

Well construction details for the 16" wells and the natural gas liquid storage caverns are presented at the end of this attachment.

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Well Construction Plan

The following is the general program to be used to drill Magnum Gas Storage Wells 1, 2, 3 and 4. Depths shown are approximate, from Rotary Kelly Bushing.

1. Rig up drilling rig.
2. Drive 48" conductor casing to approximately 200 feet or refusal.
3. Drill a 17-1/2" hole to [REDACTED] feet and log.
4. Open 17-1/2" hole up to [REDACTED] with hole openers of increasing size.
5. Run and cement [REDACTED] feet of [REDACTED] pipe. Centralizers to be placed every other casing section.
6. After the cement sets, cut off the [REDACTED] casing and weld on a [REDACTED] reducer and [REDACTED] flange. Nipple up a [REDACTED] annular BOP.
7. Drill a 17-1/2" hole to top of salt structure estimated to be \pm [REDACTED] feet. Lost circulation may occur over this interval; control as necessary by the use of lost circulation material, cement plugs or drill without returns.
8. Run gamma ray, SP induction and resistivity logs as specified.
9. Open the 17-1/2" hole to [REDACTED] with hole openers and underreamers of increasing size.
10. Run X-Y caliper log.
11. Run and cement \pm [REDACTED] or equivalent pipe to top of salt structure. Use the stab-in cementing method. Centralizers to be placed every other casing section.
12. After the cement sets, pressure test the casing in accordance with the approved MIT testing protocol.
13. Cut off the [REDACTED] casing and weld on a [REDACTED] reducer and [REDACTED] Nipple up a [REDACTED] annular BOP.
14. Switch to salt saturated mud after [REDACTED] casing is set at top of salt structure or at the depth where salt structure is encountered during drilling.
15. Drill a [REDACTED]
16. Run gamma ray, SP induction, neutron and bulk density logs as specified.
17. Open the [REDACTED] with hole openers and underreamers of increasing size.
18. Run X-Y caliper log.
19. Run and cement [REDACTED] section.
20. Allow the cement to set 72 hours. Pressure test the casing in accordance with the approved MIT testing protocol.
21. Cut off the [REDACTED] reducer and [REDACTED] flange. Nipple up a [REDACTED] annular BOP.
22. Drill a [REDACTED] feet.
23. Run gamma ray, SP induction, neutron and bulk density logs as specified.
24. Open the [REDACTED] using hole openers and underreamers.
25. Run X-Y caliper log.

26. Run and cement [REDACTED] pipe.
Use the stab-in cementing method. Centralizers to be placed every other casing section.
27. Allow the cement to set 72 hours. Pressure test the casing in accordance with the approved MIT testing protocol.
28. Drill out plug and ten feet of salt formation.
29. Pressure test casing shoe in accordance with the approved MIT testing protocol.
30. Drill a [REDACTED] feet. Note: there are [REDACTED] cores that will be taken in this interval.
31. Log cuttings and check for loss of drilling fluid indicating a porous formation is encountered. If so, perform a tightness test over this interval.
32. Run gamma ray, neutron and bulk density logs as specified.
33. If logs indicate a porous zone in the salt section, perform tightness test over the zone.
34. Under ream the [REDACTED] feet.
35. Run X-Y caliper log.
36. Run casing inspection logs in [REDACTED] casing from shoe to surface.
37. Run in approx. [REDACTED]
[REDACTED] Casing.
38. Install and test the upper wellhead assembly.
39. Run in approx. [REDACTED] feet of [REDACTED]
40. Install remainder of wellhead.
41. Rig down and move out rig from location.
42. Clean up location.

CASING AND LIFT RING WELDING PROTOCOL

This specification describes the requirements for welding of lift rings on 20" last cemented casing, double jointing, and welding of the 20" last cemented casing. All work will be performed from a land rig located near Delta UT beginning in November 2010.

WELL REQUIREMENTS:

Casing to be welded consists of:

[REDACTED] ft. Last Cemented Casing.

Provide all labor, equipment, and materials necessary to provide the following services:

Welding of lift rings to [REDACTED] final cemented casing.

