

Date: March 2008

Atlantic Richfield  
Company

Project: 134557

**Well B/W-25D  
Construction Details**

# Brown and Caldwell

Carson City, Nevada

## BORING LOG

Project Name: Yerington Second Step Hydrogeologic Framework Assessment

Project Number: 132025

Soil Boring:  Monitoring Well:  Piezometer:

Boring/Well Number: B/W-25D

Sheet **1** of **14**

<b>Boring Location:</b> South side of road, one mile west on Luzier Lane.		<b>Northing:</b>	<b>Easting:</b>
<b>Drilling Contractor:</b> Boart Longyear	<b>Driller:</b> R. Salois	<b>Top of PVC Elevation:</b> feet amsl	
<b>Drilling Equipment:</b> GP24-300RS	<b>Borehole Diameter:</b> 6-inches	<b>Ground Surface Elevation:</b> feet amsl	
<b>Drilling Method:</b> Sonic	<b>Drilling Fluid:</b> Water	<b>Date Started:</b> 12/17/07	<b>Date Finished:</b> 1/19/08
<b>Sampling Method:</b> Core Barrel		<b>Completed Depth:</b> 252 fbgs	<b>Water Depth:</b> fbmp
<b>Well Seal:</b> Bentonite and Cement		<b>WELL CONSTRUCTION</b>	
<b>Logged By:</b> C. Strauss		<b>Type and Diameter of Well Casing:</b> 2-inch Schedule 80 PVC	
		<b>Slot Size:</b> 0.010 inch	<b>Filter Material:</b> #10-20 Silica Sand

Depth (ft)	Elevation (ft)	USCS Group Symbol	Material Description	Sample Name	Sample Location	Lithology	Well Construction	Remarks
		SP	<b>Poorly Graded Sand (0 - 2)</b> Dry, loose, no odor. Primarily medium to fine sand with ~5% gravel to 10 mm and ~10% silt and clay. The sand and gravel are subangular to subrounded. The fines are nonplastic, and do not react to HCl.					Description of drilled cuttings based on ASTM Method D-2488 (the visual-manual procedure), grain-size determinations and nomenclature based on the Unified Soil Classification System.  Horizontal Survey data is expressed in the Nevada State Plane system, Nevada West zone, in feet.  Sharp contacts indicated by solid lines, gradational contacts indicated by dashed line.  All depths are below land surface unless stated otherwise.  WELL DESIGN for B/W-25D: PVC Stickup: feet. Cement - Bentonite Grout: 0 - 208 feet Bentonite Chips: 208 - 213 feet No. 60 Silica Sand: 213 - 214 feet #10-20 Silica Sand Filter Pack: 214 - 238 feet 2-inch Nominal Schedule 80 PVC 0.010 Slotted Screen: 218 - 238 feet Native Collapse: 238 - 252 feet Additional Bentonite Fill: NA feet  Number of wells at this location: 3 Screen intervals for paired wells are labeled at the installed depths.
		SM	<b>Silty Sand (2 - 9)</b> Dry, loose to dense, no odor. Primarily medium to fine sand with ~5% gravel to 5mm and ~20% silt and clay. The sand and gravel are subangular to subrounded. The fines are nonplastic to low plasticity and toughness, and do not react to HCl.					
5								
		SP	<b>Poorly Graded Sand (9 - 12)</b> Dry, loose, no odor. Primarily medium to fine sand with ~5% gravel to 10 mm and ~15% silt and clay. The sand and gravel are subangular to subrounded. The fines are nonplastic, and do not react to HCl.					
10								
		SC	<b>Clayey Sand (12 - 14)</b> Moist, dense, no odor. Primarily medium to fine sand with ~5% gravel to 10 mm and ~25% silt and clay. The sand and gravel are angular to subangular. The fines are nonplastic to low plasticity and toughness, and do not react to HCl.					
		SP	<b>Poorly Graded Sand (14 - 15)</b> Moist to saturated, dense, no odor. Primarily medium to fine sand with ~10% gravel to 15 mm and ~10% silt					

