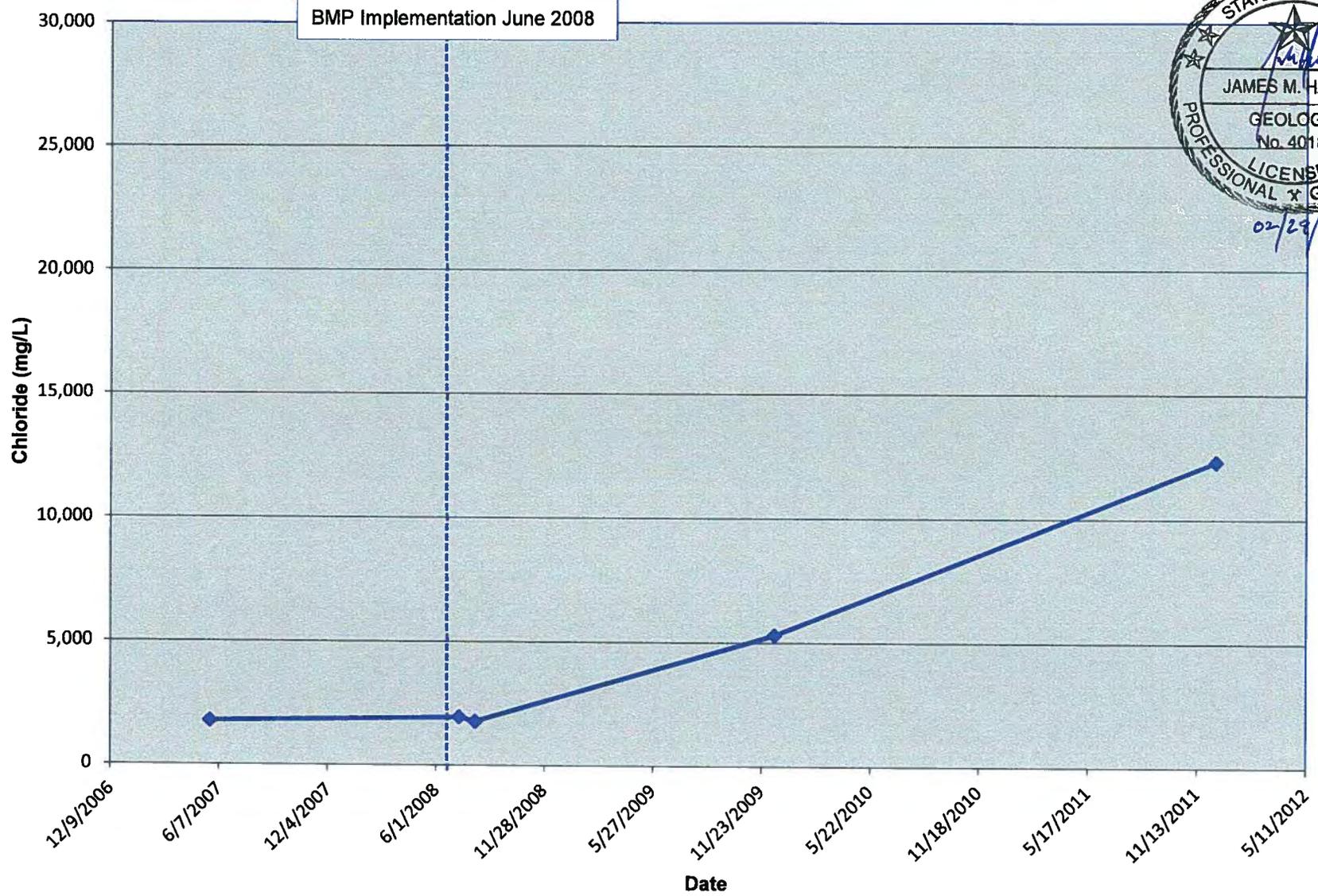
**GRAPH 6. Chloride Concentrations in MW-13  
Deeper Groundwater Zone**



**GRAPH 7. Chloride Concentrations in MW-7  
Alluvial Groundwater Zone**

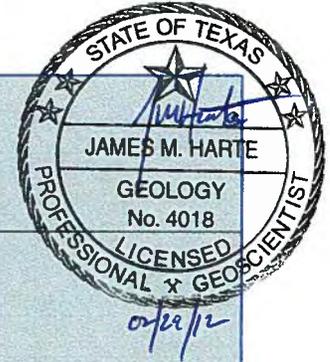
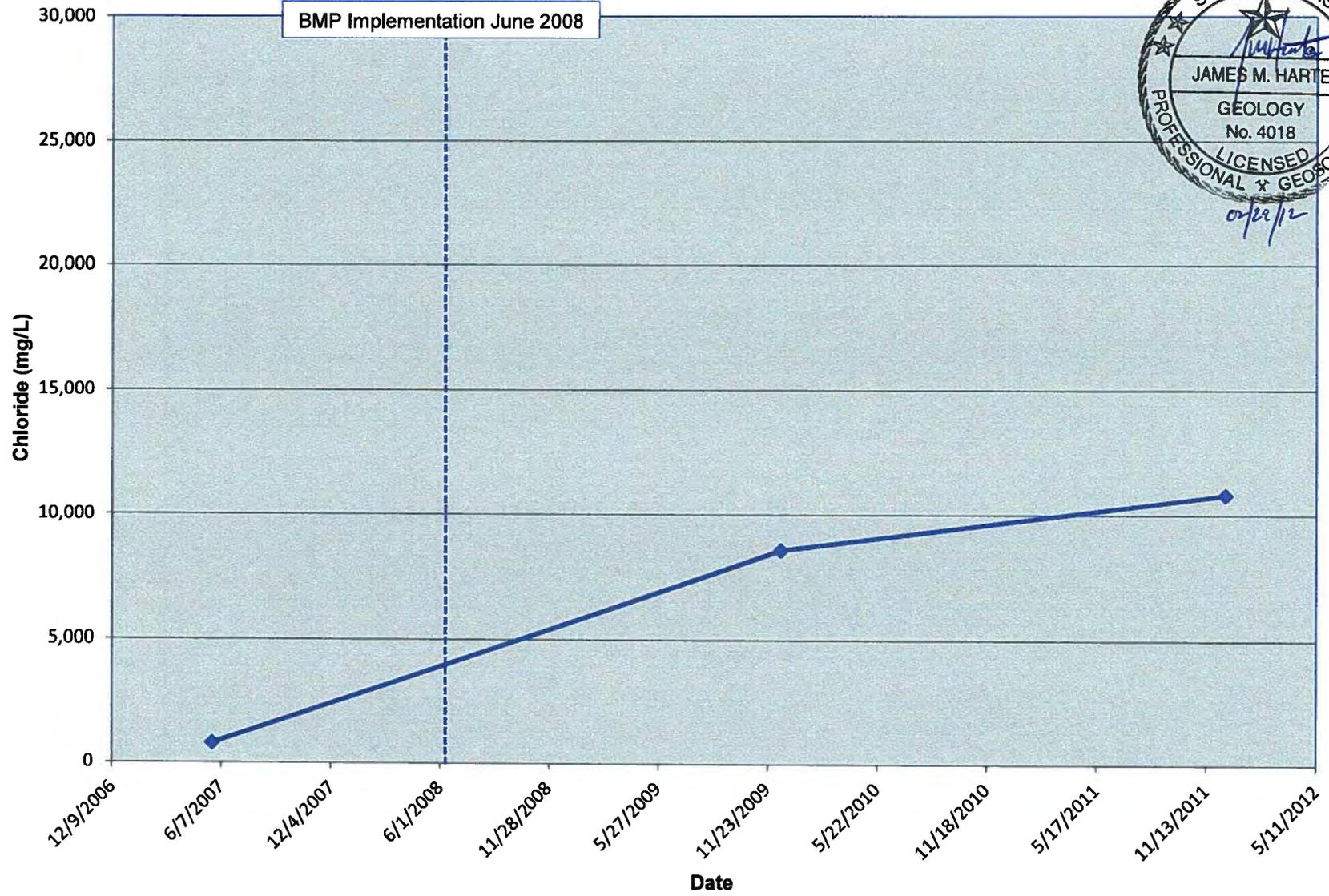


**GRAPH 8. Chloride Concentrations in MW-8  
Alluvial Groundwater Zone**

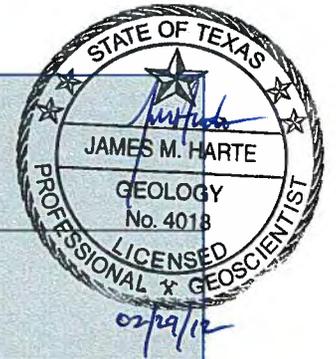
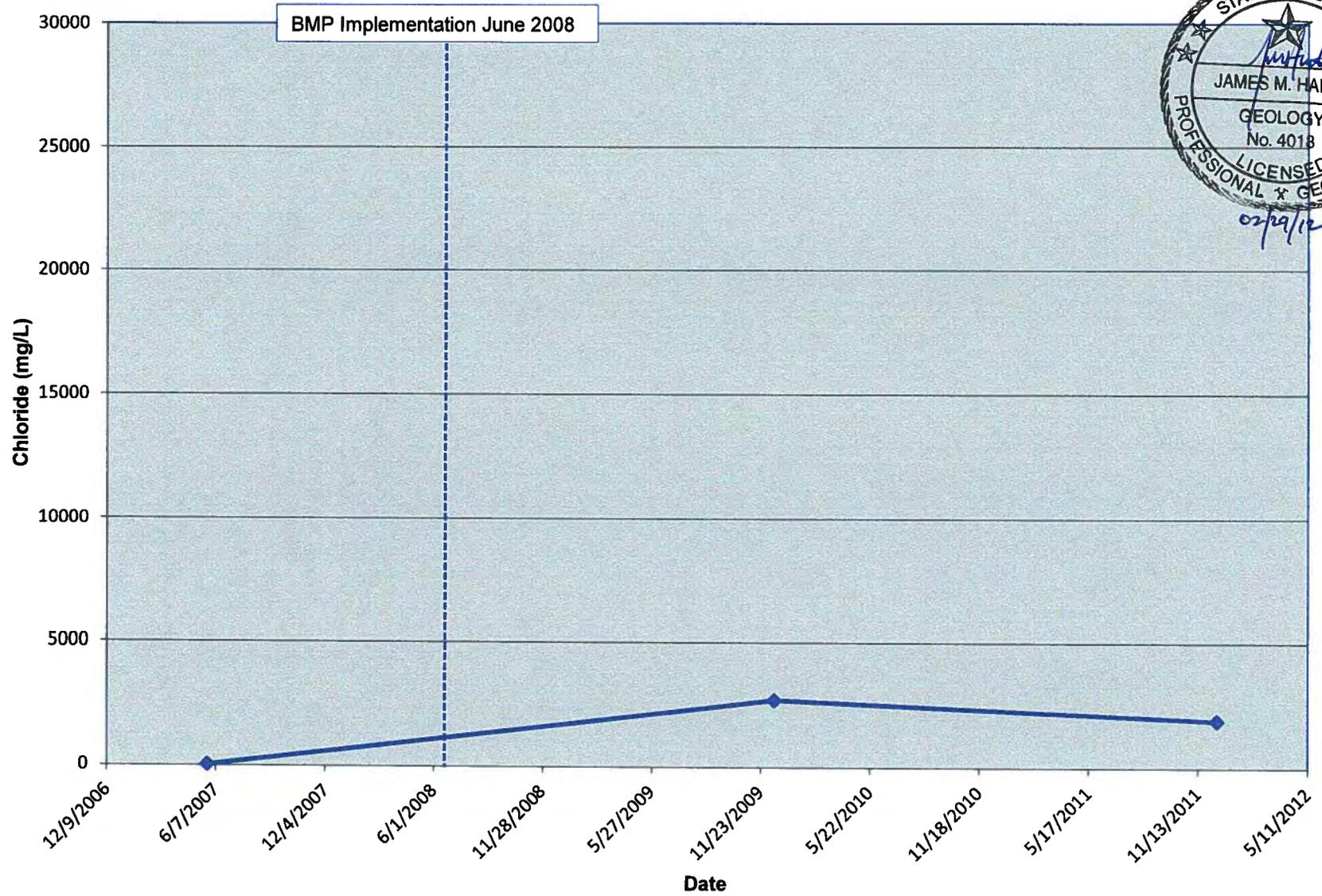