Weld one lift ring to each double joint of [REDACTED] casing, approximately 4' from one end. Allow a maximum gap of 1/16 inch between lift rings and the curvature of the pipe. Welding to take place well in advance of running the casing and shall therefore be

performed during daylight hours. Lift rings will be provided by PB ESS. See attached lift ring welding drawing.

Lift ring welding and inspection to be performed in accordance with AWS (American Welding Society) D1.1 Structural Welding Code. Perform nondestructive testing (NDT) on the welds using ultrasonic shear wave equipment as specified in AWS D1.1 and interpreted by a NDT Level II or III Certified Technician who is qualified under ASNT CP-189, Standard for Qualification and Certification for Nondestructive Testing Personnel, 2006 Edition and CP-105, ASNT Standard Topical Outlines for Qualification of Nondestructive Testing Personnel, 2006 Edition.

Double Jointing of 36" casing.

Casing double joint welding shall be performed in accordance with API Standard 1104 Welding of Pipelines and Related Facilities, 2005 edition. Pipe base material's carbon equivalency will be computed from the material composition as written in the Material Test Report (MTR) that is provided when the pipe is purchased. The welding contractor will provide a Welding Procedure Specification (WPS) that matches the base material and Procedure Qualification Report (PQR) and welders who are qualified to the WPS with Welders Qualification Report (WQR). The welding contractor will provide the WQR for each potential welder prior to his beginning to weld. The field supervisor will verify that the WQR and welder's photo identification match.

Perform nondestructive testing (NDT) on the butt welds using radiography as specified in API Standard 1104 and interpreted by a NDT Level II or III Certified Technician who is qualified under ASNT CP-189, Standard for Qualification and Certification for Nondestructive Testing Personnel, 2006 Edition and CP-105, ASNT Standard Topical Outlines for Qualification of Nondestructive Testing Personnel, 2006 Edition.

Each completed girth, butt weld shall be radiograph tested to API Standard 1104 qualifications. The radiograph methods and qualifications shall comply with API Standard 1104 "Certification of Nondestructive Testing Personnel" and "Acceptance Methods for Nondestructive Testing Personnel".

Double joint (pipe in horizontal position) approximately 3840' (96 jts) of 20" x 1.0" last cemented casing. The double jointing will take place well in advance of running the pipe, therefore, done during daylight hours.

Adequate pipe supports shall be used to support the pipe in a level "aligned" condition. All double-jointed casing lengths shall be examined and shall be as straight as possible.

Use alignment clamps to ensure proper alignment. Give special attention to ensure straightness is within 0.2 percent of the length or less than 1" of deviation in 40' length.

Check double-jointed casing lengths for straightness by using a taut string. Deviation from straight or chord height shall not exceed two inches. The taut string shall be run from the bottom end of the joint to the bottom side of the lift ring on the other end. The measurement is to be read adjacent to the double-joint weld bead. A series of readings shall be taken to find the maximum deviation. Any double-joint with more than two inches of deviation, shall have the weld cut out, beveled by machine (portable flame cutter or machine tool) and re-welded at the double-jointing contractors expense.

Welding of 24" double joints while running casing.

Casing welding shall be performed in accordance with API Standard 1104 Welding of Pipelines and Related Facilities. Pipe base material's carbon equivalency will be computed from the material composition as written in the Material Test Report (MTR) that is provided when the pipe is purchased. The welding contractor will provide a Welding Procedure Specification (WPS) that matches the base material and Procedure Qualification Report (PQR) and welders who are qualified to the WPS with Welders Qualification Report (WQR). The welding contractor will provide the WQR for each potential welder prior to his beginning to weld. The field supervisor will verify that the WQR and welder's photo identification match.

Perform nondestructive testing (NDT) on the butt welds using radiography as specified in API Standard 1104 and interpreted by a NDT Level II or III Certified Technician who is qualified under ASNT CP-189, Standard for Qualification and Certification for Nondestructive Testing Personnel, 2006 Edition and CP-105, ASNT Standard Topical Outlines for Qualification of Nondestructive Testing Personnel, 2006 Edition.