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Soil Boring:

Monitoring Well:

Piezometer:

Boring/Well Number: B/W-25D

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Depth (ft)	Elevation (ft)	USCS Group Symbol	Material Description	Sample Name	Sample Location	Lithology	Well Construction	Remarks
		SM	and clay. The sand and gravel are subangular to subrounded. The fines are nonplastic, and do not react to HCl. <b>Silty Sand (15 - 18)</b> Dry to moist, very dense, no odor. Primarily medium to fine sand with ~5% gravel to 5 mm and ~30% silt and clay. The sand and gravel are subangular to subrounded. The fines have low to medium plasticity and toughness, and do not react to HCl.					
		SP	<b>Poorly Graded Sand (18 - 18.5)</b> Moist to saturated, dense, no odor. Primarily medium to fine sand with ~5% gravel to 10 mm and ~10% silt and clay. The sand and gravel are subangular to subrounded. The fines are nonplastic, and do not react to HCl.					
		SM						
20			<b>Silty Sand (18.5 - 23)</b> Moist, very dense, no odor. Primarily medium to fine sand with ~5% gravel to 5 mm and ~25% silt and clay. The sand and gravel are subangular to subrounded. The fines have low plasticity and toughness, and do not react to HCl.					
25		SC	<b>Clayey Sand (23 - 29)</b> Dry to moist, very dense, no odor. Primarily medium to fine sand with ~5% gravel to 10 mm and ~30% silt and clay. The sand and gravel are angular to subangular. The fines have low plasticity and toughness, and do not react to HCl.					
30		SW	<b>Well-Graded Sand (29 - 31)</b> Saturated, dense, no odor. Primarily medium to fine sand with ~10% gravel to 10 mm and ~10% silt and clay. The sand and gravel are subangular to subrounded. The fines are nonplastic, and do not react to HCl.					
		SM	<b>Silty Sand (31 - 31.5)</b> Moist, very dense, no odor. Primarily medium to fine sand with ~5% gravel to 5 mm and ~25% silt and clay. The sand and gravel are subangular to subrounded. The fines are nonplastic to low plasticity and toughness, and do not react to HCl.					
		SW						
		CL						
			<b>Well-Graded Sand (31.5 - 32.5)</b> Saturated, dense, no odor. Primarily medium to fine sand with ~10% gravel to 10 mm and ~10% silt and clay. The sand and gravel are subangular to	B/W-25D@29.5-34.5				

← B/W-25S screened from 29 to 49 feet

# BORING LOG

Project Name: Yerington Second Step Hydrogeologic Framework Assessment

Project Number: 132025

Soil Boring:  Monitoring Well:  Piezometer:

Boring/Well Number: BW-25D

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Depth (ft)	Elevation (ft)	USCS Group Symbol	Material Description	Sample Name	Sample Location	Lithology	Well Construction	Remarks
35			<p>subrounded. The fines are nonplastic, and do not react to HCl.</p> <p><b>Sandy Lean Clay (32.5 - 37)</b>                      Dry to moist, very dense, no odor. Primarily silt and clay with ~35% medium to fine sand with no gravel. The sand and gravel are angular to subangular. The fines have medium plasticity and toughness, and do not react to HCl.</p>		●			
		SP	<p><b>Poorly Graded Sand (37 - 43)</b>                      Saturated, dense, no odor. Primarily medium to fine sand with ~10% gravel to 10 mm and ~10% silt and clay. The sand and gravel are subangular to subrounded. The fines are nonplastic, and do not react to HCl.</p>					
40								
		SP	<p><b>Poorly Graded Sand (43 - 45)</b>                      Saturated, dense, no odor. Primarily medium to fine sand with ~5% gravel to 10 mm and ~15% silt and clay. The sand and gravel are subangular to subrounded. The fines are nonplastic, and do not react to HCl.</p>					
45			<p><b>Sandy Lean Clay (45 - 47)</b>                      Dry to moist, very dense, no odor. Primarily silt and clay with ~40% medium to fine sand with ~5% coarse sand to 5 mm. The sand is angular to subangular. The fines have low to medium plasticity and toughness, have a light brown color, and have no reaction to a weak reaction to HCl.</p>					
		CL						
		SP	<p><b>Poorly Graded Sand (47 - 55)</b>                      Saturated, dense, no odor. Primarily medium to fine sand with ~10% gravel to 10 mm and ~10% silt and clay. The sand and gravel are subangular to subrounded. The fines are nonplastic, and do not react to HCl. The sand is fining upward in section.</p>					
50								
				BW-25D@50-55				