02/29/12

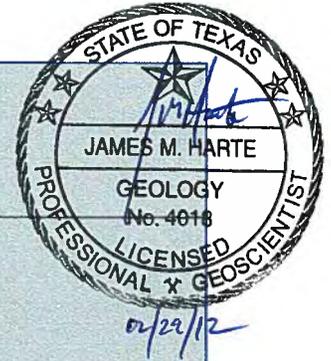
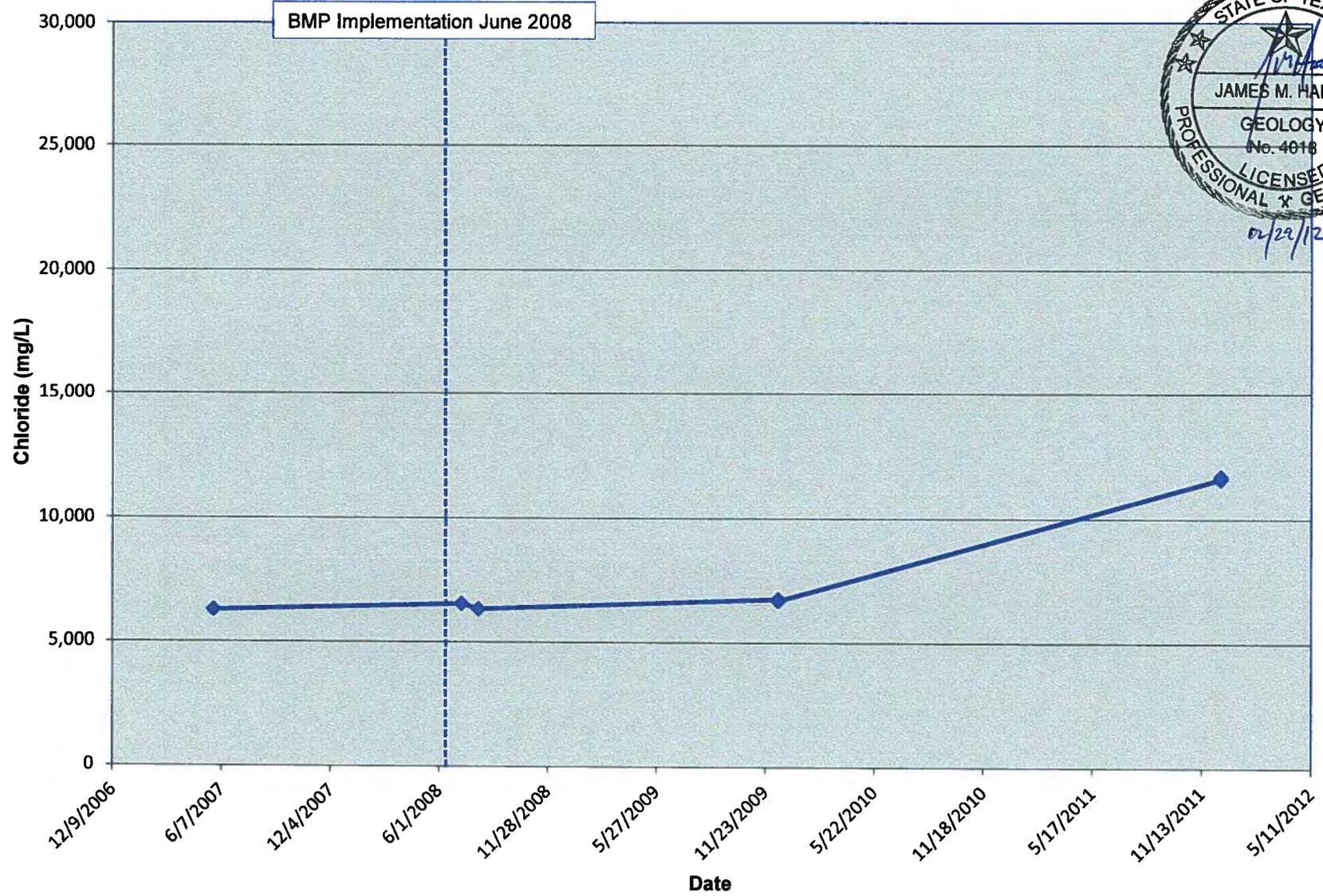
**GRAPH 9. Chloride Concentrations in MW-14  
Alluvial Groundwater Zone**



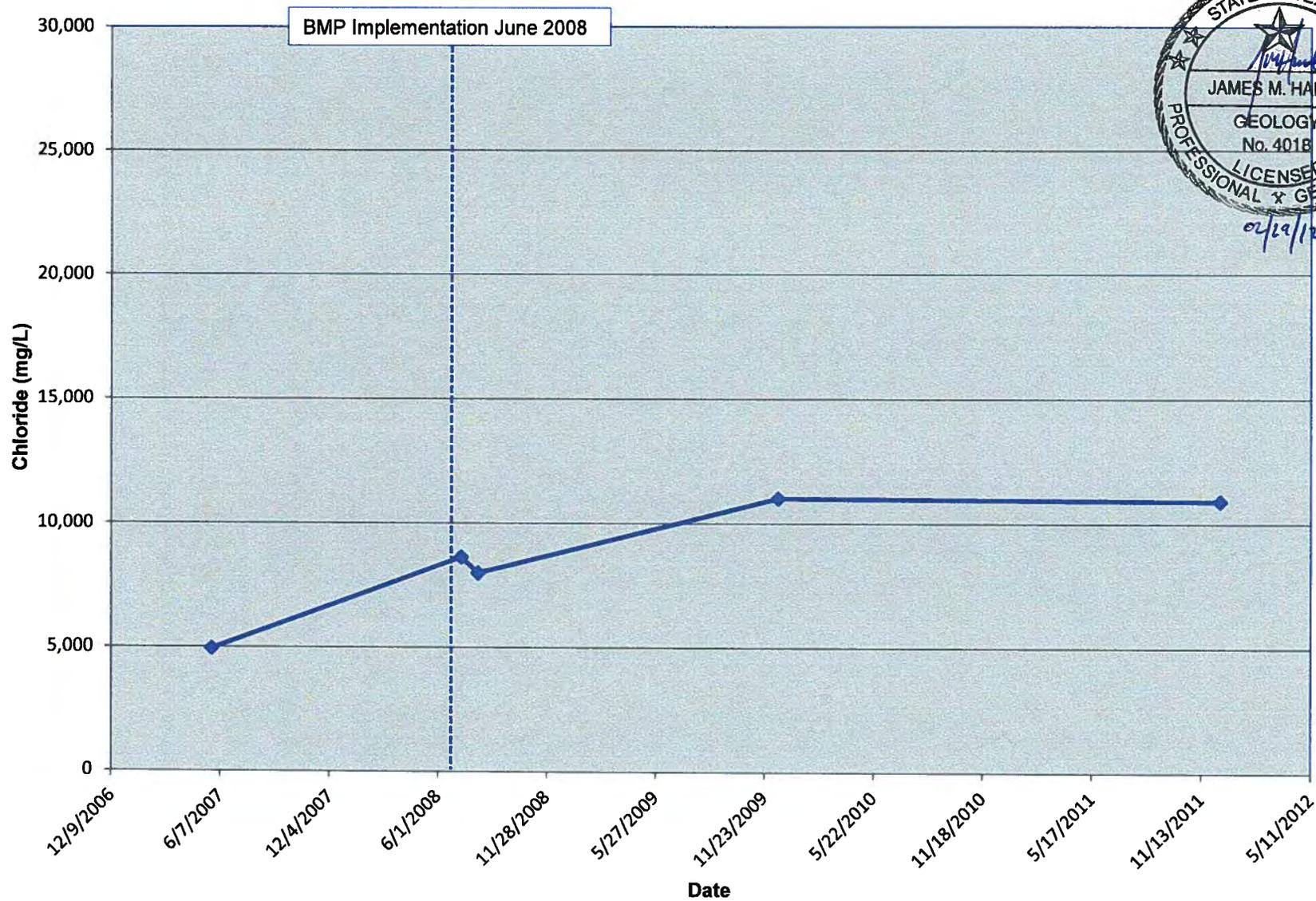
**GRAPH 10. Chloride Concentrations in MW-17  
Alluvial Groundwater Zone**



**GRAPH 11. Chloride Concentrations in MW-9  
Alluvial Groundwater Zone**



**GRAPH 12. Chloride Concentrations in MW-16  
Alluvial Groundwater Zone**



**ATTACHMENT 1**

**Field Forms**

## GROUNDWATER SAMPLING FORM

		Sample Location		MW-1 RPC Ballinger	
		Client			
		Site			
Depth to Water (ft)	Before Sampling	10.11		Sample Collection Time	
	After Sampling	~m		Purge Method	
Total Depth (ft)		14.24		Sample Method	
Standing Water Column (ft)		4.13		Water Description	
One Purge Volume (gal)		0.70		Sampling Personnel	
				10/15 Bailer Bailer GORHAM CAMP, SUNDAY TURSDAY BL	

Date	Time	Purge Volume (gal)		Depth to Water (ft)	pH (SU)	Temp (C)	m Conductivity (µ-siemens/cm)	TDS (ppm)	ORP (mV)	Dissolved Oxygen (mg/L)	Turbidity (NTUs)	
		This Period	Cumulative									
12/1/11	10410	3.0	3.0	[Large vertical scribble]	7.05	22.8	17.16	1603	31	[Large vertical scribble]		
		* Bailed DM to 10/13										





## GROUNDWATER SAMPLING FORM

		Sample Location		MW-4		
		Client		PRC		
		Site		Ballinger		
Depth to Water (ft)	Before Sampling	11.02		Sample Collection Time		1025
	After Sampling	~m		Purge Method		Bailer
Total Depth (ft)		17.70		Sample Method		Bailer
Standing Water Column (ft)		6.68		Water Description		Black
One Purge Volume (gal)		1.1		Sampling Personnel		BC

Date	Time	Purge Volume (gal)		Depth to Water (ft)	pH (SU)	Temp (C)	Conductivity (u-siemens/cm)	TDS (ppm)	ORP (mV)	Dissolved Oxygen (mg/L)	Turbidity (NTUs)			
		This Period	Cumulative											
12/14/11	1025	3.0	3.0		6.55	22.7	20.06	19.67	0					



















**SURFACE WATER SAMPLING FORM** B-S-LOWER SEEP-1  
(BC)

	Sample Location	<del>SW-TRB-1</del>
	Client	RRC
	Site	Ballinger
Sample Collection Time	1325	
Sample Method	Grab	
Water Description	clear	
Sampling Personnel	BCAF	

Date	Time	pH (SU)	Temp (C)	Conductivity (u-siemens/cm)	TDS (ppm)	ORP (mV)
12/14	13:25	6.89	14.8	19.61	19.45	-147

## SURFACE WATER SAMPLING FORM

	Sample Location	<del>CR</del> SW-CR-2500' <sup>OP</sup>
	Client	RRC
	Site	Ballin
Sample Collection Time	1410	
Sample Method	6/5B	
Water Description	Clear	
Sampling Personnel	BLAIR	

Date	Time	pH (SU)	Temp (C)	Conductivity (u-siemens/cm)	TDS (ppm)	ORP (mV)
12/14	14:10	8.04	15.8	3401	2704	152

### SURFACE WATER SAMPLING FORM

	Sample Location	ECM SW-EC-2500'UP
	Client	PRC
	Site	Ballinger
Sample Collection Time	1405	
Sample Method	SURFACE WATER	
Water Description	CLEAR w/ SLIGHT TURBIDITY	
Sampling Personnel	BC AF	

Date	Time	pH (SU)	Temp (C)	Conductivity (u-siemens/cm)	TDS (ppm)	ORP (mV)
12/14	14:05	8.03	16.6	2964	2328	89

## SURFACE WATER SAMPLING FORM

	Sample Location	SW-SP50-Dam
	Client	RPC
	Site	Ball Lake
Sample Collection Time	1140	
Sample Method	grab	
Water Description	clear	
Sampling Personnel	BC	

Date	Time	pH (SU)	Temp (C)	Conductivity (u-siemens/cm)	TDS (ppm)	ORP (mV)
12/14/11	1141	7.79	16.1	3390	2690	215

## SURFACE WATER SAMPLING FORM

	Sample Location	SW-CR-500-DOWN
	Client	PRC
	Site	Ballinger
Sample Collection Time	1130	
Sample Method	Grab	
Water Description	Clear	
Sampling Personnel	B L	

Date	Time	pH (SU)	Temp (C)	Conductivity (u-siemens/cm)	TDS (ppm)	ORP (mV)
1129	12/14/11	7.80	16.0	3402	2699	219

## SURFACE WATER SAMPLING FORM

	Sample Location	#- SW-CR-900 - Dam
	Client	RAC
	Site	<del>Point</del> RAC
Sample Collection Time	1125	
Sample Method	Grab	
Water Description	clear	
Sampling Personnel	BL	

Date	Time	pH (SU)	Temp (C)	Conductivity (u-siemens/cm)	TDS (ppm)	ORP (mV)
11/14/11	1124	<del>7.7</del> 7.7	16.0	3386	2692	211

## SURFACE WATER SAMPLING FORM

	Sample Location	Sw-cr-250-up
	Client	PCC
	Site	Ballou
Sample Collection Time	1150	
Sample Method	BABS	
Water Description	Clear	
Sampling Personnel	BC	

Date	Time	pH (SU)	Temp (C)	Conductivity (u-siemens/cm)	TDS (ppm)	ORP (mV)
12/14/11	1149	7.79	16.0	3389	2700	220

## SURFACE WATER SAMPLING FORM

	Sample Location	SW-CR-50-up
	Client	PRC
	Site	Ballage
Sample Collection Time	1200	
Sample Method	Grab	
Water Description	CLEAR	
Sampling Personnel	BCL	

Date	Time	pH (SU)	Temp (C)	Conductivity (u-siemens/cm)	TDS (ppm)	ORP (mV)
12/14/14	1159	7.81	16.1	3390	2699	215

## SURFACE WATER SAMPLING FORM

	Sample Location	SW-CR-1,000' up
	Client	RPC
	Site	Bollinger
Sample Collection Time	10:40	
Sample Method	Grab	
Water Description	TURBID, NO ODOR	
Sampling Personnel	AF	

Date	Time	pH (SU)	Temp (C)	Conductivity (u-siemens/cm)	TDS (ppm)	ORP (mV)
12/14/11	10:40	8.02	15.1	3451	2752	-40

## SURFACE WATER SAMPLING FORM

	Sample Location	SW-CR-2500' Down
	Client	RRC
	Site	Bannock
Sample Collection Time	15:10	
Sample Method	SW - By Hand	
Water Description	TURBID	
Sampling Personnel	BC/AF	

Date	Time	pH (SU)	Temp (C)	Conductivity (u-siemens/cm)	TDS (ppm)	ORP (mV)
12/14	15:10	7.93	14.7	3513	2805	-128

### SURFACE WATER SAMPLING FORM

	Sample Location	B-SW-CR-1500 Dam
	Client	RRC
	Site	Dallas
Sample Collection Time	1115	
Sample Method	Grab	
Water Description	Clear	
Sampling Personnel	BCL	

Date	Time	pH (SU)	Temp (C)	Conductivity (u-siemens/cm)	TDS (ppm)	ORP (mV)
12/14/11	1110	7.94	16.3	3274	2594	198

**ATTACHMENT 2**

**Laboratory Analytical Data Reports**

**(See Attached CD)**



December 27, 2011

Daniel Stine  
TRC Environmental Corp.  
505 East Huntland Drive Suite 250  
Austin, Texas 78752

Order No: 1112139

TEL: (512) 329-6080  
FAX: (512) 329-8750

RE: Ballinger

Dear Daniel Stine:

DHL Analytical received 24 sample(s) on 12/17/2011 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAC except where noted in the Case Narrative. All non-NELAC methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

A handwritten signature in black ink that reads "John DuPont".