Each completed girth, butt weld shall be Nondestructively tested to API Standard 1104 qualifications. The test methods and qualifications shall comply with API Standard 1104 "Certification of Nondestructive Testing Personnel" and "Acceptance Methods for Nondestructive Testing Personnel".

Weld double joints with pipe in vertical position from rig floor. Approximately 48 double joints to be welded. This welding will take place while running the casing to the design depth and will be a 24 hour per day operation.

Use alignment clamps to ensure proper alignment. Give special attention to ensure straightness is within 0.2 percent of the length.

SUBMITTALS

Submit the following "Submittals" to PB Energy Storage Services for review and approval:

Welding procedure specifications.

Welding procedure qualification records; submit prior to start of work.

Welder qualifications for each welder for each procedure the welder is to use.

CONDITIONS

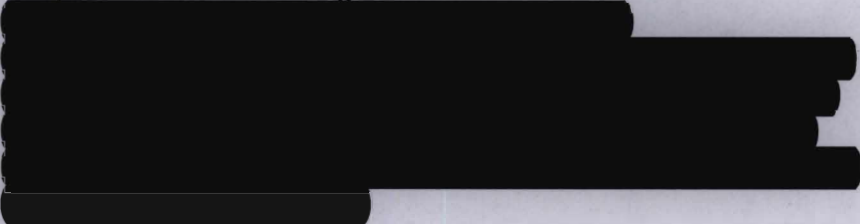
Provide weather protection around welding areas to isolate welding from wind and rain. Do not weld in wet or excessively windy conditions that cannot be prevented.

Pipe ends that are field beveled or beveled by cutting torch shall be reported to the PB ESS representative.

SPECIFICATIONS FOR CEMENTING SERVICES AND MATERIALS

Provide all the labor, equipment, and materials necessary to provide the following services:

Proposed wellbore configuration



1. Cement specifications for the [redacted] Surface casing. Cement job will pumped through a stabbed-in 5" DP.

Cement to surface: Class A (Standard) + Defoamer (if deemed necessary)

Water Ratio	5.2 gals/sk
Slurry Weight	15.6 lbs/gal.
Slurry Volume	1.18 ft ³ /sack
Excess	50% Open Hole Volume (4 Arm Caliper Available)

2. Cement specifications for the [redacted] Intermediate. Cement job will pumped through a stabbed-in 5" DP.

Cement to surface: Class A (Standard) + Defoamer (if deemed necessary).

Water Ratio	5.2 gals/sk
Slurry Weight	15.6 lbs/gal.
Slurry Volume	1.18 ft ³ /sack
Excess	50% Open Hole Volume (4 Arm Caliper Available)

3. Cement specifications for the [redacted] Next to Last Casing. Cement job will pumped through a stabbed-in 5" DP.

Cement to surface: Class G (Premium) + [REDACTED] (if deemed necessary).

Water Ratio	5.2 gals/sk
Slurry Weight	16.3 lbs/gal.
Slurry Volume	1.24 ft ³ /sack
Excess	30% Open Hole Volume (4 Arm Caliper Available)

4. Cement specifications for the [REDACTED] Next to Last Casing. Cement job will pumped through a stabbed-in 5" DP.

Cement to surface: Class G (Premium) + [REDACTED] (if deemed necessary).

Water Ratio	5.2 gals/sk
Slurry Weight	16.3 lbs/gal.
Slurry Volume	1.24 ft ³ /sack
Excess	30% Open Hole Volume (4 Arm Caliper Available)

