ExxonMobil
Refining & Supply Company
3225 Gallows Road
Fairfax, Virginia 22037

Transmitted Via overnight mail

November 7, 2006

ExxonMobil
Refining & Supply

Gary Janosko, Chief,
Fuel Cycle Facilities Branch
Division of Fuel Cycle Safety and Safeguards
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Re: Documentation of Monitoring Well Installation
License No. SUA-1139
Highland Reclamation Project
Converse County, Wyoming

Dear Mr. Janosko:

As mentioned in previous correspondence, ExxonMobil Corporation (ExxonMobil) authorized the installation of seven additional monitoring wells since 2004 at the Highlands Reclamation Site. The new monitoring wells were installed in an effort to evaluate groundwater concentrations down-gradient of the tailing basin. Attached are the reports by MFG and Blasland, Bouck, & Lee, Inc. (BBL), an ARCADIS company:

- MFG, 2004. Monitoring Well Installation at the ExxonMobil Highlands Site, November 16th.
- BBL, 2006. Monitoring Well Installation ExxonMobil Highland Site, October 17th.

These monitoring wells have been included in the quarterly groundwater sampling events since their installation. A comprehensive data evaluation for these wells will be submitted to the Nuclear Regulatory Commission upon completion of 2007 quarterly sampling.

Please contact me at (703) 846-3272 if you have any questions.

Sincerely,

EXXONMOBIL CORPORATION

Dan Burnham
Project Manager

/gb

Enclosure: 2

cc: Rebecca Lindeman, BBL
Lou Miller, MFG
Jeff Boner, Property Owner

MEMORANDUM

BBL®

an ARCADIS company

To: Dan Burnham

Date: September 12, 2006

From: Rebecca Lindeman

cc: Lou Miller, MFG
Jeff Boner, Property Owner

Re: Monitoring Well Installation
ExxonMobil Highland Site

At the request of Exxon Mobil Corporation (ExxonMobil), Blasland, Bouck & Lee, Inc., an ARCADIS Company (BBL), installed four monitoring wells on an adjacent property to the ExxonMobil Highland Reclamation Project Site located near Douglas, Wyoming. The purpose of the well installation was to enable sampling of groundwater downgradient of the tailing basin in two different subsurface units: alluvial material and the first water bearing bedrock formation. This report describes the installation and development of four monitoring wells: BBL-1, BBL-2, BBL-3, and BBL-4. The locations of the new monitoring wells are shown on the Monitoring Well Location Map included as Figure 1; survey data are presented in Table 1.

The monitoring well installation activities commenced on June 26, 2006 and were completed on July 8, 2006. Development of the new monitoring wells and pump installation occurred between July 13, 2006 and July 18, 2006. Quarterly groundwater sampling will include analysis of Nuclear Regulatory Commission parameters as listed in the Procedures Manual.

Monitoring Well Installation

Drilling Engineers Inc., of Fort Collins, Colorado installed boreholes using a CME 75 drill rig utilizing hollow stem augers and air rotary drilling. The crew decontaminated downhole drilling equipment by power washing with tap water prior to and following drilling activities.

The field geologist observed downhole soil conditions via drill cuttings and split spoons recovered during drilling activities. At the completion of the borehole, drill cuttings were spread on the ground surface at the well site. Borehole logs are presented in Appendix A.

BBl-1 was initially drilled with hollow stem augers to 30 feet below ground surface (bgs) and air rotary to 56.5 feet bgs. This borehole was subsequently abandoned due to caving sands. The abandoned BBL-1 borehole encountered an alluvial channel with a high conductivity alluvial sand deposit not encountered at other boreholes. This sand deposit was not encountered at the next BBL-1 location, which supports the conclusion that it is an alluvial sand and not a bedrock sand deposit. Abandoned BBL-1 (BBL-1 P&A) was sealed by filling with chip bentonite. BBL-1 was relocated 63 feet to the northwest.

BBL-1, which is the deepest well, was drilled using hollow stem augers/air rotary drilling. BBL-1 was completed in the first water bearing bedrock formation. A hollow stem auger (8 ¼-inch inside diameter and 12 ¼-inch outside diameter) was advanced to 67 ½-feet (bgs) at BBL-1 and was then utilized as temporary

surface casing. Air rotary drilling (using a 7 7/8-inch diameter Ken Claw Bullet Bit) was then used to advance the borehole to total well completion depth.