John DuPont  
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-11-7



# Table of Contents

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**Sample Summary** ..... 10

**Prep Dates Report** ..... 11

**Analytical Dates Report** ..... 15

**Sample Results** ..... 19

**Analytical QC Summary Report** ..... 43

**MQL Summary Report** ..... 51





Sample Receipt Checklist

Client Name TRC Environmental Corp.

Date Received: 12/17/2011

Work Order Number 1112139

Received by JB

Checklist completed by: [Signature] 12/19/2011 Reviewed by: [Initials] 12/19/2011

Carrier name: Hand Delivered

- Shipping container/cooler in good condition? Yes [checked] No [ ] Not Present [ ]
Custody seals intact on shipping container/cooler? Yes [ ] No [ ] Not Present [checked]
Custody seals intact on sample bottles? Yes [ ] No [ ] Not Present [checked]
Chain of custody present? Yes [checked] No [ ]
Chain of custody signed when relinquished and received? Yes [checked] No [ ]
Chain of custody agrees with sample labels? Yes [checked] No [checked]
Samples in proper container/bottle? Yes [checked] No [ ]
Sample containers intact? Yes [checked] No [ ]
Sufficient sample volume for indicated test? Yes [checked] No [ ]
All samples received within holding time? Yes [checked] No [ ]
Container/Temp Blank temperature in compliance? Yes [checked] No [ ] 1.0 °C
Water - VOA vials have zero headspace? Yes [ ] No [ ] No VOA vials submitted [checked]
Water - pH acceptable upon receipt? Yes [ ] No [ ] Not Applicable [checked]

Adjusted? \_\_\_\_\_ Checked by \_\_\_\_\_

Any No response must be detailed in the comments section below.

Client contacted TRC Date contacted: 12/19/11 Person contacted Andrew

Contacted by: [Signature] Regarding: MW-16 + MW-17

Comments: Per Andrew add samples to COC and analyze.

Corrective Action: Added samples to COC and logged in for requested analysis.

## Laboratory Data Package Signature Page – RG-366/TRRP-13

This data package consists of:

This signature page, the laboratory review checklist, and the following reportable data:

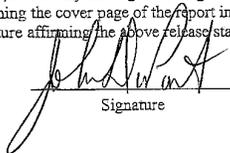
- R1 Field chain-of-custody documentation;
- R2 Sample identification cross-reference;
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - a) Items consistent with NELAC Chapter 5,
  - b) dilution factors,
  - c) preparation methods,
  - d) cleanup methods, and
  - e) if required for the project, tentatively identified compounds (TICs).
- R4 Surrogate recovery data including:
  - a) Calculated recovery (%R), and
  - b) The laboratory's surrogate QC limits.
- R5 Test reports/summary forms for blank samples;
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - a) LCS spiking amounts,
  - b) Calculated %R for each analyte, and
  - c) The laboratory's LCS QC limits.
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - a) Samples associated with the MS/MSD clearly identified,
  - b) MS/MSD spiking amounts,
  - c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
  - d) Calculated %Rs and relative percent differences (RPDs), and
  - e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - a) The amount of analyte measured in the duplicate,
  - b) The calculated RPD, and
  - c) The laboratory's QC limits for analytical duplicates.
- R9 List of method quantitation limits (MQLs) and detectability check sample results (DCS results can be found with the Miscellaneous Documents) for each analyte for each method and matrix;
- R10 Other problems or anomalies.

The Exception Report for every "No" or "Not Reviewed (NR)" item in Laboratory Review checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

**Release Statement:** I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge that all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information or data affecting the quality of the data has been knowingly withheld.

This laboratory was last inspected by TCEQ on May 17-20, 2011. Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

John DuPont – General Manager  
Scott Schroeder – Technical Director

  
Signature

12/27/11  
Date

# DHL Analytical, Inc.

## Laboratory Review Checklist: Reportable Data

Project Name: Ballinger	Date: 12/27/2011
Reviewer Name: Angie O'Donnell	Laboratory Work Order: 1112139
Prep Batch Number(s): See Prep Dates Report	Run Batch: See Analytical Dates Report

#1	A <sup>2</sup>	Description	Yes	No	NA <sup>3</sup>	NR <sup>4</sup>	ER# <sup>5</sup>
R1	OI	<b>Chain-of-Custody (C-O-C)</b>					
		1) Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				R1-01
		2) Were all departures from standard conditions described in an exception report?	X				
R2	OI	<b>Sample and Quality Control (QC) Identification</b>					
		1) Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
		2) Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
R3	OI	<b>Test Reports</b>					
		1) Were all samples prepared and analyzed within holding times?	X				
		2) Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
		3) Were calculations checked by a peer or supervisor?	X				
		4) Were all analyte identifications checked by a peer or supervisor?	X				
		5) Were sample detection limits reported for all analytes not detected?	X				
		6) Were all results for soil and sediment samples reported on a dry weight basis?			X		
		7) Were % moisture (or solids) reported for all soil and sediment samples?			X		
		8) Were bulk soils/solids samples for volatile analysis extracted with methanol per EPA Method 5035?			X		
		9) If required for the project, TICs reported?			X		
R4	O	<b>Surrogate Recovery Data</b>					
		1) Were surrogates added prior to extraction?			X		
		2) Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
R5	OI	<b>Test Reports/Summary Forms for Blank Samples</b>					
		1) Were appropriate type(s) of blanks analyzed?	X				
		2) Were blanks analyzed at the appropriate frequency?	X				
		3) Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
		4) Were blank concentrations < MQL?	X				
R6	OI	<b>Laboratory Control Samples (LCS):</b>					
		1) Were all COCs included in the LCS?	X				
		2) Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
		3) Were LCSs analyzed at the required frequency?	X				
		4) Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
		5) Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
		6) Was the LCSD RPD within QC limits (if applicable)?	X				
R7	OI	<b>Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Data</b>					
		1) Were the project/method specified analytes included in the MS and MSD?	X				
		2) Were MS/MSD analyzed at the appropriate frequency?	X				
		3) Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		X			R7-03
		4) Were MS/MSD RPDs within laboratory QC limits?	X				
R8	OI	<b>Analytical Duplicate Data</b>					
		1) Were appropriate analytical duplicates analyzed for each matrix?	X				
		2) Were analytical duplicates analyzed at the appropriate frequency?	X				
		3) Were RPDs or relative standard deviations within the laboratory QC limits?	X				
R9	OI	<b>Method Quantitation Limits (MQLs):</b>					
		1) Are the MQLs for each method analyte included in the laboratory data package?	X				
		2) Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
		3) Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
R10	OI	<b>Other Problems/Anomalies</b>					
		1) Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				R10-01
		2) Was applicable and available technology used to lower the SDL to minimize the matrix interference affects on the sample results?	X				
		3) Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				

- Items identified by the letter "R" should be included in the laboratory data package submitted to the TCEQ in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
- O = organic analyses; I = inorganic analyses (and general chemistry, when applicable).
- NA = Not applicable.
- NR = Not Reviewed.
- ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

**DHL Analytical, Inc.**

**Laboratory Review Checklist (continued): Supporting Data**

Project Name: Ballinger		Date: 12/27/2011					
Reviewer Name: Angie O'Donnell		Laboratory Work Order: 1112139					
# <sup>1</sup>	A <sup>2</sup>	Description	Yes	No	NA <sup>3</sup>	NR <sup>4</sup>	ER# <sup>5</sup>
S1	OI	<b>Initial Calibration (ICAL)</b>					
		1) Were response factors and/or relative response factors for each analyte within QC limits?	X				
		2) Were percent RSDs or correlation coefficient criteria met?	X				
		3) Was the number of standards recommended in the method used for all analytes?	X				
		4) Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		5) Are ICAL data available for all instruments used?	X				
		6) Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	<b>Initial and Continuing Calibration Verification (ICCV and CCV) and Continuing Calibration blank (CCB):</b>					
		1) Was the CCV analyzed at the method-required frequency?	X				
		2) Were percent differences for each analyte within the method-required QC limits?	X				
		3) Was the ICAL curve verified for each analyte?	X				
		4) Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
S3	O	<b>Mass Spectral Tuning:</b>					
		1) Was the appropriate compound for the method used for tuning?	X				
		2) Were ion abundance data within the method-required QC limits?	X				
S4	O	<b>Internal Standards (IS):</b>					
		1) Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	<b>Raw Data (NELAC Section 5.5.10)</b>					
		1) Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		2) Were data associated with manual integrations flagged on the raw data?	X				
S6	O	<b>Dual Column Confirmation</b>					
		1) Did dual column confirmation results meet the method-required QC?			X		
S7	O	<b>Tentatively Identified Compounds (TICs):</b>					
		1) If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	<b>Interference Check Sample (ICS) Results:</b>					
		1) Were percent recoveries within method QC limits?			X		
S9	I	<b>Serial Dilutions, Post Digestion Spikes, and Method of Standard Additions</b>					
		1) Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
S10	OI	<b>Method Detection Limit (MDL) Studies</b>					
		1) Was a MDL study performed for each reported analyte?	X				
		2) Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	<b>Proficiency Test Reports:</b>					
		1) Was the lab's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	<b>Standards Documentation</b>					
		1) Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	<b>Compound/Analyte Identification Procedures</b>					
		1) Are the procedures for compound/analyte identification documented?	X				
S14	OI	<b>Demonstration of Analyst Competency (DOC)</b>					
		1) Was DOC conducted consistent with NELAC Chapter 5 – Appendix C?	X				
		2) Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	<b>Verification/Validation Documentation for Methods (NELAC Chapter 5)</b>					
		1) Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	<b>Laboratory Standard Operating Procedures (SOPs):</b>					
		1) Are laboratory SOPs current and on file for each method performed?	X				

1 Items identified by the letter "R" should be included in the laboratory data package submitted to the TCEQ in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.  
 2 O = organic analyses; I = inorganic analyses (and general chemistry, when applicable).  
 3 NA = Not applicable.  
 4 NR = Not Reviewed.  
 5 ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

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CLIENT: TRC Environmental Corp.  
Project: Ballinger  
Lab Order: 1112139

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**CASE NARRATIVE**

The sample was analyzed using the methods outlined in the following references:

Method M2540C - Total Dissolved Solids  
Method E300 - Anions by IC

**Exception Report R1-01**

The samples were received and log-in performed on 12/17/2011. A total of 24 samples were received and all were analyzed. Sample B-SW-CR-250-UP was collected in plastic container and was within a plastic bag. The lid container was dislodged during shipment. The client was notified and instructed the laboratory to proceed with analysis. The remaining samples arrived in good condition and were properly packaged. Samples were added to the Chain of Custody per the client's request on 12/19/2011.

**Exception Report R7-03**

For Anions Analysis, batches 49653, 49666, 49682, the recoveries of a couple of analytes for the Matrix Spike and Matrix Spike Duplicate (1112139-07, 1112153-09, 1112139-21 MS/MSD) were outside of the method control limits. These are flagged accordingly in the QC Summary Report. These analytes were within method control limits in the associated LCS's. The reference samples selected for the QC sample for batch 49666 was not from this workorder. No further corrective action was taken.

**Exception Report R10-01**

For Anions Analysis, some of the samples were diluted due to concentration of anions.