REPORT

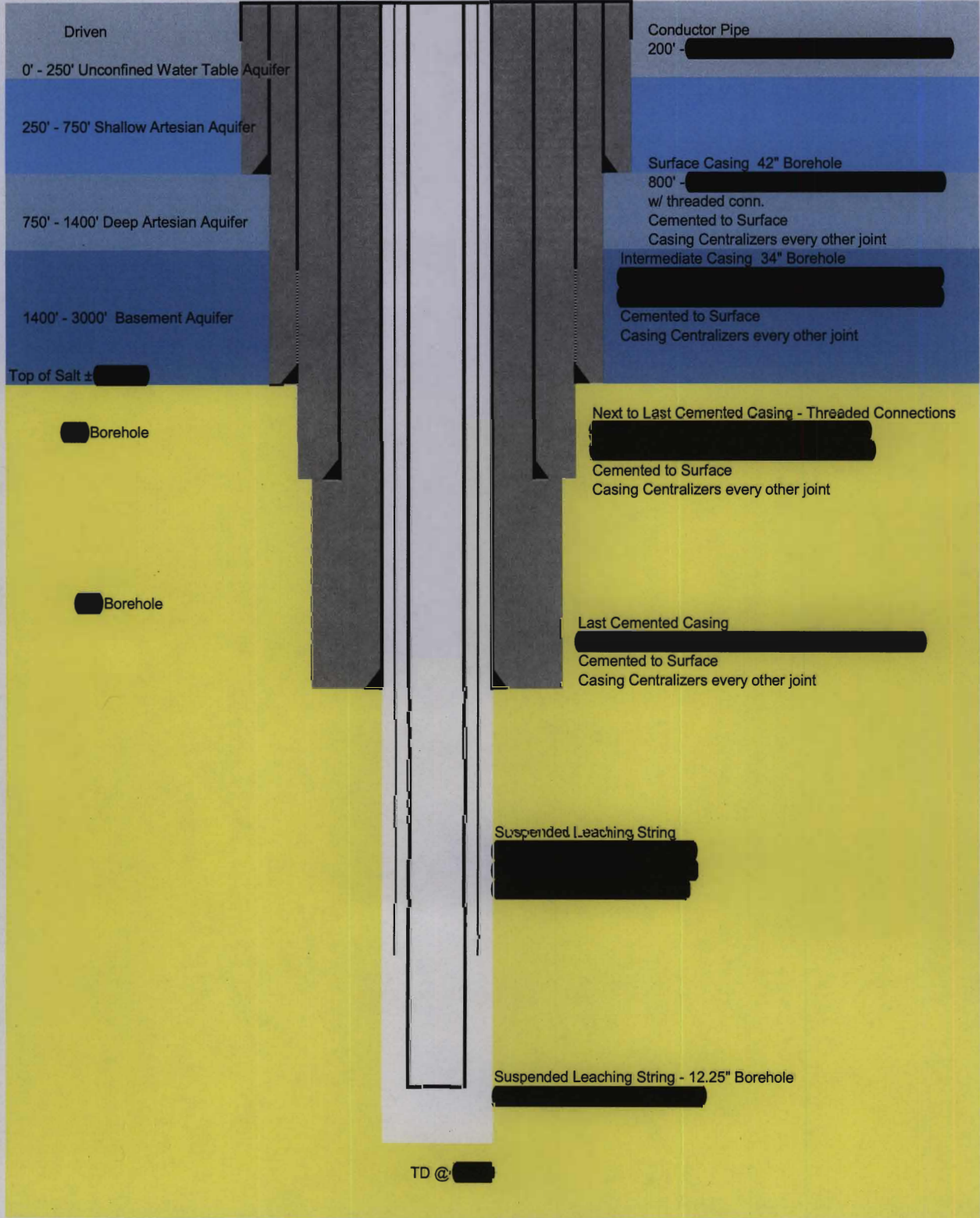
The casing cement jobs shall be documented by an affidavit from the cementing company showing the amount and type of cementing materials and the method of placement.

WELL CONDITIONING

Before commencing drilling operations (spudding the well), Magnum will provide detailed procedures for conditioning the hole prior to cementing casing. The pre-flush procedure will ensure that the wellbore is properly conditioned for cementing operations in accordance with recommendations from the cementing contractor.

The well is conditioned to circulate the drilling fluids, sweep cuttings out of the hole, obtain consistent fluid properties, and adjust the fluid viscosity and density in an attempt to prevent cement channeling through the fluid. Detailed procedures for this process have not been written at this time as it is a typical task during drilling, but when the drilling fluids contractor is hired his mud engineer will be tasked to write a program for the fluids.