Three shallow monitoring wells were drilled using hollow stem augers: BBL-2, BBL-3, and BBL-4. The shallow monitoring wells were completed in the alluvial material overlying the bedrock. Hollow stem augers (6 ¼-inch inside diameter and 10 ¼-inch outside diameter) were advanced to total depth.

The well completion details for the four wells are summarized in Table 2. Monitoring well completion diagrams are presented in Appendix B. The 4-inch diameter monitoring wells were constructed from Schedule 40 PVC. Slotted well screens (0.020-inch) were installed at the depths specified in Table 2. Centralizers were installed at the top and bottom of the screen interval of monitoring well BBL-1. A bottom bentonite pellet seal was installed to 41.8 feet bgs in BBL-3 to minimize bedrock ground water entering the alluvial well. Filter pack sand (10-20) was installed to 4 to 9 feet above the screen of the four monitoring wells. A pelleted bentonite seal was installed above the filter pack in each monitoring well. Chip bentonite was installed above the pelleted bentonite seal to near ground surface. The top of each PVC opening was covered with a slip cap. The surface completion for each well consisted of a key-locked protective steel casing with a 3-foot square sloping cement pad.

The monitoring wells were installed with guidance from Wyoming Permit-By-Rule (Wyoming Department of Environmental Quality, 2000). Wyoming Department of Environmental Quality allows Permit-By-Rule installations for monitoring wells 4-inches or less in diameter.

Monitoring Well Pump Installation and Development

Grundfos 3-inch, 230 volt electric submersible pumps with single-phase motors were installed in each of the monitoring wells by Pronghorn Pump and Repair of Glenrock, Wyoming. Monitoring wells BBL-1 and BBL-4 contain ½ horsepower (hp), 5 gallons per minute (gpm) pumps. Monitoring wells BBL-2 and BBL-3 contain 1/3-hp, 5 gpm pumps. The pump was installed at 133 feet bgs in BBL-1, at 35 feet bgs in BBL-2, at 40 feet bgs in BBL-3, and at 40 feet bgs in BBL-4.

Pronghorn Pump and Repair developed the monitoring wells by pumping between 40 and 80 casing volumes per well until purge water was reasonably clear. BBL-1 was pumped for a total of 7 ¾ hours over three days at a rate of 5-gpm and 6.5-gpm. Due to their low flow rates, BBL-2, BBL-3, and BBL-4 were pumped dry and then allowed to recover before repeating the process at least twice. The process was complete in well BBL-2 after 5 days, in BBL-3 after 4 days, and in BBL-4 after 3 days.

Downhole development equipment consisted of dedicated electric submersible pumps and disposable bailers. Development water was released on the ground surface in the vicinity of the well site.

Following development activities, flow restrictors were installed at monitoring wells BBL-2, BBL-3, and BBL-4. BBL-2 received a 1-gpm dole valve, while BBL-3 and BBL-4 each received a 2-gpm dole valve.

Initial Water Quality Analyses

Initial water quality samples were collected from the new wells in July 2006 and quarterly groundwater sampling is scheduled for the remainder of 2006 and 2007. A full year of data may be necessary to provide an evaluation of site groundwater conditions. Therefore, a comprehensive data evaluation for these wells will be submitted to the Nuclear Regulatory Commission upon completion of 2007 quarterly sampling.

References

Wyoming Department of Environmental Quality, 2000. *Guideline #1, Permit-By-Rule: Requirements and Recommendations for the Design, Construction and Installation of Monitoring Wells, Piezometers, Boreholes, Test Pits and other Sub-surface Investigation Facilities at Sites Where Pollution Has Not Been Identified.* Prepared for the Water Quality Division, Groundwater Pollution Control Program. Cheyenne, WY. Version 2.0, May.