# BORING LOG

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Soil Boring:  Monitoring Well:  Piezometer:

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Depth (ft)	Elevation (ft)	USCS Group Symbol	Material Description	Sample Name	Sample Location	Lithology	Well Construction	Remarks
75			The sand and gravel are subangular to subrounded. The fines have low plasticity and toughness, have a light brown color, and have no reaction to a weak reaction to HCl.					
80		SW	<b>Well-Graded Sand (78.5 - 89)</b> Saturated, dense, no odor. Primarily medium to fine sand with ~10% gravel to 10 mm and ~15% silt and clay. The sand and gravel are subangular to subrounded. The fines are nonplastic, and do not react to HCl.	B/W-25D@80-85				
90		SM	<b>Silty Sand (89 - 95)</b> Dry to moist, dense, no odor. Primarily medium to fine sand with ~5% coarse sand to 5 mm and ~35% silt and clay. The sand is subangular to subrounded. The fines have medium plasticity and toughness, and have no reaction to a weak reaction to HCl.					





# BORING LOG

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Boring/Well Number: BW-25D

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Depth (ft)	Elevation (ft)	USCS Group Symbol	Material Description	Sample Name	Sample Location	Lithology	Well Construction	Remarks
130		SM	<p><b>Silty Sand (129 - 135.5)</b>                      Moist, dense, no odor. Primarily medium to fine sand with ~5% coarse grain sand and ~30% silt and clay. The sand is subangular to subrounded. The fines are nonplastic to low plasticity and toughness, and do not react to HCl.</p>					
135		SM	<p><b>Silty Sand (135.5 - 142.5)</b>                      Moist, dense, no odor. Primarily medium to fine sand with ~5% coarse grain sand and ~20% silt and clay. The sand is subangular to subrounded. The fines are nonplastic, and do not react to HCl. Zone is mostly fine sand.</p>					
140		SP	<p><b>Poorly Graded Sand (142.5 - 146)</b>                      Saturated, dense, no odor. Primarily medium to fine sand with ~5% gravel to 10mm, ~10% coarse grain sand and ~10% silt and clay. The sand and gravel are subangular to subrounded. The fines are nonplastic, and do not react to HCl.</p>	BW-25D@80-85				
145		SM	<p><b>Silty Sand (146 - 149)</b>                      Moist, dense, no odor. Primarily medium to fine sand with ~10% coarse grain sand to 5mm and ~25% silt and clay. The sand is subangular to subrounded. The fines are nonplastic, and do not react to HCl.</p>					