All measurements from Ground Level



PB - ENERGY STORAGE SERVICES, INC.

Magnum

Gas Storage Well Casing Design

DRAWN: M. Meace

Updated: D. Hanser

DATE: 10/10

SCALE: NONE

JOB NO. 50747

16-inch Injection Well Construction Plan

The following is the general program to be used to drill the Magnum 16-inch injection wells. Depths shown are approximate, **from Ground Level**.

1. Rig up drilling rig.
2. Drive 36-inch conductor casing to approximately 150 feet or refusal.
3. Drill a 17-1/2-inch hole to ± [REDACTED] feet and log.
4. Open 17-1/2-inch hole up to [REDACTED]-inch with hole openers of increasing size.
5. Run and cement [REDACTED] feet of [REDACTED]-inch O.D., [REDACTED]-inch wall thickness, [REDACTED] Centralizers to be placed every other casing section.
6. Allow the cement to set a minimum of 18 hours. Pressure test the casing in accordance with State rules.
7. After the cement sets, cut off the [REDACTED]-inch casing and weld on a [REDACTED]-inch x [REDACTED]-inch reducer and [REDACTED]-inch flange. Nipple up a [REDACTED]-inch annular BOP.
8. Drill a 17-1/2-inch hole to slightly above top of salt structure estimated to be ± [REDACTED] feet. Lost circulation may occur over this interval; control as necessary by the use of lost circulation material, cement plugs or drill without returns.
9. Run gamma ray, SP induction and resistivity logs as specified.
10. Open the 17-1/2-inch hole to [REDACTED]-inch with hole openers of increasing size.
11. Run X-Y caliper log.
12. Run and cement ± [REDACTED] feet of [REDACTED]-inch O.D., 1-inch wall thickness, and [REDACTED] feet of [REDACTED]-inch O.D., [REDACTED]-inch wall thickness [REDACTED] or equivalent threaded and coupled pipe to top of salt structure. Use the stab-in cementing method. Centralizers to be placed every other casing section.
13. After the cement sets, pressure test the casing in accordance with State rules.
14. Cut off the [REDACTED]-inch casing and weld on a [REDACTED]-inch x [REDACTED]-inch reducer and [REDACTED]-inch flange. Nipple up a [REDACTED]-inch annular BOP.
15. Switch to salt saturated mud after [REDACTED]-inch casing is set at top of salt structure or at the depth where salt structure is encountered during drilling.
16. Drill a 17-1/2-inch hole to ± [REDACTED] feet.
17. Run gamma ray, SP induction, neutron and bulk density logs as specified.
18. Open the 17-1/2-inch hole to [REDACTED]-inch with hole openers and under reamers of increasing size.
19. Run X-Y caliper log.
20. Run and cement [REDACTED] feet of [REDACTED]-inch O.D., [REDACTED]-inch wall thickness, [REDACTED] [REDACTED] and [REDACTED] feet of [REDACTED]-inch O.D. and [REDACTED]-inch wall thickness, [REDACTED] T&C threaded and coupled line pipe. Use the stab-in cementing method. Centralizers to be placed every other casing section.
21. Allow the cement to set a minimum of 72 hours. Pressure test the casing in accordance with State rules.