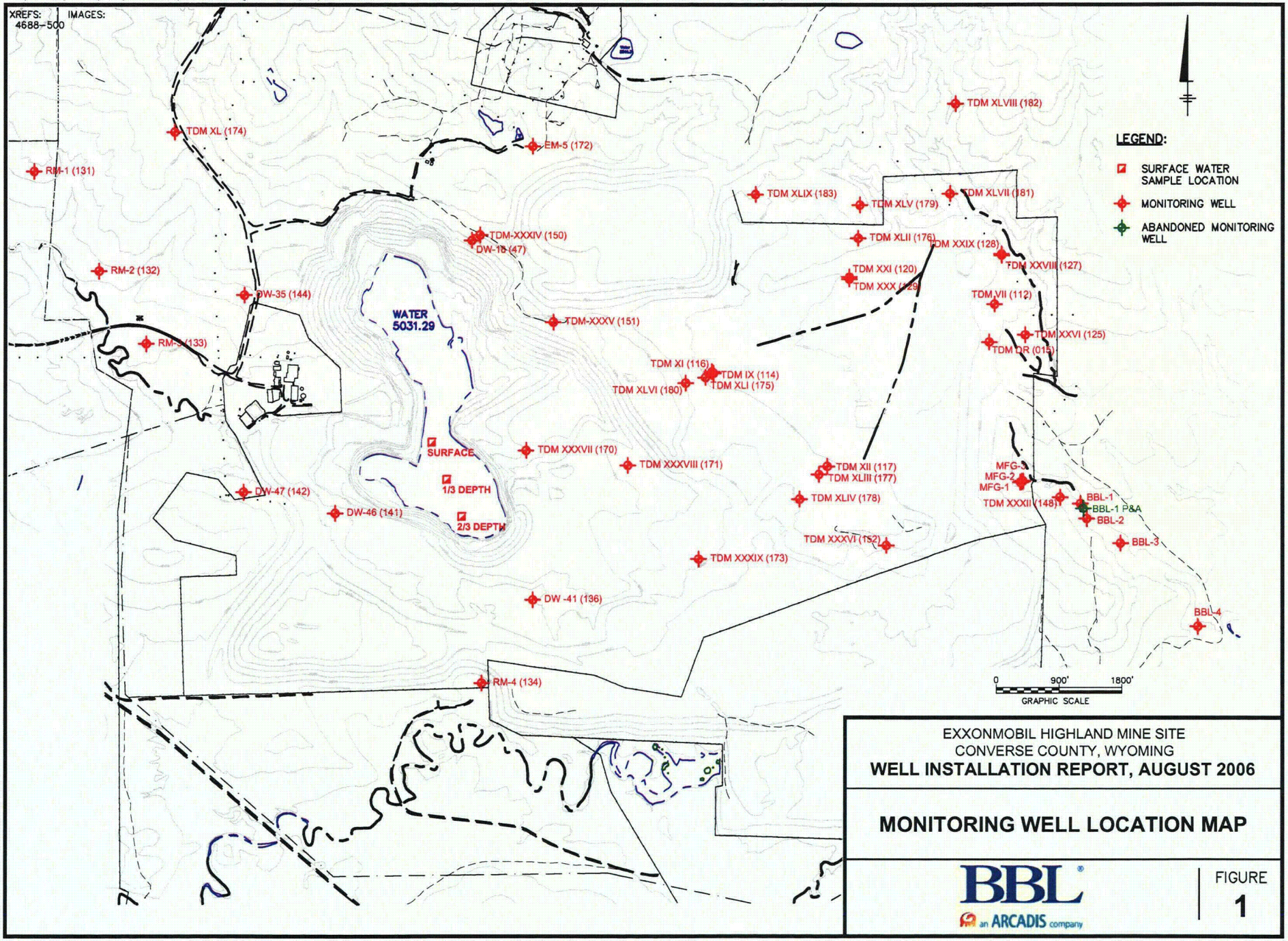
ah/gb

Figures

BBL®
an ARCADIS company

SYR-85-WLJ LAYER: ON=*, OFF=*REF*
F:\ACTIVE\-DWG\ACT\85598005\85598C02.dwg SAVED: 9/28/2006 12:30 PM LAYOUT: WELLS PAGESETUP: ---- PENTABLE: PLTFULL.CTB PRINTED: 9/28/2006 12:30 PM BY: WJONES