CLIENT: TRC Environmental Corp.  
 Project: Ballinger  
 Lab Order: 1112139

## Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recv'd
1112139-01	B-MW-8		12/13/11 03:15 PM	12/17/11
1112139-02	B-MW-7		12/13/11 03:30 PM	12/17/11
1112139-03	B-MW-14		12/13/11 03:50 PM	12/17/11
1112139-04	B-MW-3		12/13/11 03:55 PM	12/17/11
1112139-05	B-MW-5		12/13/11 04:00 PM	12/17/11
1112139-06	B-MW-4		12/14/11 10:25 AM	12/17/11
1112139-07	B-SW-CR-1000-UP		12/14/11 10:40 AM	12/17/11
1112139-08	B-MW-1		12/14/11 10:45 AM	12/17/11
1112139-09	B-SW-CR-1500-DOWN		12/14/11 11:15 AM	12/17/11
1112139-10	B-SW-CR-900-DOWN		12/14/11 11:25 AM	12/17/11
1112139-11	B-SW-CR-500-DOWN		12/14/11 11:30 AM	12/17/11
1112139-12	B-SW-CR-50-DOWN		12/14/11 11:40 AM	12/17/11
1112139-13	B-SW-CR-250-UP		12/14/11 11:50 AM	12/17/11
1112139-14	B-SW-CR-50-UP		12/14/11 12:00 PM	12/17/11
1112139-15	B-MW-13		12/14/11 12:10 PM	12/17/11
1112139-16	B-MW-09		12/14/11 12:15 PM	12/17/11
1112139-17	B-MW-09-D		12/14/11 12:15 PM	12/17/11
1112139-18	B-S-LOWER-SEEP-1		12/14/11 01:25 PM	12/17/11
1112139-19	B-MW-02		12/14/11 01:30 PM	12/17/11
1112139-20	B-SW-EC-2500-UP		12/14/11 02:05 PM	12/17/11
1112139-21	B-SW-CR-2500-UP		12/14/11 02:10 PM	12/17/11
1112139-22	B-SW-CR-2500-DOWN		12/14/11 03:10 PM	12/17/11
1112139-23	B-MW-16		12/14/11	12/17/11
1112139-24	B-MW-17		12/14/11 03:00 PM	12/17/11

CLIENT: TRC Environmental Corp.  
 Project: Ballinger  
 Lab Order: 1112139

**PREP DATES REPORT**

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1112139-01A	B-MW-8	12/13/11 03:15 PM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-8	12/13/11 03:15 PM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-8	12/13/11 03:15 PM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-8	12/13/11 03:15 PM	Aqueous	M2540C	TDS Preparation	12/20/11 04:20 PM	49635
1112139-02A	B-MW-7	12/13/11 03:30 PM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-7	12/13/11 03:30 PM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-7	12/13/11 03:30 PM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-7	12/13/11 03:30 PM	Aqueous	M2540C	TDS Preparation	12/20/11 04:20 PM	49635
1112139-03A	B-MW-14	12/13/11 03:50 PM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-14	12/13/11 03:50 PM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-14	12/13/11 03:50 PM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-14	12/13/11 03:50 PM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-14	12/13/11 03:50 PM	Aqueous	M2540C	TDS Preparation	12/20/11 04:20 PM	49635
1112139-04A	B-MW-3	12/13/11 03:55 PM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-3	12/13/11 03:55 PM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-3	12/13/11 03:55 PM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-3	12/13/11 03:55 PM	Aqueous	M2540C	TDS Preparation	12/20/11 04:20 PM	49635
1112139-05A	B-MW-5	12/13/11 04:00 PM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-5	12/13/11 04:00 PM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-5	12/13/11 04:00 PM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-5	12/13/11 04:00 PM	Aqueous	M2540C	TDS Preparation	12/20/11 04:20 PM	49635
1112139-06A	B-MW-4	12/14/11 10:25 AM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-4	12/14/11 10:25 AM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-4	12/14/11 10:25 AM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-4	12/14/11 10:25 AM	Aqueous	M2540C	TDS Preparation	12/20/11 04:20 PM	49635
1112139-07A	B-SW-CR-1000-UP	12/14/11 10:40 AM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-SW-CR-1000-UP	12/14/11 10:40 AM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-SW-CR-1000-UP	12/14/11 10:40 AM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-SW-CR-1000-UP	12/14/11 10:40 AM	Aqueous	M2540C	TDS Preparation	12/20/11 04:20 PM	49635

CLIENT: TRC Environmental Corp.  
 Project: Ballinger  
 Lab Order: 1112139

**PREP DATES REPORT**

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1112139-08A	B-MW-1	12/14/11 10:45 AM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-1	12/14/11 10:45 AM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-1	12/14/11 10:45 AM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-MW-1	12/14/11 10:45 AM	Aqueous	M2540C	TDS Preparation	12/20/11 04:20 PM	49635
1112139-09A	B-SW-CR-1500-DOWN	12/14/11 11:15 AM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-SW-CR-1500-DOWN	12/14/11 11:15 AM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-SW-CR-1500-DOWN	12/14/11 11:15 AM	Aqueous	M2540C	TDS Preparation	12/20/11 04:20 PM	49635
1112139-10A	B-SW-CR-900-DOWN	12/14/11 11:25 AM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-SW-CR-900-DOWN	12/14/11 11:25 AM	Aqueous	E300	Anion Preparation	12/20/11 08:38 AM	49653
	B-SW-CR-900-DOWN	12/14/11 11:25 AM	Aqueous	M2540C	TDS Preparation	12/20/11 04:20 PM	49635
1112139-11A	B-SW-CR-500-DOWN	12/14/11 11:30 AM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-SW-CR-500-DOWN	12/14/11 11:30 AM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-SW-CR-500-DOWN	12/14/11 11:30 AM	Aqueous	M2540C	TDS Preparation	12/20/11 04:20 PM	49635
1112139-12A	B-SW-CR-50-DOWN	12/14/11 11:40 AM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-SW-CR-50-DOWN	12/14/11 11:40 AM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-SW-CR-50-DOWN	12/14/11 11:40 AM	Aqueous	M2540C	TDS Preparation	12/20/11 04:20 PM	49635
1112139-13A	B-SW-CR-250-UP	12/14/11 11:50 AM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-SW-CR-250-UP	12/14/11 11:50 AM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-SW-CR-250-UP	12/14/11 11:50 AM	Aqueous	M2540C	TDS Preparation	12/21/11 04:30 PM	49665
1112139-14A	B-SW-CR-50-UP	12/14/11 12:00 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-SW-CR-50-UP	12/14/11 12:00 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-SW-CR-50-UP	12/14/11 12:00 PM	Aqueous	M2540C	TDS Preparation	12/21/11 04:30 PM	49665
1112139-15A	B-MW-13	12/14/11 12:10 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-MW-13	12/14/11 12:10 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-MW-13	12/14/11 12:10 PM	Aqueous	M2540C	TDS Preparation	12/21/11 04:30 PM	49665
1112139-16A	B-MW-09	12/14/11 12:15 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-MW-09	12/14/11 12:15 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-MW-09	12/14/11 12:15 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-MW-09	12/14/11 12:15 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666

CLIENT: TRC Environmental Corp.  
 Project: Ballinger  
 Lab Order: 1112139

**PREP DATES REPORT**

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
	B-MW-09	12/14/11 12:15 PM	Aqueous	M2540C	TDS Preparation	12/21/11 04:30 PM	49665
1112139-17A	B-MW-09-D	12/14/11 12:15 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-MW-09-D	12/14/11 12:15 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-MW-09-D	12/14/11 12:15 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-MW-09-D	12/14/11 12:15 PM	Aqueous	M2540C	TDS Preparation	12/21/11 04:30 PM	49665
1112139-18A	B-S-LOWER-SEEP-1	12/14/11 01:25 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-S-LOWER-SEEP-1	12/14/11 01:25 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-S-LOWER-SEEP-1	12/14/11 01:25 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-S-LOWER-SEEP-1	12/14/11 01:25 PM	Aqueous	M2540C	TDS Preparation	12/21/11 04:30 PM	49665
1112139-19A	B-MW-02	12/14/11 01:30 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-MW-02	12/14/11 01:30 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-MW-02	12/14/11 01:30 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-MW-02	12/14/11 01:30 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-MW-02	12/14/11 01:30 PM	Aqueous	M2540C	TDS Preparation	12/21/11 04:30 PM	49665
1112139-20A	B-SW-EC-2500-UP	12/14/11 02:05 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-SW-EC-2500-UP	12/14/11 02:05 PM	Aqueous	E300	Anion Preparation	12/21/11 08:35 AM	49666
	B-SW-EC-2500-UP	12/14/11 02:05 PM	Aqueous	M2540C	TDS Preparation	12/21/11 04:30 PM	49665
1112139-21A	B-SW-CR-2500-UP	12/14/11 02:10 PM	Aqueous	E300	Anion Preparation	12/22/11 08:37 AM	49682
	B-SW-CR-2500-UP	12/14/11 02:10 PM	Aqueous	E300	Anion Preparation	12/22/11 08:37 AM	49682
	B-SW-CR-2500-UP	12/14/11 02:10 PM	Aqueous	M2540C	TDS Preparation	12/21/11 04:30 PM	49665
1112139-22A	B-SW-CR-2500-DOWN	12/14/11 03:10 PM	Aqueous	E300	Anion Preparation	12/22/11 08:37 AM	49682
	B-SW-CR-2500-DOWN	12/14/11 03:10 PM	Aqueous	E300	Anion Preparation	12/22/11 08:37 AM	49682
	B-SW-CR-2500-DOWN	12/14/11 03:10 PM	Aqueous	M2540C	TDS Preparation	12/21/11 04:30 PM	49665
1112139-23A	B-MW-16	12/14/11	Aqueous	E300	Anion Preparation	12/22/11 08:37 AM	49682
	B-MW-16	12/14/11	Aqueous	E300	Anion Preparation	12/22/11 08:37 AM	49682
	B-MW-16	12/14/11	Aqueous	E300	Anion Preparation	12/22/11 08:37 AM	49682
	B-MW-16	12/14/11	Aqueous	E300	Anion Preparation	12/22/11 08:37 AM	49682
	B-MW-16	12/14/11	Aqueous	M2540C	TDS Preparation	12/21/11 04:30 PM	49665
1112139-24A	B-MW-17	12/14/11 03:00 PM	Aqueous	E300	Anion Preparation	12/22/11 08:37 AM	49682

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CLIENT: TRC Environmental Corp.  
Project: Ballinger  
Lab Order: 1112139

**PREP DATES REPORT**

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Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
	B-MW-17	12/14/11 03:00 PM	Aqueous	E300	Anion Preparation	12/22/11 08:37 AM	49682
	B-MW-17	12/14/11 03:00 PM	Aqueous	M2540C	TDS Preparation	12/21/11 04:30 PM	49665

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CLIENT: TRC Environmental Corp.  
 Project: Ballinger  
 Lab Order: 1112139

## ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1112139-01A	B-MW-8	Aqueous	E300	Anions by IC method - Water	49653	100	12/20/11 09:30 AM	IC2_111220A
	B-MW-8	Aqueous	E300	Anions by IC method - Water	49653	1000	12/20/11 10:28 AM	IC2_111220A
	B-MW-8	Aqueous	E300	Anions by IC method - Water	49653	10	12/20/11 02:14 PM	IC2_111220A
	B-MW-8	Aqueous	M2540C	Total Dissolved Solids	49635	1	12/20/11 04:20 PM	WC_111220A
1112139-02A	B-MW-7	Aqueous	E300	Anions by IC method - Water	49653	100	12/20/11 09:42 AM	IC2_111220A
	B-MW-7	Aqueous	E300	Anions by IC method - Water	49653	1000	12/20/11 10:40 AM	IC2_111220A
	B-MW-7	Aqueous	E300	Anions by IC method - Water	49653	10	12/20/11 02:25 PM	IC2_111220A
	B-MW-7	Aqueous	M2540C	Total Dissolved Solids	49635	1	12/20/11 04:20 PM	WC_111220A
1112139-03A	B-MW-14	Aqueous	E300	Anions by IC method - Water	49653	100	12/20/11 09:54 AM	IC2_111220A
	B-MW-14	Aqueous	E300	Anions by IC method - Water	49653	1000	12/20/11 11:12 AM	IC2_111220A
	B-MW-14	Aqueous	E300	Anions by IC method - Water	49653	1000	12/20/11 12:59 PM	IC2_111220A
	B-MW-14	Aqueous	E300	Anions by IC method - Water	49653	10	12/20/11 02:37 PM	IC2_111220A
	B-MW-14	Aqueous	M2540C	Total Dissolved Solids	49635	1	12/20/11 04:20 PM	WC_111220A
1112139-04A	B-MW-3	Aqueous	E300	Anions by IC method - Water	49653	100	12/20/11 10:05 AM	IC2_111220A
	B-MW-3	Aqueous	E300	Anions by IC method - Water	49653	1000	12/20/11 11:23 AM	IC2_111220A
	B-MW-3	Aqueous	E300	Anions by IC method - Water	49653	10	12/20/11 02:48 PM	IC2_111220A
	B-MW-3	Aqueous	M2540C	Total Dissolved Solids	49635	1	12/20/11 04:20 PM	WC_111220A
1112139-05A	B-MW-5	Aqueous	E300	Anions by IC method - Water	49653	100	12/20/11 10:17 AM	IC2_111220A
	B-MW-5	Aqueous	E300	Anions by IC method - Water	49653	1000	12/20/11 11:35 AM	IC2_111220A
	B-MW-5	Aqueous	E300	Anions by IC method - Water	49653	10	12/20/11 03:00 PM	IC2_111220A
	B-MW-5	Aqueous	M2540C	Total Dissolved Solids	49635	1	12/20/11 04:20 PM	WC_111220A
1112139-06A	B-MW-4	Aqueous	E300	Anions by IC method - Water	49653	100	12/20/11 11:46 AM	IC2_111220A
	B-MW-4	Aqueous	E300	Anions by IC method - Water	49653	1000	12/20/11 12:47 PM	IC2_111220A
	B-MW-4	Aqueous	E300	Anions by IC method - Water	49653	10	12/20/11 03:12 PM	IC2_111220A
	B-MW-4	Aqueous	M2540C	Total Dissolved Solids	49635	1	12/20/11 04:20 PM	WC_111220A
1112139-07A	B-SW-CR-1000-UP	Aqueous	E300	Anions by IC method - Water	49653	10	12/20/11 11:58 AM	IC2_111220A
	B-SW-CR-1000-UP	Aqueous	E300	Anions by IC method - Water	49653	1	12/20/11 03:23 PM	IC2_111220A
	B-SW-CR-1000-UP	Aqueous	E300	Anions by IC method - Water	49653	100	12/20/11 04:45 PM	IC2_111220A
	B-SW-CR-1000-UP	Aqueous	M2540C	Total Dissolved Solids	49635	1	12/20/11 04:20 PM	WC_111220A