22. Cut off the [REDACTED]-inch casing and weld on a [REDACTED]-inch flange. Nipple up a [REDACTED] annular BOP.
23. Drill a 17-1/2-inch hole to ± [REDACTED] feet.
24. Run gamma ray, SP induction, neutron and bulk density logs as specified.
25. Open the 17-1/2-inch hole up to [REDACTED]-inch using hole openers and underreamers.
26. Run X-Y caliper log.
27. Run and cement [REDACTED] feet of [REDACTED]-inch O.D. [REDACTED]-inch and [REDACTED] feet of [REDACTED]-inch O.D. [REDACTED]-inch wall thickness, API [REDACTED] casing. Use the stab-in cementing method. Centralizers to be placed every other casing section.
28. Allow the cement to set a minimum of 72 hours. Pressure test the casing in accordance with State rules.
29. Drill out plug and ten feet of salt formation.
30. Pressure test casing shoe in accordance with the State rules and regulations.
31. Drill a [REDACTED]-inch hole to ± [REDACTED] feet.
32. Log cuttings and check for loss of drilling fluid indicating a porous formation is encountered. If so, perform a tightness test over this interval.
33. Run gamma ray, neutron and bulk density logs as specified.
34. If logs indicate a porous zone in the salt section, perform tightness test over the zone.
35. Under ream the [REDACTED]-inch hole to [REDACTED]-inch down to a depth of [REDACTED] feet.
36. Run X-Y caliper log.
37. Run casing inspection and cement bond logs in [REDACTED]-inch casing from shoe to surface.
38. Run in approx. [REDACTED] & C Casing.
39. Install and test the upper wellhead assembly.
40. Run in approx. [REDACTED] feet of [REDACTED]-inch, [REDACTED] b/ft, [REDACTED] Casing.
41. Install remainder of wellhead.
42. Rig down and move out rig from location.
43. Clean up location.

WELDING PROTOCOL

1. Lift ring welding and inspection to be performed in accordance with AWS (American Welding Society) D1.1 Structural Welding Code. Perform nondestructive testing (NDT) on the welds using ultrasonic shear wave equipment as specified in AWS D1.1 and interpreted by a NDT Level II or III Certified Technician who is qualified under ASNT CP-189, Standard for Qualification and Certification for Nondestructive Testing Personnel, 2006 Edition and CP-105, ASNT Standard Topical Outlines for Qualification of Nondestructive Testing Personnel, 2006 Edition..
2. Casing double joint welding shall be performed in accordance with API Standard 1104 Welding of Pipelines and Related Facilities. Pipe base material's carbon equivalency will be computed from the material composition as written in the Material Test Report (MTR) that is provided when the pipe is purchased. The welding contractor will provide a Welding Procedure Specification (WPS) that matches the base material and Procedure Qualification Report (PQR) and welders who are qualified to the WPS with Welders Qualification Report (WQR). The welding contractor will provide the WQR for each potential welder prior to beginning production welding. The field supervisor will verify that the WQR and welder's photo identification match. Perform nondestructive testing (NDT) on the butt welds using radiography as specified in API Standard 1104 and interpreted by a NDT Level II or III Certified Technician who is qualified under ASNT CP-189, Standard for Qualification and Certification for Nondestructive Testing Personnel, 2006 Edition and CP-105, ASNT Standard Topical Outlines for Qualification of Nondestructive Testing Personnel, 2006 Edition. Each completed girth, butt weld shall be radiograph tested to API Standard 1104 qualifications. The radiograph methods and qualifications shall comply with API Standard 1104 -"Certification of Nondestructive Testing Personnel" and "Acceptance Methods for Nondestructive Testing Personnel".
3. Casing rig welding shall be performed in accordance with API Standard 1104 Welding of Pipelines and Related Facilities. Pipe base material's carbon equivalency will be computed from the material composition as written in the Material Test Report (MTR) that is provided when the pipe is purchased. The welding contractor will provide a Welding Procedure Specification (WPS) that matches the base material and Procedure Qualification Report (PQR) and welders who are qualified to the WPS with Welders Qualification Report (WQR). The welding contractor will provide the WQR for each potential welder prior to beginning production welding. The field supervisor will verify that the WQR and welder's photo identification match. Perform nondestructive testing (NDT) on the butt welds using radiography as specified in API Standard 1104 and interpreted by a NDT Level II or III Certified Technician who is qualified under

ASNT CP-189, Standard for Qualification and Certification for Nondestructive Testing Personnel, 2006 Edition and CP-105, ASNT Standard Topical Outlines for Qualification of Nondestructive Testing Personnel, 2006 Edition. Each completed girth, butt weld shall be nondestructively tested to API Standard 1104 qualifications. The test methods and qualifications shall comply with API Standard 1104 "Certification of Nondestructive Testing Personnel" and "Acceptance Methods for Nondestructive Testing Personnel".