XREFS: IMAGES:
4688-500



EXXONMOBIL HIGHLAND MINE SITE
CONVERSE COUNTY, WYOMING
WELL INSTALLATION REPORT, AUGUST 2006

MONITORING WELL LOCATION MAP

BBL an ARCADIS company

FIGURE
1

Tables

BBL®
an ARCADIS company

TABLE 1
SURVEY DATA

MONITORING WELL INSTALLATION MEMORANDUM
EXXONMOBIL - HIGHLAND MINE SITE,
CONVERSE COUNTY, WYOMING

Well	Northing	Easting	Elevation (Top of PVC)
BBL-1 P&A	873682.75	415431.73	-
BBL-1	873723.37	415383.07	5094.40
BBL-2	873510.60	415471.18	5093.03
BBL-3	873158.74	415961.36	5087.56
BBL-4	871969.39	417072.44	5068.64

Notes:
Datum: NAD83
P&A - plugged and abandoned
PVC - polyvinyl chloride

TABLE 2
WELL COMPLETION SUMMARY

MONITORING WELL INSTALLATION MEMORANDUM
EXXONMOBIL - HIGHLAND MINE SITE, CONVERSE COUNTY, WYOMING

Well	Total Depth (ft bgs)	Open Hole (ft bgs)	Bottom of PVC (ft bgs)	Top of Screen (ft bgs)	Top of Filter Pack (ft bgs)	Top of Bentonite Pellets (ft bgs)	Top of Bottom Bentonite Seal (ft bgs)	PVC Stickup (ft ags)	Static Water Level (7/8/06, ft bgs)
BBL-1	136.5	125.9	126.2	85.8	79.5	75.0	N/A	2.0	31.12 (<24 hours after construction)
BBL-2	36.5	36.5	36.1	20.7	16.0	14.7	N/A	2.0	27.4
BBL-3	44.5	42.0	40.2	24.8	15.5	14.8	41.8	2.0	23.4
BBL-4	39.6	39.6	39.6	14.2	10.3	8.6	N/A	2.0	14.8

Notes:

ft - feet

ft ags - feet above ground surface

ft bgs - feet below ground surface

Appendix A

Borehole Logs

BBL®
an ARCADIS company

BBL® an ARCADIS company

BORING LOG

Driller: Drilling Engineers, Inc.	Date Drilled: 06-29-06	Logged By:
Boring Dia: 6.25 Inches	Boring Number: BBL-1 P&A	Reed Lyday

Sample	Blow Counts	Completion	Depth Feet	Lithology	Description
			5		SILT (minor material: sand), trace clay, tan-brown, iron stains, loose, dry
					SILT (minor material: clay), brown, dense, moist
			10		CLAY (minor material: silt) weathered shale, brown, soft, moist
					Ca nodules
					moist
			15		
					Ca nodules, firm
					moist
			20		
			25		
					(minor material: fine sand, soft, wet)
			30		CLAY (minor material: sand), weathered shale, gray, iron stain, loose, producing water, air drilling
			35		
					SAND, coarse angular to poorly sorted, subrounded, heterogenous lithology

Completion Notes:

BBL-1 was initially drilled with hollow stem auger to 30 feet bgs and air rotary to 56.5 feet bgs. This borehole was adandoned due to caving sands. The abandoned BBL-1 borehole encountered an alluvial channel with a high conductivity alluvial sand deposit not encountered at other boreholes. This sand deposit was not encountered at the next BBL-1 location, which supports conclusion that it is an alluvial sand and not a bedrock sand deposit. Abandoned BBL-1 was sealed by filling with chip bentonite. BBL-1 was relocated 63 feet northwest of BBL-1 P&A.