CLIENT: TRC Environmental Corp.  
 Project: Ballinger  
 Lab Order: 1112139

**ANALYTICAL DATES REPORT**

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1112139-08A	B-MW-1	Aqueous	E300	Anions by IC method - Water	49653	100	12/20/11 12:09 PM	IC2_111220A
	B-MW-1	Aqueous	E300	Anions by IC method - Water	49653	1000	12/20/11 01:36 PM	IC2_111220A
	B-MW-1	Aqueous	E300	Anions by IC method - Water	49653	10	12/20/11 04:10 PM	IC2_111220A
	B-MW-1	Aqueous	M2540C	Total Dissolved Solids	49635	1	12/20/11 04:20 PM	WC_111220A
1112139-09A	B-SW-CR-1500-DOWN	Aqueous	E300	Anions by IC method - Water	49653	10	12/20/11 01:51 PM	IC2_111220A
	B-SW-CR-1500-DOWN	Aqueous	E300	Anions by IC method - Water	49653	1	12/20/11 04:22 PM	IC2_111220A
	B-SW-CR-1500-DOWN	Aqueous	M2540C	Total Dissolved Solids	49635	1	12/20/11 04:20 PM	WC_111220A
1112139-10A	B-SW-CR-900-DOWN	Aqueous	E300	Anions by IC method - Water	49653	10	12/20/11 02:02 PM	IC2_111220A
	B-SW-CR-900-DOWN	Aqueous	E300	Anions by IC method - Water	49653	1	12/20/11 04:34 PM	IC2_111220A
	B-SW-CR-900-DOWN	Aqueous	M2540C	Total Dissolved Solids	49635	1	12/20/11 04:20 PM	WC_111220A
1112139-11A	B-SW-CR-500-DOWN	Aqueous	E300	Anions by IC method - Water	49666	10	12/21/11 09:23 AM	IC2_111221A
	B-SW-CR-500-DOWN	Aqueous	E300	Anions by IC method - Water	49666	1	12/21/11 12:59 PM	IC2_111221A
	B-SW-CR-500-DOWN	Aqueous	M2540C	Total Dissolved Solids	49635	1	12/20/11 04:20 PM	WC_111220A
1112139-12A	B-SW-CR-50-DOWN	Aqueous	E300	Anions by IC method - Water	49666	10	12/21/11 09:35 AM	IC2_111221A
	B-SW-CR-50-DOWN	Aqueous	E300	Anions by IC method - Water	49666	1	12/21/11 01:10 PM	IC2_111221A
	B-SW-CR-50-DOWN	Aqueous	M2540C	Total Dissolved Solids	49635	1	12/20/11 04:20 PM	WC_111220A
1112139-13A	B-SW-CR-250-UP	Aqueous	E300	Anions by IC method - Water	49666	10	12/21/11 09:46 AM	IC2_111221A
	B-SW-CR-250-UP	Aqueous	E300	Anions by IC method - Water	49666	1	12/21/11 01:22 PM	IC2_111221A
	B-SW-CR-250-UP	Aqueous	M2540C	Total Dissolved Solids	49665	1	12/21/11 04:30 PM	WC_111221B
1112139-14A	B-SW-CR-50-UP	Aqueous	E300	Anions by IC method - Water	49666	10	12/21/11 09:58 AM	IC2_111221A
	B-SW-CR-50-UP	Aqueous	E300	Anions by IC method - Water	49666	1	12/21/11 01:33 PM	IC2_111221A
	B-SW-CR-50-UP	Aqueous	M2540C	Total Dissolved Solids	49665	1	12/21/11 04:30 PM	WC_111221B
1112139-15A	B-MW-13	Aqueous	E300	Anions by IC method - Water	49666	100	12/21/11 10:10 AM	IC2_111221A
	B-MW-13	Aqueous	E300	Anions by IC method - Water	49666	1	12/21/11 01:45 PM	IC2_111221A
	B-MW-13	Aqueous	M2540C	Total Dissolved Solids	49665	1	12/21/11 04:30 PM	WC_111221B
1112139-16A	B-MW-09	Aqueous	E300	Anions by IC method - Water	49666	100	12/21/11 10:58 AM	IC2_111221A
	B-MW-09	Aqueous	E300	Anions by IC method - Water	49666	1000	12/21/11 11:59 AM	IC2_111221A
	B-MW-09	Aqueous	E300	Anions by IC method - Water	49666	1	12/21/11 01:56 PM	IC2_111221A
	B-MW-09	Aqueous	E300	Anions by IC method - Water	49666	10	12/21/11 02:55 PM	IC2_111221A

CLIENT: TRC Environmental Corp.  
 Project: Ballinger  
 Lab Order: 1112139

**ANALYTICAL DATES REPORT**

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
	B-MW-09	Aqueous	M2540C	Total Dissolved Solids	49665	1	12/21/11 04:30 PM	WC_111221B
1112139-17A	B-MW-09-D	Aqueous	E300	Anions by IC method - Water	49666	100	12/21/11 11:10 AM	IC2_111221A
	B-MW-09-D	Aqueous	E300	Anions by IC method - Water	49666	1000	12/21/11 12:11 PM	IC2_111221A
	B-MW-09-D	Aqueous	E300	Anions by IC method - Water	49666	10	12/21/11 02:08 PM	IC2_111221A
	B-MW-09-D	Aqueous	M2540C	Total Dissolved Solids	49665	1	12/21/11 04:30 PM	WC_111221B
1112139-18A	B-S-LOWER-SEEP-1	Aqueous	E300	Anions by IC method - Water	49666	100	12/21/11 11:21 AM	IC2_111221A
	B-S-LOWER-SEEP-1	Aqueous	E300	Anions by IC method - Water	49666	1000	12/21/11 12:22 PM	IC2_111221A
	B-S-LOWER-SEEP-1	Aqueous	E300	Anions by IC method - Water	49666	10	12/21/11 02:20 PM	IC2_111221A
	B-S-LOWER-SEEP-1	Aqueous	M2540C	Total Dissolved Solids	49665	1	12/21/11 04:30 PM	WC_111221B
1112139-19A	B-MW-02	Aqueous	E300	Anions by IC method - Water	49666	100	12/21/11 11:33 AM	IC2_111221A
	B-MW-02	Aqueous	E300	Anions by IC method - Water	49666	1000	12/21/11 12:34 PM	IC2_111221A
	B-MW-02	Aqueous	E300	Anions by IC method - Water	49666	1	12/21/11 02:31 PM	IC2_111221A
	B-MW-02	Aqueous	E300	Anions by IC method - Water	49666	10	12/21/11 03:07 PM	IC2_111221A
	B-MW-02	Aqueous	M2540C	Total Dissolved Solids	49665	1	12/21/11 04:30 PM	WC_111221B
1112139-20A	B-SW-EC-2500-UP	Aqueous	E300	Anions by IC method - Water	49666	100	12/21/11 11:44 AM	IC2_111221A
	B-SW-EC-2500-UP	Aqueous	E300	Anions by IC method - Water	49666	1	12/21/11 02:43 PM	IC2_111221A
	B-SW-EC-2500-UP	Aqueous	M2540C	Total Dissolved Solids	49665	1	12/21/11 04:30 PM	WC_111221B
1112139-21A	B-SW-CR-2500-UP	Aqueous	E300	Anions by IC method - Water	49682	10	12/22/11 09:30 AM	IC2_111222A
	B-SW-CR-2500-UP	Aqueous	E300	Anions by IC method - Water	49682	1	12/22/11 11:16 AM	IC2_111222A
	B-SW-CR-2500-UP	Aqueous	M2540C	Total Dissolved Solids	49665	1	12/21/11 04:30 PM	WC_111221B
1112139-22A	B-SW-CR-2500-DOWN	Aqueous	E300	Anions by IC method - Water	49682	10	12/22/11 09:42 AM	IC2_111222A
	B-SW-CR-2500-DOWN	Aqueous	E300	Anions by IC method - Water	49682	1	12/22/11 11:51 AM	IC2_111222A
	B-SW-CR-2500-DOWN	Aqueous	M2540C	Total Dissolved Solids	49665	1	12/21/11 04:30 PM	WC_111221B
1112139-23A	B-MW-16	Aqueous	E300	Anions by IC method - Water	49682	100	12/22/11 09:53 AM	IC2_111222A
	B-MW-16	Aqueous	E300	Anions by IC method - Water	49682	5000	12/22/11 10:05 AM	IC2_111222A
	B-MW-16	Aqueous	E300	Anions by IC method - Water	49682	1000	12/22/11 10:28 AM	IC2_111222A
	B-MW-16	Aqueous	E300	Anions by IC method - Water	49682	10	12/22/11 12:02 PM	IC2_111222A
	B-MW-16	Aqueous	M2540C	Total Dissolved Solids	49665	1	12/21/11 04:30 PM	WC_111221B
1112139-24A	B-MW-17	Aqueous	E300	Anions by IC method - Water	49682	100	12/22/11 10:17 AM	IC2_111222A

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CLIENT: TRC Environmental Corp.  
Project: Ballinger  
Lab Order: 1112139

**ANALYTICAL DATES REPORT**

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Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
	B-MW-17	Aqueous	E300	Anions by IC method - Water	49682	1	12/22/11 12:14 PM	IC2_111222A
	B-MW-17	Aqueous	M2540C	Total Dissolved Solids	49665	1	12/21/11 04:30 PM	WC_111221B

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**CLIENT:** TRC Environmental Corp.  
**Project:** Ballinger  
**Project No:**  
**Lab Order:** 1112139

**Client Sample ID:** B-MW-8  
**Lab ID:** 1112139-01  
**Collection Date:** 12/13/11 03:15 PM  
**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<3.00	3.00	10.0		mg/L	10	12/20/11 02:14 PM
Chloride	12300	300	1000		mg/L	1000	12/20/11 10:28 AM
Sulfate	2380	100	300		mg/L	100	12/20/11 09:30 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	25000	200	200		mg/L	1	12/20/11 04:20 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.  
**Project:** Ballinger  
**Project No:**  
**Lab Order:** 1112139

**Client Sample ID:** B-MW-7  
**Lab ID:** 1112139-02  
**Collection Date:** 12/13/11 03:30 PM  
**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<3.00	3.00	10.0		mg/L	10	12/20/11 02:25 PM
Chloride	16600	300	1000		mg/L	1000	12/20/11 10:40 AM
Sulfate	1740	100	300		mg/L	100	12/20/11 09:42 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	34600	200	200		mg/L	1	12/20/11 04:20 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.  
**Project:** Ballinger  
**Project No:**  
**Lab Order:** 1112139

**Client Sample ID:** B-MW-14  
**Lab ID:** 1112139-03  
**Collection Date:** 12/13/11 03:50 PM  
**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<3.00	3.00	10.0		mg/L	10	12/20/11 02:37 PM
Chloride	10800	300	1000		mg/L	1000	12/20/11 12:59 PM
Sulfate	4160	100	300		mg/L	100	12/20/11 09:54 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	23100	200	200		mg/L	1	12/20/11 04:20 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.  
**Project:** Ballinger  
**Project No:**  
**Lab Order:** 1112139

**Client Sample ID:** B-MW-3  
**Lab ID:** 1112139-04  
**Collection Date:** 12/13/11 03:55 PM  
**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<3.00	3.00	10.0		mg/L	10	12/20/11 02:48 PM
Chloride	26600	300	1000		mg/L	1000	12/20/11 11:23 AM
Sulfate	1980	100	300		mg/L	100	12/20/11 10:05 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	48000	200	200		mg/L	1	12/20/11 04:20 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.

**Project:** Ballinger

**Project No:**

**Lab Order:** 1112139

**Client Sample ID:** B-MW-5

**Lab ID:** 1112139-05

**Collection Date:** 12/13/11 04:00 PM

**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<3.00	3.00	10.0		mg/L	10	12/20/11 03:00 PM
Chloride	23200	300	1000		mg/L	1000	12/20/11 11:35 AM
Sulfate	1250	100	300		mg/L	100	12/20/11 10:17 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	40300	200	200		mg/L	1	12/20/11 04:20 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.  
**Project:** Ballinger  
**Project No:**  
**Lab Order:** 1112139

**Client Sample ID:** B-MW-4  
**Lab ID:** 1112139-06  
**Collection Date:** 12/14/11 10:25 AM  
**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<3.00	3.00	10.0		mg/L	10	12/20/11 03:12 PM
Chloride	8700	300	1000		mg/L	1000	12/20/11 12:47 PM
Sulfate	1560	100	300		mg/L	100	12/20/11 11:46 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	18000	200	200		mg/L	1	12/20/11 04:20 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.  
**Project:** Ballinger  
**Project No:**  
**Lab Order:** 1112139

**Client Sample ID:** B-SW-CR-1000-UP  
**Lab ID:** 1112139-07  
**Collection Date:** 12/14/11 10:40 AM  
**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<0.300	0.300	1.00		mg/L	1	12/20/11 03:23 PM
Chloride	473	3.00	10.0		mg/L	10	12/20/11 11:58 AM
Sulfate	1510	10.0	30.0		mg/L	10	12/20/11 11:58 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	2980	10.0	10.0		mg/L	1	12/20/11 04:20 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.  
**Project:** Ballinger  
**Project No:**  
**Lab Order:** 1112139

**Client Sample ID:** B-MW-1  
**Lab ID:** 1112139-08  
**Collection Date:** 12/14/11 10:45 AM  
**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<3.00	3.00	10.0		mg/L	10	12/20/11 04:10 PM
Chloride	6480	300	1000		mg/L	1000	12/20/11 01:36 PM
Sulfate	865	100	300		mg/L	100	12/20/11 12:09 PM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	12500	50.0	50.0		mg/L	1	12/20/11 04:20 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.