SPECIFICATIONS FOR CEMENTING SERVICES AND MATERIALS

This specification covers the requirements to supply cement, equipment and services for storage wells located near Delta, UT. The work will be conducted from a land rig. Cement bond logs cannot be used with reliability on the [REDACTED]-inch plus well casings proposed for the gas storage wells and therefore will not be run on the larger casings. A review of cement bonding capabilities with PB Energy Storage Systems has confirmed that there are no test methods currently available to conduct a bond log. Therefore, cementing operations will be visually verified at the time of cementing via the observance of cement rising within the outer well annulus to the surface.

Proposed wellbore configuration (Depths RKB)

- [REDACTED]-inch Conductor Pipe: 0 - Approx. 150 feet (Driven to refusal)
- [REDACTED]-inch Surface Casing: [REDACTED] feet (Approx. [REDACTED]-inch Open Hole)
- [REDACTED]-inch Intermediate Casing: [REDACTED] feet (Approx. [REDACTED]-inch Open Hole)
- [REDACTED]-inch Next to Last Casing: [REDACTED] feet (Approx. [REDACTED]-inch Open Hole)
- [REDACTED]-inch Last Cemented Casing: [REDACTED] feet (Approx. [REDACTED]-inch Open Hole)

Top of Salt: Approx. [REDACTED] feet

1. Cement specifications for the [REDACTED]-inch Surface casing. Cement job will be pumped through a stabbed-in 5-inch DP.
Cement to surface: Class A (Standard) + Defoamer (if deemed necessary)
Water Ratio 5.2 gals/sk
Slurry Weight 15.6 lbs/gal.
Slurry Volume 1.18 cu. ft./sack
Excess 50% Open Hole Volume (4 Arm Caliper Available)
2. Cement specifications for the [REDACTED]-inch Intermediate. Cement job will be pumped through a stabbed-in 5-inch DP.
Cement to surface: Class A (Standard) + Defoamer (if deemed necessary).

Water Ratio 5.2 gals/sk
Slurry Weight 15.6 lbs/gal.
Slurry Volume 1.18 cu. ft./sack
Excess 50% Open Hole Volume (4 Arm Caliper Available)

3. Cement specifications for the 6-inch Next to Last Casing. Cement job will be pumped through a stabbed-in 5-inch DP.

Cement to surface: Class G (Premium) + 37.2% Salt + Defoamer (if deemed necessary).

Water Ratio 5.0 gals/sk
Slurry Weight 16.3 lbs/gal.
Slurry Volume 1.24 cu. ft./sack
Excess 30% Open Hole Volume (4 Arm Caliper Available)

4. Cement specifications for the 6-inch Last Casing. Cement job will be pumped through a stabbed-in 5-inch DP.

Cement to surface: Class G (Premium) + 37.2% Salt + Defoamer (if deemed necessary).

Water Ratio 5.0 gals/sk
Slurry Weight 16.3 lbs/gal.
Slurry Volume 1.24 cu. ft./sack
Excess 30% Open Hole Volume (4 Arm Caliper Available)

WELL CONDITIONING

Before commencing drilling operations (spudding the well), Magnum will provide detailed procedures for conditioning the hole prior to cementing casing. The pre-flush procedure will ensure that the wellbore is properly conditioned for cementing operations in accordance with recommendations from the cementing contractor.

The well is conditioned to circulate the drilling fluids, sweep cuttings out of the hole, obtain consistent fluid properties, and adjust the fluid viscosity and density in an attempt to prevent cement channeling through the fluid. Detailed procedures for this process have not been written at this time as it is a typical task during drilling, but when the drilling fluids contractor is hired his mud engineer will be tasked to write a program for the fluids.

REPORT

During Drilling the casing cement jobs shall be documented by an affidavit from the cementing company showing the amount and type of cementing materials and the method of placement.

Three samples of the cement slurry for each of the intermediate and salt casings shall be collected in suitable sized and shaped containers so that the hardened cement can be tested for compressive strength.