Site:

Highland Mine

Converse County, WY

Project No.: 85598

BBL® an ARCADIS company

BORING LOG

Driller: Drilling Engineers, Inc.	Date Drilled: 06-29-06	Logged By:
Boring Dia: 6.25 Inches	Boring Number: BBL-1 P&A	Reed Lyday

Sample	Blow Counts	Completion	Depth Feet	Lithology	Description
			45		Coarse-medium SAND (minor material: black shale, fragments of cemented sandstone, and quartz) multi-color: gray, brown, red, white, loose, mixture of large shale and sandstone fragments, alluvial gravel, subangular-subrounded
			50		Cemented fine SANDSTONE and black shale (mixed with shallow sands), believed to be bedrock, tan to black
					(minor material: fine black-gray cemented sandstone)
			55		(minor material: black shale)
			60		
			65		
			70		
			75		

Completion Notes:

BBL-1 was initially drilled with hollow stem auger to 30 feet bgs and air rotary to 56.5 feet bgs. This borehole was adandoned due to caving sands. The abandoned BBL-1 borehole encountered an alluvial channel with a high conductivity alluvial sand deposit not encountered at other boreholes. This sand deposit was not encountered at the next BBL-1 location, which supports conclusion that it is an alluvial sand and not a bedrock sand deposit. Abandoned BBL-1 was sealed by filling with chip bentonite. BBL-1 was relocated 63 feet northwest of BBL-1 P&A.

Site:

Highland Mine

Converse County, WY

Project No.: 85598

BBL® an ARCADIS company

BORING LOG

Driller: Drilling Engineers, Inc.	Date Drilled: 7-6-06	Logged By:
Boring Dia: 8.25 Inches	Boring Number: BBL-1	Joe Reed, MFG Inc.

Sample	Blow Counts	Completion	Depth Feet	Lithology	Description
			5		SANDY CLAYEY SILT (minor material: very fine sandy clay), yellow-brown (10YR 5/4), slightly cohesive, loose, dry
					SANDY CLAYEY SILT (minor material: 10 % very fine sand and clay), brown (10 YR 5/3), slightly cohesive, loose to medium dense or soft to medium stiff, very slightly moist
			10		SILTY CLAY (minor material: silt), trace very fine sand, moist, trace white nodules (calcite), brown (10 YR 5/3), medium stiff
			15		
			20		
			25		
			30		SILTY CLAY (minor material: silt), trace very fine sand, dark gray brown (10YR 4/2), medium stiff, moist
			35		
					NO RETURN

Completion Notes:

Schedule 40, 0.020" slotted PVC casing from 85.8 to 126.2 feet bgs; schedule 40, solid, PVC casing from 0 to 85.8 feet bgs; backfilled with filter pack (10-20) sand from 79.5 to 125.9 feet bgs, hydrated 3/8" bentonite pellets from 75 to 79.5 feet bgs, and hydrated bentonite chips from 0 to 75 feet bgs . 3' X 3' X 8" concrete pad with 8" locking well vault installed at the surface. Static water level at 31.1 feet bgs.

Site:

Highland Mine

Converse County, WY

Project No.: 85598

BBL an ARCADIS company

BORING LOG

Driller: Drilling Engineers, Inc.	Date Drilled: 7-6-06	Logged By:
Boring Dia: 8.25 Inches	Boring Number: BBL-1	Joe Reed, MFG Inc.

Sample	Blow Counts	Completion	Depth Feet	Lithology	Description
			45		
			50		Hard drilling. Believe to be top of bedrock.
			55		SILTY CLAYEY SAND/SANDY CLAYEY SILT, (minor material: very fine sand, clay, silt), gray (5Y 5/1), slightly harder drilling, soft-medium dense, moist
			60		Trace medium sand
			65		Weathered SHALE/Weathered SHALE with coarse SAND/SANDY SHALE (minor material: 5-10% coarse sand, very fine sand), dark greenish gray (Gley 4/1), medium stiff to stiff, slightly moist, visual sample
			70		SHALE (minor material: trace fine sand), dark greenish gray (Gley 4/1), hard, dry, start air drilling shale
			75		SHALE (minor material: trace coal), black (10YR 2/1), hard - breaks easily with thumbnail, dry

Completion Notes:

Schedule 40, 0.020" slotted PVC casing from 85.8 to 126.2 feet bgs; schedule 40, solid, PVC casing from 0 to 85.8 feet bgs; backfilled with filter pack (10-20) sand from 79.5 to 125.9 feet bgs, hydrated 3/8" bentonite pellets from 75 to 79.5 feet bgs, and hydrated bentonite chips from 0 to 75 feet bgs . 3' X 3' X 8" concrete pad with 8" locking well vault installed at the surface. Static water level at 31.1 feet bgs.