**Project:** Ballinger

**Project No:**

**Lab Order:** 1112139

**Client Sample ID:** B-SW-CR-1500-DOWN

**Lab ID:** 1112139-09

**Collection Date:** 12/14/11 11:15 AM

**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<0.300	0.300	1.00		mg/L	1	12/20/11 04:22 PM
Chloride	465	3.00	10.0		mg/L	10	12/20/11 01:51 PM
Sulfate	1470	10.0	30.0		mg/L	10	12/20/11 01:51 PM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	2860	200	200		mg/L	1	12/20/11 04:20 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.

**Project:** Ballinger

**Project No:**

**Lab Order:** 1112139

**Client Sample ID:** B-SW-CR-900-DOWN

**Lab ID:** 1112139-10

**Collection Date:** 12/14/11 11:25 AM

**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<0.300	0.300	1.00		mg/L	1	12/20/11 04:34 PM
Chloride	469	3.00	10.0		mg/L	10	12/20/11 02:02 PM
Sulfate	1490	10.0	30.0		mg/L	10	12/20/11 02:02 PM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	2870	10.0	10.0		mg/L	1	12/20/11 04:20 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.

**Project:** Ballinger

**Project No:**

**Lab Order:** 1112139

**Client Sample ID:** B-SW-CR-500-DOWN

**Lab ID:** 1112139-11

**Collection Date:** 12/14/11 11:30 AM

**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<0.300	0.300	1.00		mg/L	1	12/21/11 12:59 PM
Chloride	462	3.00	10.0		mg/L	10	12/21/11 09:23 AM
Sulfate	1500	10.0	30.0		mg/L	10	12/21/11 09:23 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	2930	10.0	10.0		mg/L	1	12/20/11 04:20 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.

**Project:** Ballinger

**Project No:**

**Lab Order:** 1112139

**Client Sample ID:** B-SW-CR-50-DOWN

**Lab ID:** 1112139-12

**Collection Date:** 12/14/11 11:40 AM

**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<0.300	0.300	1.00		mg/L	1	12/21/11 01:10 PM
Chloride	470	3.00	10.0		mg/L	10	12/21/11 09:35 AM
Sulfate	1510	10.0	30.0		mg/L	10	12/21/11 09:35 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	2870	10.0	10.0		mg/L	1	12/20/11 04:20 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.  
**Project:** Ballinger  
**Project No:**  
**Lab Order:** 1112139

**Client Sample ID:** B-SW-CR-250-UP  
**Lab ID:** 1112139-13  
**Collection Date:** 12/14/11 11:50 AM  
**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<0.300	0.300	1.00		mg/L	1	12/21/11 01:22 PM
Chloride	174	3.00	10.0		mg/L	10	12/21/11 09:46 AM
Sulfate	528	10.0	30.0		mg/L	10	12/21/11 09:46 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	1060	20.0	20.0		mg/L	1	12/21/11 04:30 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.

**Project:** Ballinger

**Project No:**

**Lab Order:** 1112139

**Client Sample ID:** B-SW-CR-50-UP

**Lab ID:** 1112139-14

**Collection Date:** 12/14/11 12:00 PM

**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<0.300	0.300	1.00		mg/L	1	12/21/11 01:33 PM
Chloride	478	3.00	10.0		mg/L	10	12/21/11 09:58 AM
Sulfate	1530	10.0	30.0		mg/L	10	12/21/11 09:58 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	2940	10.0	10.0		mg/L	1	12/21/11 04:30 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.  
**Project:** Ballinger  
**Project No:**  
**Lab Order:** 1112139

**Client Sample ID:** B-MW-13  
**Lab ID:** 1112139-15  
**Collection Date:** 12/14/11 12:10 PM  
**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<0.300	0.300	1.00		mg/L	1	12/21/11 01:45 PM
Chloride	1180	30.0	100		mg/L	100	12/21/11 10:10 AM
Sulfate	2010	100	300		mg/L	100	12/21/11 10:10 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	4990	10.0	10.0		mg/L	1	12/21/11 04:30 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.  
**Project:** Ballinger  
**Project No:**  
**Lab Order:** 1112139

**Client Sample ID:** B-MW-09  
**Lab ID:** 1112139-16  
**Collection Date:** 12/14/11 12:15 PM  
**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<3.00	3.00	10.0		mg/L	10	12/21/11 02:55 PM
Chloride	11600	300	1000		mg/L	1000	12/21/11 11:59 AM
Sulfate	2150	100	300		mg/L	100	12/21/11 10:58 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	23000	200	200		mg/L	1	12/21/11 04:30 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.

**Project:** Ballinger

**Project No:**

**Lab Order:** 1112139

**Client Sample ID:** B-MW-09-D

**Lab ID:** 1112139-17

**Collection Date:** 12/14/11 12:15 PM

**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<3.00	3.00	10.0		mg/L	10	12/21/11 02:08 PM
Chloride	11700	300	1000		mg/L	1000	12/21/11 12:11 PM
Sulfate	2170	100	300		mg/L	100	12/21/11 11:10 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	24000	200	200		mg/L	1	12/21/11 04:30 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.  
**Project:** Ballinger  
**Project No:**  
**Lab Order:** 1112139

**Client Sample ID:** B-S-LOWER-SEEP-1  
**Lab ID:** 1112139-18  
**Collection Date:** 12/14/11 01:25 PM  
**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<3.00	3.00	10.0		mg/L	10	12/21/11 02:20 PM
Chloride	7810	300	1000		mg/L	1000	12/21/11 12:22 PM
Sulfate	939	100	300		mg/L	100	12/21/11 11:21 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	13700	50.0	50.0		mg/L	1	12/21/11 04:30 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.  
**Project:** Ballinger  
**Project No:**  
**Lab Order:** 1112139

**Client Sample ID:** B-MW-02  
**Lab ID:** 1112139-19  
**Collection Date:** 12/14/11 01:30 PM  
**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<3.00	3.00	10.0		mg/L	10	12/21/11 03:07 PM
Chloride	7940	300	1000		mg/L	1000	12/21/11 12:34 PM
Sulfate	1420	100	300		mg/L	100	12/21/11 11:33 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	15700	50.0	50.0		mg/L	1	12/21/11 04:30 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.

**Project:** Ballinger

**Project No:**

**Lab Order:** 1112139

**Client Sample ID:** B-SW-EC-2500-UP

**Lab ID:** 1112139-20

**Collection Date:** 12/14/11 02:05 PM

**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<0.300	0.300	1.00		mg/L	1	12/21/11 02:43 PM
Chloride	403	30.0	100		mg/L	100	12/21/11 11:44 AM
Sulfate	1020	100	300		mg/L	100	12/21/11 11:44 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	2350	10.0	10.0		mg/L	1	12/21/11 04:30 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.

**Project:** Ballinger

**Project No:**

**Lab Order:** 1112139

**Client Sample ID:** B-SW-CR-2500-UP

**Lab ID:** 1112139-21

**Collection Date:** 12/14/11 02:10 PM

**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<0.300	0.300	1.00		mg/L	1	12/22/11 11:16 AM
Chloride	475	3.00	10.0		mg/L	10	12/22/11 09:30 AM
Sulfate	1540	10.0	30.0		mg/L	10	12/22/11 09:30 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	3000	10.0	10.0		mg/L	1	12/21/11 04:30 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.  
**Project:** Ballinger  
**Project No:**  
**Lab Order:** 1112139

**Client Sample ID:** B-SW-CR-2500-DOWN  
**Lab ID:** 1112139-22  
**Collection Date:** 12/14/11 03:10 PM  
**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<0.300	0.300	1.00		mg/L	1	12/22/11 11:51 AM
Chloride	455	3.00	10.0		mg/L	10	12/22/11 09:42 AM
Sulfate	1440	10.0	30.0		mg/L	10	12/22/11 09:42 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	2820	10.0	10.0		mg/L	1	12/21/11 04:30 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.

**Project:** Ballinger

**Project No:**

**Lab Order:** 1112139

**Client Sample ID:** B-MW-16

**Lab ID:** 1112139-23

**Collection Date:** 12/14/11

**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<3.00	3.00	10.0		mg/L	10	12/22/11 12:02 PM
Chloride	10900	300	1000		mg/L	1000	12/22/11 10:28 AM
Sulfate	1730	100	300		mg/L	100	12/22/11 09:53 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	23700	200	200		mg/L	1	12/21/11 04:30 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

**CLIENT:** TRC Environmental Corp.

**Project:** Ballinger

**Project No:**

**Lab Order:** 1112139

**Client Sample ID:** B-MW-17

**Lab ID:** 1112139-24

**Collection Date:** 12/14/11 03:00 PM

**Matrix:** Aqueous

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
<b>Anions by IC method - Water</b>		<b>E300</b>					<b>Analyst: JBC</b>
Bromide	<0.300	0.300	1.00		mg/L	1	12/22/11 12:14 PM
Chloride	1910	30.0	100		mg/L	100	12/22/11 10:17 AM
Sulfate	2400	100	300		mg/L	100	12/22/11 10:17 AM
<b>Total Dissolved Solids</b>		<b>M2540C</b>					<b>Analyst: JCG</b>
Total Dissolved Solids (Residue, Filterable)	6940	50.0	50.0		mg/L	1	12/21/11 04:30 PM

<b>Qualifiers:</b>	See Final Page of Report for MQLs and MDLs	J	Analyte detected between SDL and RL
B	Analyte detected in the associated Method Blank	N	Parameter not NELAC certified
C	Sample Result or QC discussed in the Case Narrative	ND	Not Detected at the SDL
DF	Dilution Factor	RL	Reporting Limit (MQL adjusted for moisture and sample size)
E	TPH pattern not Gas or Diesel Range Pattern	S	Spike Recovery outside control limits
		SDL	Sample Detection Limit

CLIENT: TRC Environmental Corp.  
 Work Order: 1112139  
 Project: Ballinger

**ANALYTICAL QC SUMMARY REPORT**  
 RunID: IC2\_111220A

<b>Sample ID:</b> LCS-49653	<b>Batch ID:</b> 49653	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> LCS	<b>Run ID:</b> IC2_111220A	<b>Analysis Date:</b> 12/20/11 08:54 AM	<b>Prep Date:</b> 12/20/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	20.3	1.00	20.00	0	102	90	110			
Chloride	9.81	1.00	10.00	0	98.1	90	110			
Sulfate	30.3	3.00	30.00	0	101	90	110			

<b>Sample ID:</b> LCSD-49653	<b>Batch ID:</b> 49653	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> LCSD	<b>Run ID:</b> IC2_111220A	<b>Analysis Date:</b> 12/20/11 09:06 AM	<b>Prep Date:</b> 12/20/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	20.5	1.00	20.00	0	102	90	110	0.545	20	
Chloride	9.86	1.00	10.00	0	98.6	90	110	0.494	20	
Sulfate	30.5	3.00	30.00	0	102	90	110	0.565	20	

<b>Sample ID:</b> MB-49653	<b>Batch ID:</b> 49653	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> MBLK	<b>Run ID:</b> IC2_111220A	<b>Analysis Date:</b> 12/20/11 09:18 AM	<b>Prep Date:</b> 12/20/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	<0.300	1.00								
Chloride	<0.300	1.00								
Sulfate	<1.00	3.00								

<b>Sample ID:</b> 1112139-07A MS	<b>Batch ID:</b> 49653	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> MS	<b>Run ID:</b> IC2_111220A	<b>Analysis Date:</b> 12/20/11 12:24 PM	<b>Prep Date:</b> 12/20/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Chloride	389	10.0	100.0	283.8	105	90	110			
Sulfate	1240	30.0	300.0	906.7	112	90	110			S

<b>Sample ID:</b> 1112139-07A MSD	<b>Batch ID:</b> 49653	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> MSD	<b>Run ID:</b> IC2_111220A	<b>Analysis Date:</b> 12/20/11 12:36 PM	<b>Prep Date:</b> 12/20/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Chloride	389	10.0	100.0	283.8	105	90	110	0.000	20	
Sulfate	1240	30.0	300.0	906.7	112	90	110	0.066	20	S

<b>Sample ID:</b> 1112139-07A MS	<b>Batch ID:</b> 49653	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> MS	<b>Run ID:</b> IC2_111220A	<b>Analysis Date:</b> 12/20/11 03:47 PM	<b>Prep Date:</b> 12/20/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	17.7	1.00	20.00	0	88.5	90	110			S

<b>Sample ID:</b> 1112139-07A MSD	<b>Batch ID:</b> 49653	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> MSD	<b>Run ID:</b> IC2_111220A	<b>Analysis Date:</b> 12/20/11 03:59 PM	<b>Prep Date:</b> 12/20/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	17.7	1.00	20.00	0	88.7	90	110	0.272	20	S