# BORING LOG

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Depth (ft)	Elevation (ft)	USCS Group Symbol	Material Description	Sample Name	Sample Location	Lithology	Well Construction	Remarks
150		SM	<p><b>Silty Sand (149 - 155)</b>                      Dry to moist, dense, no odor. Primarily fine sand with ~20% medium grain sand to 2mm and ~40% silt and clay. The sand is angular to subangular. The fines are nonplastic, and do not react to HCl.</p>					
155		CL	<p><b>Clayey Sand (155 - 157)</b>                      Moist, very dense, no odor. Primarily medium to fine sand with ~5% gravel to 10mm, ~5% coarse grain sand and ~30% silt and clay. The sand and gravel are angular to subangular. The fines are nonplastic to low plasticity and toughness, and have a weak reaction to HCl.</p>					
		CL	<p><b>Sandy Lean Clay (157 - 158)</b>                      Dry, very dense, no odor. Primarily silt and clay with ~45% medium to fine grain sand to 2mm. The sand is angular to subangular. The fines have moderate to high plasticity, are moderately tough, and have no reaction to a weak reaction to HCl.</p>					
		SC	<p><b>Clayey Sand (158 - 162.5)</b>                      Dry to moist, very dense, no odor. Primarily medium to fine sand with ~5% gravel to 10mm, ~10% coarse grain sand and ~40% silt and clay. The sand and gravel are angular to subangular. The fines are nonplastic to low plasticity and toughness, and have a weak reaction to HCl.</p>					
160		CL	<p><b>Lean Clay (162.5 - 165)</b>                      Dry, very dense, no odor. Primarily silt and clay with ~40% medium to fine grain sand to 2mm. The sand is angular to subangular. The fines have medium plasticity and toughness, and have a weak reaction to HCl.</p>					
165		SP	<p><b>Poorly Graded Sand (165 - 166)</b>                      Saturated, dense, no odor. Primarily medium to fine sand with ~5% gravel to 5mm, ~10% coarse grain sand and ~15% silt and clay. The sand and gravel are subangular to subrounded. The fines are nonplastic, and do not react to HCl.</p>					
		CL	<p><b>Lean Clay (166 - 169)</b></p>					

# BORING LOG

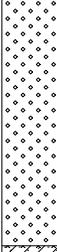
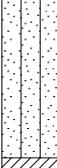
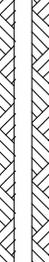
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Depth (ft)	Elevation (ft)	USCS Group Symbol	Material Description	Sample Name	Sample Location	Lithology	Well Construction	Remarks
			Moist, very dense, no odor. Primarily silt and clay with ~5% coarse grain sand to 3mm and ~45% medium to fine grain sand. The sand is angular to subangular. The fines are nonplastic to low plasticity and toughness, have a brown-gray color, and have no reaction to a weak reaction to HCl.					
170		SW	<b>Well-Graded Sand (169 - 172)</b> Saturated, dense, no odor. Primarily medium to fine sand with ~5% gravel to 10mm, ~10% coarse grain sand and ~ 15% silt and clay. The sand and gravel are subangular to subrounded. The fines are nonplastic, and do not react to HCl. Zone has more fines and finer sand are toward top of section.					
175		SC	<b>Clayey Sand (172 - 175)</b> Moist, very dense, no odor. Primarily medium to fine sand with ~5% gravel to 10mm. ~10% coarse grain sand and ~40% silt and clay. The sand and gravel are angular to subangular. The fines have low plasticity and toughness, have a light brown color, and do not react to HCl.					
180		CL	<b>Lean Clay (175 - 177)</b> Dry, very dense, no odor. Primarily silt and clay with ~40% medium to fine grained sand with a maximum grain size of 1 mm. The sand is angular to subangular. The fines have moderate to high plasticity, are moderately tough, have a brown color, and do not react to HCl.					
185		SM	<b>Silty Sand (177 - 181)</b> Dry to moist, dense, no odor. Primarily medium to fine sand with ~5% gravel to 5 mm and ~40% silt and clay. The sand and gravel are angular to subangular. The fines have low plasticity and toughness, and do not react to HCl.					
190		SM	<b>Silty Sand (181 - 183)</b> Moist, dense, no odor. Primarily medium to fine sand with ~5% coarse sand to 5 mm and ~20% silt and clay. The sand is subangular to subrounded. The fines are nonplastic, and do not react to HCl.					
195		CL	<b>Lean Clay (183 - 187.5)</b> Dry to moist, very dense, no odor. Primarily silt and clay with ~35% medium to fine grained sand. The sand is angular to subangular. The fines have moderate to high plasticity, are moderately tough, have a brown color, and do not react to HCl.					