Site:

Highland Mine

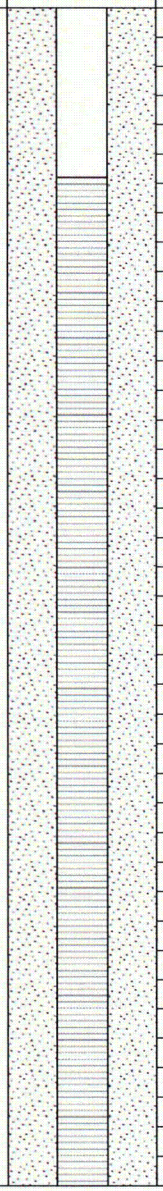
Converse County, WY

Project No.: 85598

BBL an ARCADIS company

BORING LOG

Driller: Drilling Engineers, Inc.	Date Drilled: 7-6-06	Logged By:
Boring Dia: 8.25 Inches	Boring Number: BBL-1	Joe Reed, MFG Inc.

Sample	Blow Counts	Completion	Depth Feet	Lithology	Description
			85		SHALE (minor material: trace very fine sand), dark gray (Gley 4) harder drilling, dry
					NO RETURN - Believed wet
			90		SHALE (minor material: trace very fine sand), dark gray (Gley 4), wet, intermittent returns
			95		Trace coal
					SHALE (minor material: trace very fine sand), dark gray (Gley 4/Black), producing more water <2 gpm
			100		Pyrite and Coal
			105		SHALE/SAND, interbedded shales and sands, mostly shale sand is fine, medium, and coarse, shale very dark gray (2.5Y 3/1), sand gray, approximately 2 gpm
					SHALE (minor material: trace coal, trace very fine sand) shale interbedded with sandy shale, very dark gray, (2.5Y 3/1), 2 gpm
			110		
			115		

Completion Notes:

Schedule 40, 0.020" slotted PVC casing from 85.8 to 126.2 feet bgs; schedule 40, solid, PVC casing from 0 to 85.8 feet bgs; backfilled with filter pack (10-20) sand from 79.5 to 125.9 feet bgs, hydrated 3/8" bentonite pellets from 75 to 79.5 feet bgs, and hydrated bentonite chips from 0 to 75 feet bgs . 3' X 3' X 8" concrete pad with 8" locking well vault installed at the surface. Static water level at 31.1 feet bgs.

Site:

Highland Mine

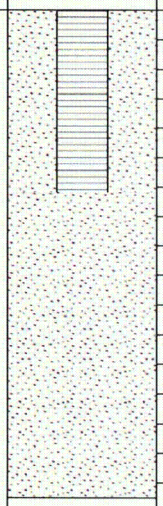
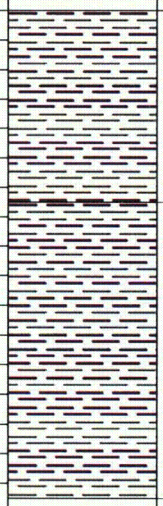
Converse County, WY

Project No.: 85598

BBL an ARCADIS company

BORING LOG

Driller: Drilling Engineers, Inc.	Date Drilled: 7-6-06	Logged By:
Boring Dia: 8.25 Inches	Boring Number: BBL-1	Joe Reed, MFG Inc.

Sample	Blow Counts	Completion	Depth Feet	Lithology	Description
			125 130 135 140 145 150 155		SHALE, no sandy shale layers, very dark gray (2.5Y 3/1), 2 gpm

Completion Notes:

Schedule 40, 0.020" slotted PVC casing from 85.8 to 126.2 feet bgs; schedule 40, solid, PVC casing from 0 to 85.8 feet bgs; backfilled with filter pack (10-20) sand from 79.5 to 125.9 feet bgs, hydrated 3/8" bentonite pellets from 75 to 79.5 feet bgs, and hydrated bentonite chips from 0 to 75 feet bgs . 3' X 3' X 8" concrete pad with 8" locking well vault installed at the surface. Static water level at 31.1 feet bgs.