<b>Qualifiers:</b>	B	Analyte detected in the associated Method Blank	R	RPD outside accepted control limits
	DF	Dilution Factor	RL	Reporting Limit
	J	Analyte detected between MDL and RL	S	Spike Recovery outside control limits
	MDL	Method Detection Limit	J	Analyte detected between SDL and RL
	ND	Not Detected at the Method Detection Limit	N	Parameter not NELAC certified

**CLIENT:** TRC Environmental Corp.  
**Work Order:** 1112139  
**Project:** Ballinger

**ANALYTICAL QC SUMMARY REPORT**

**RunID:** IC2\_111220A

<b>Sample ID:</b>	ICV-111220	<b>Batch ID:</b>	R58299	<b>TestNo:</b>	E300	<b>Units:</b>	mg/L			
<b>SampType:</b>	ICV	<b>Run ID:</b>	IC2_111220A	<b>Analysis Date:</b>	12/20/11 08:40 AM	<b>Prep Date:</b>				
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	53.1	1.00	50.00	0	106	90	110			
Chloride	26.1	1.00	25.00	0	104	90	110			
Sulfate	80.9	3.00	75.00	0	108	90	110			

<b>Sample ID:</b>	CCV1-111220	<b>Batch ID:</b>	R58299	<b>TestNo:</b>	E300	<b>Units:</b>	mg/L			
<b>SampType:</b>	CCV	<b>Run ID:</b>	IC2_111220A	<b>Analysis Date:</b>	12/20/11 10:51 AM	<b>Prep Date:</b>				
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	20.4	1.00	20.00	0	102	90	110			
Chloride	9.89	1.00	10.00	0	98.9	90	110			
Sulfate	30.6	3.00	30.00	0	102	90	110			

<b>Sample ID:</b>	CCV2-111220	<b>Batch ID:</b>	R58299	<b>TestNo:</b>	E300	<b>Units:</b>	mg/L			
<b>SampType:</b>	CCV	<b>Run ID:</b>	IC2_111220A	<b>Analysis Date:</b>	12/20/11 01:10 PM	<b>Prep Date:</b>				
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	20.5	1.00	20.00	0	103	90	110			
Chloride	9.91	1.00	10.00	0	99.1	90	110			
Sulfate	30.8	3.00	30.00	0	103	90	110			

<b>Sample ID:</b>	CCV3-111220	<b>Batch ID:</b>	R58299	<b>TestNo:</b>	E300	<b>Units:</b>	mg/L			
<b>SampType:</b>	CCV	<b>Run ID:</b>	IC2_111220A	<b>Analysis Date:</b>	12/20/11 03:35 PM	<b>Prep Date:</b>				
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	20.6	1.00	20.00	0	103	90	110			
Chloride	10.0	1.00	10.00	0	100	90	110			
Sulfate	31.4	3.00	30.00	0	105	90	110			

<b>Sample ID:</b>	CCV4-111220	<b>Batch ID:</b>	R58299	<b>TestNo:</b>	E300	<b>Units:</b>	mg/L			
<b>SampType:</b>	CCV	<b>Run ID:</b>	IC2_111220A	<b>Analysis Date:</b>	12/20/11 05:20 PM	<b>Prep Date:</b>				
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	20.6	1.00	20.00	0	103	90	110			

<b>Qualifiers:</b>	B	Analyte detected in the associated Method Blank	R	RPD outside accepted control limits
	DF	Dilution Factor	RL	Reporting Limit
	J	Analyte detected between MDL and RL	S	Spike Recovery outside control limits
	MDL	Method Detection Limit	J	Analyte detected between SDL and RL
	ND	Not Detected at the Method Detection Limit	N	Parameter not NELAC certified

**CLIENT:** TRC Environmental Corp.  
**Work Order:** 1112139  
**Project:** Ballinger

**ANALYTICAL QC SUMMARY REPORT**  
**RunID: IC2\_111221A**

<b>Sample ID:</b> LCS-49666	<b>Batch ID:</b> 49666	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> LCS	<b>Run ID:</b> IC2_111221A	<b>Analysis Date:</b> 12/21/11 08:49 AM	<b>Prep Date:</b> 12/21/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	20.5	1.00	20.00	0	103	90	110			
Chloride	9.99	1.00	10.00	0	99.9	90	110			
Sulfate	30.6	3.00	30.00	0	102	90	110			

<b>Sample ID:</b> LCSD-49666	<b>Batch ID:</b> 49666	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> LCSD	<b>Run ID:</b> IC2_111221A	<b>Analysis Date:</b> 12/21/11 09:00 AM	<b>Prep Date:</b> 12/21/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	20.6	1.00	20.00	0	103	90	110	0.436	20	
Chloride	10.0	1.00	10.00	0	100	90	110	0.350	20	
Sulfate	30.8	3.00	30.00	0	103	90	110	0.666	20	

<b>Sample ID:</b> MB-49666	<b>Batch ID:</b> 49666	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> MBLK	<b>Run ID:</b> IC2_111221A	<b>Analysis Date:</b> 12/21/11 09:12 AM	<b>Prep Date:</b> 12/21/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	<0.300	1.00								
Chloride	<0.300	1.00								
Sulfate	<1.00	3.00								

<b>Sample ID:</b> 1112139-11A MS	<b>Batch ID:</b> 49666	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> MS	<b>Run ID:</b> IC2_111221A	<b>Analysis Date:</b> 12/21/11 10:21 AM	<b>Prep Date:</b> 12/21/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	208	10.0	200.0	0	104	90	110			
Chloride	380	10.0	100.0	277.2	103	90	110			
Sulfate	1230	30.0	300.0	900.0	111	90	110			S

<b>Sample ID:</b> 1112139-11A MSD	<b>Batch ID:</b> 49666	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> MSD	<b>Run ID:</b> IC2_111221A	<b>Analysis Date:</b> 12/21/11 10:33 AM	<b>Prep Date:</b> 12/21/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	207	10.0	200.0	0	103	90	110	0.597	20	
Chloride	382	10.0	100.0	277.2	104	90	110	0.296	20	
Sulfate	1230	30.0	300.0	900.0	110	90	110	0.290	20	S

<b>Qualifiers:</b>	B	Analyte detected in the associated Method Blank	R	RPD outside accepted control limits
	DF	Dilution Factor	RL	Reporting Limit
	J	Analyte detected between MDL and RL	S	Spike Recovery outside control limits
	MDL	Method Detection Limit	J	Analyte detected between SDL and RL
	ND	Not Detected at the Method Detection Limit	N	Parameter not NELAC certified

**CLIENT:** TRC Environmental Corp.  
**Work Order:** 1112139  
**Project:** Ballinger

**ANALYTICAL QC SUMMARY REPORT**

**RunID:** IC2\_111221A

<b>Sample ID:</b> ICV-111221	<b>Batch ID:</b> R58315	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> ICV	<b>Run ID:</b> IC2_111221A	<b>Analysis Date:</b> 12/21/11 08:36 AM	<b>Prep Date:</b>							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	52.7	1.00	50.00	0	105	90	110			
Chloride	26.3	1.00	25.00	0	105	90	110			
Sulfate	80.7	3.00	75.00	0	108	90	110			

<b>Sample ID:</b> CCV1-111221	<b>Batch ID:</b> R58315	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> CCV	<b>Run ID:</b> IC2_111221A	<b>Analysis Date:</b> 12/21/11 10:44 AM	<b>Prep Date:</b>							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	20.5	1.00	20.00	0	103	90	110			
Chloride	9.95	1.00	10.00	0	99.5	90	110			
Sulfate	30.8	3.00	30.00	0	103	90	110			

<b>Sample ID:</b> CCV2-111221	<b>Batch ID:</b> R58315	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> CCV	<b>Run ID:</b> IC2_111221A	<b>Analysis Date:</b> 12/21/11 12:46 PM	<b>Prep Date:</b>							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	20.7	1.00	20.00	0	104	90	110			
Chloride	10.1	1.00	10.00	0	101	90	110			
Sulfate	30.9	3.00	30.00	0	103	90	110			

<b>Sample ID:</b> CCV3-111221	<b>Batch ID:</b> R58315	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> CCV	<b>Run ID:</b> IC2_111221A	<b>Analysis Date:</b> 12/21/11 03:30 PM	<b>Prep Date:</b>							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	20.6	1.00	20.00	0	103	90	110			
Sulfate	30.9	3.00	30.00	0	103	90	110			

<b>Qualifiers:</b>	B	Analyte detected in the associated Method Blank	R	RPD outside accepted control limits
	DF	Dilution Factor	RL	Reporting Limit
	J	Analyte detected between MDL and RL	S	Spike Recovery outside control limits
	MDL	Method Detection Limit	J	Analyte detected between SDL and RL
	ND	Not Detected at the Method Detection Limit	N	Parameter not NELAC certified

CLIENT: TRC Environmental Corp.  
 Work Order: 1112139  
 Project: Ballinger

**ANALYTICAL QC SUMMARY REPORT**  
 RunID: IC2\_111222A

<b>Sample ID:</b> LCS-49682	<b>Batch ID:</b> 49682	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> LCS	<b>Run ID:</b> IC2_111222A	<b>Analysis Date:</b> 12/22/11 08:54 AM	<b>Prep Date:</b> 12/22/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	20.4	1.00	20.00	0	102	90	110			
Chloride	9.87	1.00	10.00	0	98.7	90	110			
Sulfate	30.4	3.00	30.00	0	101	90	110			

<b>Sample ID:</b> LCSD-49682	<b>Batch ID:</b> 49682	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> LCSD	<b>Run ID:</b> IC2_111222A	<b>Analysis Date:</b> 12/22/11 09:05 AM	<b>Prep Date:</b> 12/22/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	20.6	1.00	20.00	0	103	90	110	0.769	20	
Chloride	10.0	1.00	10.00	0	100	90	110	1.38	20	
Sulfate	30.8	3.00	30.00	0	103	90	110	1.14	20	

<b>Sample ID:</b> MB-49682	<b>Batch ID:</b> 49682	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> MBLK	<b>Run ID:</b> IC2_111222A	<b>Analysis Date:</b> 12/22/11 09:17 AM	<b>Prep Date:</b> 12/22/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	<0.300	1.00								
Chloride	<0.300	1.00								
Sulfate	<1.00	3.00								

<b>Sample ID:</b> 1112139-21A MS	<b>Batch ID:</b> 49682	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> MS	<b>Run ID:</b> IC2_111222A	<b>Analysis Date:</b> 12/22/11 10:40 AM	<b>Prep Date:</b> 12/22/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Chloride	384	10.0	100.0	285.1	99.3	90	110			
Sulfate	1260	30.0	300.0	926.6	113	90	110			S

<b>Sample ID:</b> 1112139-21A MSD	<b>Batch ID:</b> 49682	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> MSD	<b>Run ID:</b> IC2_111222A	<b>Analysis Date:</b> 12/22/11 10:51 AM	<b>Prep Date:</b> 12/22/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Chloride	384	10.0	100.0	285.1	99.3	90	110	0.008	20	
Sulfate	1270	30.0	300.0	926.6	113	90	110	0.016	20	S

<b>Sample ID:</b> 1112139-21A MS	<b>Batch ID:</b> 49682	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> MS	<b>Run ID:</b> IC2_111222A	<b>Analysis Date:</b> 12/22/11 11:27 AM	<b>Prep Date:</b> 12/22/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	25.8	1.00	20.00	0	129	90	110			S

<b>Sample ID:</b> 1112139-21A MSD	<b>Batch ID:</b> 49682	<b>TestNo:</b> E300	<b>Units:</b> mg/L							
<b>SampType:</b> MSD	<b>Run ID:</b> IC2_111222A	<b>Analysis Date:</b> 12/22/11 11:39 AM	<b>Prep Date:</b> 12/22/11							
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>	<b>Ref Val</b>	<b>%REC</b>	<b>LowLimit</b>	<b>HighLimit</b>	<b>%RPD</b>	<b>RPD Limit</b>	<b>Qual</b>
Bromide	26.0	1.00	20.00	0	130	90	110	0.882	20	S

<b>Qualifiers:</b>	B	Analyte detected in the associated Method Blank	R	RPD outside accepted control limits
	DF	Dilution Factor	RL	Reporting Limit
	J	Analyte detected between MDL and RL	S	Spike Recovery outside control limits
	MDL	Method Detection Limit	J	Analyte detected between SDL and RL
	ND	Not Detected at the Method Detection Limit	N	Parameter not NELAC certified

CLIENT: TRC Environmental Corp.  
 Work Order: 1112139  
 Project: Ballinger

**ANALYTICAL QC SUMMARY REPORT**

RunID: IC2\_111222A

Sample ID:	ICV-111222	Batch ID:	R58332	TestNo:	E300	Units:	mg/L			
SampType:	ICV	Run ID:	IC2_111222A	Analysis Date:	12/22/11 08:41 AM	Prep Date:				
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPD Limit	Qual
Bromide	52.8	1.00	50.00	0	106	90	110			
Chloride	26.2	1.00	25.00	0	105	90	110			
Sulfate	81.2	3.00	75.00	0	108	90	110			

Sample ID:	CCV1-111222	Batch ID:	R58332	TestNo:	E300	Units:	mg/L			
SampType:	CCV	Run ID:	IC2_111222A	Analysis Date:	12/22/11 11:03 AM	Prep Date:				
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPD Limit	Qual
Bromide	20.5	1.00	20.00	0	103	90	110			
Chloride	9.95	1.00	10.00	0	99.5	90	110			
Sulfate	30.6	3.00	30.00	0	102	90	110			