# BORING LOG

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Project Number: 132025

Soil Boring:  Monitoring Well:  Piezometer:

Boring/Well Number: BW-25D

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Depth (ft)	Elevation (ft)	USCS Group Symbol	Material Description	Sample Name	Sample Location	Lithology	Well Construction	Remarks
190		SM	<p><b>Silty Sand (187.5 - 195)</b>                      Dry to moist, dense, no odor. Primarily medium to fine sand with ~5% gravel to 10 mm and ~25% silt and clay. The sand and gravel are angular to subangular. The fines are nonplastic to low plasticity and toughness, and do not react to HCl.</p>					
195		CL	<p><b>Lean Clay (195 - 196)</b>                      Dry to moist, very dense, no odor. Primarily silt and clay with ~5% gravel to 10 mm and ~ 35% medium to fine grained sand. The sand and gravel are angular to subangular. The fines have medium plasticity and toughness, have a brown color, and do not react to HCl.</p>					
200		SW	<p><b>Well-Graded Sand (196 - 200)</b>                      Saturated, dense, no odor. Primarily medium to fine sand with ~5% gravel to 10 mm and ~15% silt and clay. The sand and gravel are subangular to subrounded. The fines are nonplastic, and do not react to HCl. Zone coarsens upwater and the percent fines goes to approximately 20 toward the bottom.</p>					
205		SC	<p><b>Clayey Sand (200 - 205)</b>                      Dry to moist, very dense, no odor. Primarily medium to fine sand with ~5% gravel to 10 mm and ~40% silt and clay. The sand and gravel are angular to subangular. The fines have low plasticity and toughness, and do not react to HCl.</p>					
			<p>Clayey Sand (205 - 207)</p>					

# BORING LOG

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Boring/Well Number: B/W-25D

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Depth (ft)	Elevation (ft)	USCS Group Symbol	Material Description	Sample Name	Sample Location	Lithology	Well Construction	Remarks
		SC	Moist, dense, no odor. Primarily medium to fine sand with ~5% gravel to 10 mm and ~25% silt and clay. The sand and gravel are angular to subangular. The fines are nonplastic to low plasticity and toughness, and do not react to HCl.			[Lithology Pattern: Diagonal Lines]	[Well Construction: Solid Black]	
		CL	<b>Lean Clay (207 - 213.5)</b> Dry to moist, very dense, no odor. Primarily silt and clay with ~40% medium to fine grained sand with a maximum grain size of 1 mm. The sand and gravel are angular to subangular. The fines are nonplastic, and do not react to HCl.			[Lithology Pattern: Horizontal Lines]	[Well Construction: Solid Black]	
210						[Lithology Pattern: Diagonal Lines]	[Well Construction: Solid Black]	
		SM	<b>Silty Sand (213.5 - 217)</b> Moist, dense, no odor. Primarily medium to fine sand with ~5% gravel to 10 mm and ~30% silt and clay. The sand and gravel are subangular to subrounded. The fines are nonplastic, and do not react to HCl.			[Lithology Pattern: Stippled]	[Well Construction: Solid Black]	
215						[Lithology Pattern: Stippled]	[Well Construction: Solid Black]	
		SC	<b>Clayey Sand (217 - 222)</b> Dry to moist, very dense, no odor. Primarily medium to fine sand with ~5% coarse sand to 2 mm and ~35% silt and clay. The sand is angular to subangular. The fines are nonplastic, and do not react to HCl.			[Lithology Pattern: Diagonal Lines]	[Well Construction: Solid Black]	
220						[Lithology Pattern: Diagonal Lines]	[Well Construction: Solid Black]	
		SP	<b>Poorly Graded Sand (222 - 222.5)</b> Moist, dense, no odor. Primarily medium to fine sand with a maximum grain size of 1 mm and ~15% silt and clay. The sand is subangular to subrounded. The fines are nonplastic, and do not react to HCl.			[Lithology Pattern: Stippled]	[Well Construction: Solid Black]	
		SC					[Lithology Pattern: Stippled]	[Well Construction: Solid Black]
			<b>Clayey Sand (222.5 - 227.5)</b> Dry to moist, very dense, no odor. Primarily medium to fine sand with ~5% gravel to 5 mm and ~40% silt			[Lithology Pattern: Diagonal Lines]	[Well Construction: Solid Black]	