Site:

Highland Mine

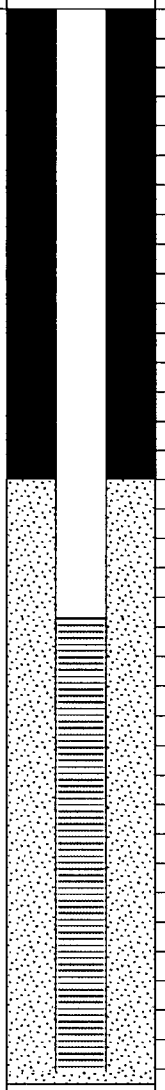
Converse County, WY

Project No.: 85598

BBL an ARCADIS company

BORING LOG

Driller: Drilling Engineers, Inc.	Date Drilled: 06-28-06	Logged By:
Boring Dia: 6.25 Inches	Boring Number: BBL-2	Reed Lyday

Sample	Blow Counts	Completion	Depth Feet	Lithology	Description
			5		SILT (minor material: sand), trace clay, tan-brown, dry
			10		SILTY CLAY (minor material: clayey silt), brown, soft, slightly moist
			15		tan-brown
			20		tan-brown gray
			25		tan
			30		SILT (minor material: sandy clay), moist
			35		very moist
	50				Cemented SANDSTONE, gray, dense, hard drilling dry/believed to be bedrock

Completion Notes:

Schedule 40, 0.020" slotted PVC casing from 20.7 to 36.1 feet bgs; schedule 40, solid, PVC casing from 0 to 20.7 feet bgs; backfilled with filter pack (10-20) sand from 16.0 to 36.5 feet bgs, hydrated 3/8" bentonite pellets from 14.7 to 16.0 feet bgs, and hydrated bentonite chips from 0 to 14.7 feet bgs. 3' X 3' X 6" concrete pad with 8" locking well vault installed at the surface.

Site:

Highland Mine

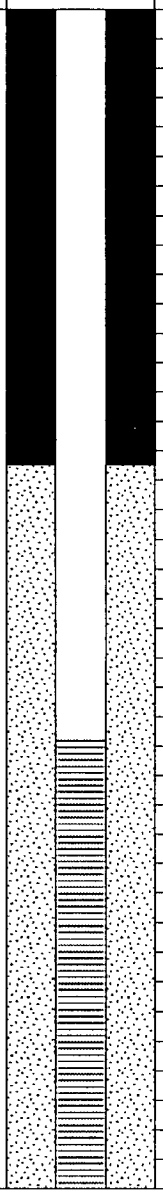
Converse County, WY

Project No.: 85598

BBL® an ARCADIS company

BORING LOG

Driller: Drilling Engineers, Inc.	Date Drilled: 06-28-06	Logged By:
Boring Dia: 6.25 Inches	Boring Number: BBL-3	Reed Lyday

Sample	Blow Counts	Completion	Depth Feet	Lithology	Description
			5		SILT (minor material: fine sand), tan-brown, loose, dry slightly moist Ca nodules, brown
			10		slightly clay, moist
			15		SILT and CLAY (minor material: clayey silt), slightly fine sand, firm
			20		SILT and CLAY (minor material: sand), brown-tan, soft
			25		SILT, Ca nodules
			30		SILTY CLAY (minor material: fine sand with trace shale fragments), soft, moist, wet at 35'
			35		SILTY CLAY (minor material: <10% fine sand) trace shale fragment, soft, wet

Completion Notes:

Schedule 40, 0.020" slotted PVC casing from 24.8 to 40.2 feet bgs; schedule 40, solid, PVC casing from 0 to 24.8 feet bgs; backfilled with hydrated 3/8" bentonite pellets from 41.8 to 42.0 feet bgs, filter pack (10-20) sand from 15.5 to 41.8 feet bgs, hydrated 3/8" bentonite pellets from 14.8 to 15.5 feet bgs, and hydrated bentonite chips from 0 to 14.8 feet bgs. 3' X 3' X 6" concrete pad with 8" locking well vault installed at the surface.