Sample ID:	CCV2-111222	Batch ID:	R58332	TestNo:	E300	Units:	mg/L			
SampType:	CCV	Run ID:	IC2_111222A	Analysis Date:	12/22/11 12:48 PM	Prep Date:				
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPD Limit	Qual
Bromide	20.6	1.00	20.00	0	103	90	110			

<b>Qualifiers:</b>	B	Analyte detected in the associated Method Blank	R	RPD outside accepted control limits
	DF	Dilution Factor	RL	Reporting Limit
	J	Analyte detected between MDL and RL	S	Spike Recovery outside control limits
	MDL	Method Detection Limit	J	Analyte detected between SDL and RL
	ND	Not Detected at the Method Detection Limit	N	Parameter not NELAC certified

**CLIENT:** TRC Environmental Corp.  
**Work Order:** 1112139  
**Project:** Ballinger

**ANALYTICAL QC SUMMARY REPORT**

**RunID:** WC\_111220A

<b>Sample ID:</b> LCS-49635	<b>Batch ID:</b> 49635	<b>TestNo:</b> M2540C	<b>Units:</b> mg/L
<b>SampType:</b> LCS	<b>Run ID:</b> WC_111220A	<b>Analysis Date:</b> 12/20/11 04:20 PM	<b>Prep Date:</b> 12/20/11
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>
Total Dissolved Solids (Residue, Fi	733	10.0	745.6
			<b>Ref Val</b> <b>%REC</b> <b>LowLimit</b> <b>HighLimit</b> <b>%RPD</b> <b>RPD Limit</b> <b>Qual</b>
			0 98.3 90 113

<b>Sample ID:</b> MB-49635	<b>Batch ID:</b> 49635	<b>TestNo:</b> M2540C	<b>Units:</b> mg/L
<b>SampType:</b> MBLK	<b>Run ID:</b> WC_111220A	<b>Analysis Date:</b> 12/20/11 04:20 PM	<b>Prep Date:</b> 12/20/11
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>
Total Dissolved Solids (Residue, Fi	<10.0	10.0	

<b>Sample ID:</b> 1112124-01CDUP	<b>Batch ID:</b> 49635	<b>TestNo:</b> M2540C	<b>Units:</b> mg/L
<b>SampType:</b> DUP	<b>Run ID:</b> WC_111220A	<b>Analysis Date:</b> 12/20/11 04:20 PM	<b>Prep Date:</b> 12/20/11
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>
Total Dissolved Solids (Residue, Fi	1760	10.0	0
			<b>Ref Val</b> <b>%REC</b> <b>LowLimit</b> <b>HighLimit</b> <b>%RPD</b> <b>RPD Limit</b> <b>Qual</b>
			1772 0.623 5

<b>Sample ID:</b> 1112139-12ADUP	<b>Batch ID:</b> 49635	<b>TestNo:</b> M2540C	<b>Units:</b> mg/L
<b>SampType:</b> DUP	<b>Run ID:</b> WC_111220A	<b>Analysis Date:</b> 12/20/11 04:20 PM	<b>Prep Date:</b> 12/20/11
<b>Analyte</b>	<b>Result</b>	<b>RL</b>	<b>SPK value</b>
Total Dissolved Solids (Residue, Fi	2910	10.0	0
			<b>Ref Val</b> <b>%REC</b> <b>LowLimit</b> <b>HighLimit</b> <b>%RPD</b> <b>RPD Limit</b> <b>Qual</b>
			2871 1.35 5

<b>Qualifiers:</b>	B	Analyte detected in the associated Method Blank	R	RPD outside accepted control limits
	DF	Dilution Factor	RL	Reporting Limit
	J	Analyte detected between MDL and RL	S	Spike Recovery outside control limits
	MDL	Method Detection Limit	J	Analyte detected between SDL and RL
	ND	Not Detected at the Method Detection Limit	N	Parameter not NELAC certified

CLIENT: TRC Environmental Corp.  
 Work Order: 1112139  
 Project: Ballinger

**ANALYTICAL QC SUMMARY REPORT**

RunID: WC\_111221B

Sample ID: LCS-49665	Batch ID: 49665	TestNo: M2540C	Units: mg/L
SampType: LCS	Run ID: WC_111221B	Analysis Date: 12/21/11 04:30 PM	Prep Date: 12/21/11
Analyte	Result	RL	SPK value
Total Dissolved Solids (Residue, Fi	711	10.0	745.6
			Ref Val %REC LowLimit HighLimit %RPD RPD Limit Qual
			0 95.4 90 113

Sample ID: MB-49665	Batch ID: 49665	TestNo: M2540C	Units: mg/L
SampType: MBLK	Run ID: WC_111221B	Analysis Date: 12/21/11 04:30 PM	Prep Date: 12/21/11
Analyte	Result	RL	SPK value
Total Dissolved Solids (Residue, Fi	<10.0	10.0	
			Ref Val %REC LowLimit HighLimit %RPD RPD Limit Qual

Sample ID: 1112139-14ADUP	Batch ID: 49665	TestNo: M2540C	Units: mg/L
SampType: DUP	Run ID: WC_111221B	Analysis Date: 12/21/11 04:30 PM	Prep Date: 12/21/11
Analyte	Result	RL	SPK value
Total Dissolved Solids (Residue, Fi	2930	10.0	0
			Ref Val %REC LowLimit HighLimit %RPD RPD Limit Qual
			2938 0.170 5

Sample ID: 1112140-08ADUP	Batch ID: 49665	TestNo: M2540C	Units: mg/L
SampType: DUP	Run ID: WC_111221B	Analysis Date: 12/21/11 04:30 PM	Prep Date: 12/21/11
Analyte	Result	RL	SPK value
Total Dissolved Solids (Residue, Fi	20600	200	0
			Ref Val %REC LowLimit HighLimit %RPD RPD Limit Qual
			20260 1.47 5

<b>Qualifiers:</b>	B	Analyte detected in the associated Method Blank	R	RPD outside accepted control limits
	DF	Dilution Factor	RL	Reporting Limit
	J	Analyte detected between MDL and RL	S	Spike Recovery outside control limits
	MDL	Method Detection Limit	J	Analyte detected between SDL and RL
	ND	Not Detected at the Method Detection Limit	N	Parameter not NELAC certified

**CLIENT:** TRC Environmental Corp.  
**Work Order:** 1112139  
**Project:** Ballinger

**MQL SUMMARY REPORT**

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<b>TestNo: E300</b>	<b>MDL</b>	<b>MQL</b>
<b>Analyte</b>	<b>mg/L</b>	<b>mg/L</b>
Bromide	0.300	1.00
Chloride	0.300	1.00
Sulfate	1.00	3.00

<b>TestNo: M2540C</b>	<b>MDL</b>	<b>MQL</b>
<b>Analyte</b>	<b>mg/L</b>	<b>mg/L</b>
Total Dissolved Solids (Residue, Fi	10.0	10.0

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**Qualifiers:**

MQL - Method Quantitation Limit as defined by TRRP  
MDL - Method Detection Limit as defined by TRRP

**ATTACHMENT 3**

**Analytical Data Review/Data Validation Checklist**



## QA Data Evaluation Results RRC – Ballinger BMP

*December 2011 Analytical Data*

### Background

Water samples were collected on December 13 and 14, 2011. The samples were submitted to DHL Analytical in Round Rock, Texas for analysis. Results for the following methods are reported:

- Bromide, Chloride, and Sulfate by U.S. EPA Method 300.0
- Total Dissolved Solids (TDS) by SM 2540 C

TRC QA staff performed a review of quality control (QC) data associated with the samples to ensure that the reported analytical results are valid, accurate, and sufficient to meet quality objectives. Data were reviewed for compliance with the requirements given in *Investigations and Abatement of Produced Water Impacts and Seeps to Surface Water in the Upper Colorado River Basin Downstream of Spence Reservoir (Segment 1426) Quality Assurance Project Plan* (Railroad Commission of Texas, Oil and Gas Division, Revision 2, March 19, 2008)(the QAPP). Items reviewed during the data validation process included sample integrity, blank analyses, spike recoveries, and duplicate recoveries. Samples reviewed to prepare this evaluation are presented in Table 1.

The following is a discussion of the QC analyses performed with the site samples and any potential data limitations associated with the results of analyses.

### Sample Integrity

All samples were adequately preserved and analyzed within method-defined holding times.

Laboratory notes indicate that the container for sample B-SW-CR-250-UP came open during shipment; however, the contents of the bottle were contained in a plastic zip top bag. This sample material was analyzed for both anions and TDS. Based on this samples excessive exposure and aeration within the plastic bag, all reported results should be considered estimated with a likely low bias.

### Blank Analyses

Target analytes were not detected in reported method blanks indicating that laboratory contamination did not impact analytical results.

### Spike Recoveries

All reported LCS recoveries fall within QAPP-specified QC limits. These results are indicative of adequate laboratory measurement control in the absence of potential matrix interferences at the time of sample analyses.

Sample B-SW-CR-1000-UP was analyzed as an MS/MSD pair for anions. Recoveries of sulfate are greater than QAPP-specified limits and recoveries of bromide are less than control limits. These results are indicative of a low bias for bromide and a high bias for sulfate in sample B-

SW-CR-1000-UP due to matrix interferences. These biases may extend to other samples collected as part of this project.

Sample B-SW-CR-500-DOWN was analyzed as MS/MSD pairs for anions. One recovery of sulfate is slightly greater than control limits and the other recovery is within limits; therefore, since one recovery is within expected tolerances, no data interpretation issues are indicated for sulfate.

Sample B-SW-CR-2500-UP was analyzed as an MS/MSD pair for anions. Both recoveries of bromide and sulfate are greater than QAPP-defined limits. These results are indicative a high bias for bromide and sulfate in sample B-SW-CR-2500-UP due to matrix interferences. These biases may extend to other samples collected for this project.

### **Duplicate Sample Analyses**

All reported RPD values for LCS/LCSD pairs are within laboratory-derived limits indicating that the laboratory achieved adequate precision in the absence of potential matrix interferences at the time of sample analysis.

RPD values associated with MS/MSD analyses are within laboratory-specified limits indicating that the sample matrix has minimal impact, if any, on analytical precision.

Sample B-MW-09-D was collected as a field duplicate of sample B-MW-09. Calculated RPD values for detected analytes in these analyses are presented in Table 2. Adequate precision is exhibited for all detected analytes and data interpretation issues are not indicated.

Samples B-SW-CR-50-DOWN and B-SW-CR-50-UP were analyzed as laboratory duplicates for TDS. Both RPD values are within laboratory-specified control limits and no data interpretation issues are indicated:

### **Conclusions**

QC data associated with laboratory measurements indicate that data are defensible and that measurement data reliability is generally within expected limits of sampling and analytical error. The data user is advised of the following identified issues:

- Reported results for all target analytes in sample B-SW-CR-250-UP are biased low based on sample integrity issues.
- Based on MS/MSD results, the following biases are present due to matrix interferences:
  - A low bias for bromide and a high bias for sulfate in sample B-SW-CR-1000-UP
  - A high bias for bromide and sulfate in sample B-SW-CR-2500-UP

**Table 1. Evaluated Samples**

TRC ID	Collected	Matrix	DHL ID
B-MW-8	12/13/2011	Aqueous	1112139-01
B-MW-7	12/13/2011	Aqueous	1112139-02
B-MW-14	12/13/2011	Aqueous	1112139-03
B-MW-3	12/13/2011	Aqueous	1112139-04
B-MW-5	12/13/2011	Aqueous	1112139-05
B-MW-4	12/14/2011	Aqueous	1112139-06
B-SW-CR-1000-UP	12/14/2011	Aqueous	1112139-07
B-MW-1	12/14/2011	Aqueous	1112139-08
B-SW-CR-1500-DOWN	12/14/2011	Aqueous	1112139-09
B-SW-CR-900-DOWN	12/14/2011	Aqueous	1112139-10
B-SW-CR-500-DOWN	12/14/2011	Aqueous	1112139-11
B-SW-CR-50-DOWN	12/14/2011	Aqueous	1112139-12
B-SW-CR-250-UP	12/14/2011	Aqueous	1112139-13
B-SW-CR-50-UP	12/14/2011	Aqueous	1112139-14
B-MW-13	12/14/2011	Aqueous	1112139-15
B-MW-09	12/14/2011	Aqueous	1112139-16
B-MW-09-D	12/14/2011	Aqueous	1112139-17
B-S-LOWER-SEEP-1	12/14/2011	Aqueous	1112139-18
B-MW-02	12/14/2011	Aqueous	1112139-19
B-SW-EC-2500-UP	12/14/2011	Aqueous	1112139-20
B-SW-CR-2500-UP	12/14/2011	Aqueous	1112139-21
B-SW-CR-2500-DOWN	12/14/2011	Aqueous	1112139-22
B-MW-16	12/14/2011	Aqueous	1112139-23
B-MW-17	12/14/2011	Aqueous	1112139-24

**Table 2. Calculated RPD Values for Field Duplicate Analyses of Sample B-MW-09**

Analyte	Result	Duplicate Result	Units	RPD	Flag
Chloride	11600	11700	mg/L	0.86	
Sulfate	2150	2170	mg/L	0.92	
TDS	23000	24000	mg/L	4.2	

\* RPD Greater than expected (i.e., RPD > 20)  
NC Not Calculated  
ND Not Detected