← B/W-25D screened from 218 to 238 feet

# BORING LOG

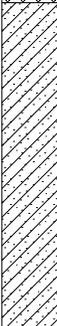
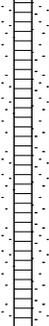
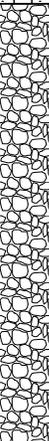
Project Name: Yerington Second Step Hydrogeologic Framework Assessment

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Soil Boring:  Monitoring Well:  Piezometer:

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Depth (ft)	Elevation (ft)	USCS Group Symbol	Material Description	Sample Name	Sample Location	Lithology	Well Construction	Remarks
225			and clay. The sand and gravel are angular to subangular. The fines have low plasticity and toughness, and have no reaction to a weak reaction to HCl.					
		SC	<b>Clayey Sand (227.5 - 228.5)</b> Dry to moist, very dense, no odor. Primarily medium to fine sand with ~5% gravel to 5 mm and ~30% silt and clay. The sand and gravel are angular to subangular. The fines are nonplastic to low plasticity and toughness, and do not react to HCl.					
		SW	<b>Well-Graded Sand (228.5 - 231)</b> Saturated, dense, no odor. Primarily medium to fine sand with ~5% gravel to 10 mm and ~15% silt and clay. The sand and gravel are subangular to subrounded. The fines have low plasticity and toughness, and have no reaction to a weak reaction to HCl. Zone has more fines toward the bottom of the section.					
230		SC	<b>Clayey Sand (231 - 235)</b> Dry, very dense, no odor. Primarily medium to fine sand with ~10% gravel to 10 mm and ~30% silt and clay. The sand and gravel are angular to subangular. The fines are nonplastic, and have no reaction to a weak reaction to HCl.					
235		CL	<b>Lean Clay (235 - 245)</b> Dry, very dense, no odor. Primarily silt and clay with ~40% medium to fine grained sand with a maximum grain size of 0.5 mm. The sand and gravel are angular to subangular. The fines are highly plastic, very tough, and do not react to HCl. Zone has weaker strength toward the top of the section.					
240								

# BORING LOG

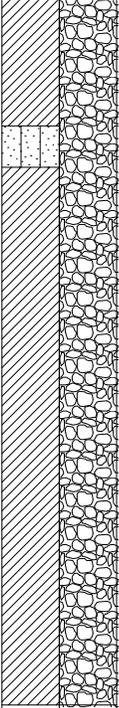
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Depth (ft)	Elevation (ft)	USCS Group Symbol	Material Description	Sample Name	Sample Location	Lithology	Well Construction	Remarks
245		SM CL	<p><b>Silty Sand (245 - 245.5)</b> Moist, dense, no odor. Primarily medium to fine sand with a maximum grain size of 2 mm and ~25% silt and clay. The sand and gravel are subangular to subrounded. The fines are nonplastic, and do not react to HCl.</p> <p><b>Lean Clay (245.5 - 252)</b> Dry to moist, very dense, no odor. Primarily silt and clay with ~30% fine sand with a maximum grain size of 0.5 mm. The sand is angular to subangular. The fines have moderate to high plasticity, are moderately tough, and do not react to HCl.</p>					
250			Bottom of Borehole at 252 feet below ground surface.					