Site:

Highland Mine

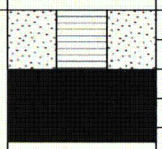
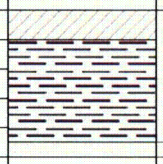
Converse County, WY

Project No.: 85598

BBL an ARCADIS company

BORING LOG

Driller: Drilling Engineers, Inc.	Date Drilled: 06-28-06	Logged By:
Boring Dia: 6.25 Inches	Boring Number: BBL-3	Reed Lyday

Sample	Blow Counts	Completion	Depth Feet	Lithology	Description
			45 50 55 60 65 70 75		SHALE, black, hard, believed to be bedrock SAND (minor material: shale), visible sample was gray sand with large, black shale fragments (thumb wide)

Completion Notes:

Schedule 40, 0.020" slotted PVC casing from 24.8 to 40.2 feet bgs; schedule 40, solid, PVC casing from 0 to 24.8 feet bgs; backfilled with hydrated 3/8" bentonite pellets from 41.8 to 42.0 feet bgs, filter pack (10-20) sand from 15.5 to 41.8 feet bgs, hydrated 3/8" bentonite pellets from 14.8 to 15.5 feet bgs, and hydrated bentonite chips from 0 to 14.8 feet bgs. 3' X 3' X 6" concrete pad with 8" locking well vault installed at the surface.

Site:

Highland Mine

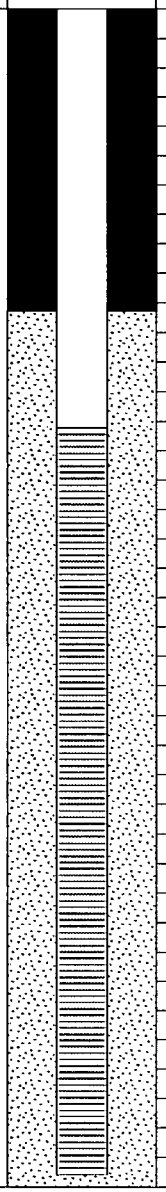
Converse County, WY

Project No.: 85598

BBL an ARCADIS company

BORING LOG

Driller: Drilling Engineers, Inc.	Date Drilled: 07-01-06	Logged By:
Boring Dia: 6.25 Inches	Boring Number: BBL-4	Reed Lyday

Sample	Blow Counts	Completion	Depth Feet	Lithology	Description
			5		SILT (minor material: sand), tan-brown, loose, dry
			10		CLAY (minor material: silt) some fine sand, some medium sand, brown, soft, slightly moist
			15		CLAY (minor material: sand), >20% fine sand, moist, wet at 14'
			20		20-30% fine sand
			25		5-10% medium sand, 20-30% fine sand
			30		10% sand, increasing clay
			35		trace sand
					trace gravel and sand

Completion Notes:

Schedule 40, 0.020" slotted PVC casing from 14.2 to 39.6 feet bgs; schedule 40, solid, PVC casing from 0 to 14.2 feet bgs; backfilled with filter pack (10-20) sand from 10.3 to 39.6 feet bgs, hydrated 3/8" bentonite pellets from 8.6 to 10.3 feet bgs, and hydrated bentonite chips from 0 to 8.6 feet bgs. 3' X 3' X 6"concrete pad with 8" locking well vault installed at the surface.

Site:

Highland Mine

Converse County, WY

Project No.: 85598

BBL an ARCADIS company

BORING LOG

Driller: Drilling Engineers, Inc.	Date Drilled: 07-01-06	Logged By:
Boring Dia: 6.25 Inches	Boring Number: BBL-4	Reed Lyday

Sample	Blow Counts	Completion	Depth Feet	Lithology	Description
	14/24				SILT (minor material: slightly sand), gray, dense, dry; visible sample taken by split-spoon
			45		
			50		
			55		
			60		
			65		
			70		
			75		

Completion Notes:

Schedule 40, 0.020" slotted PVC casing from 14.2 to 39.6 feet bgs; schedule 40, solid, PVC casing from 0 to 14.2 feet bgs; backfilled with filter pack (10-20) sand from 10.3 to 39.6 feet bgs, hydrated 3/8" bentonite pellets from 8.6 to 10.3 feet bgs, and hydrated bentonite chips from 0 to 8.6 feet bgs. 3' X 3' X 6"concrete pad with 8" locking well vault installed at the surface.

Site:

Highland Mine

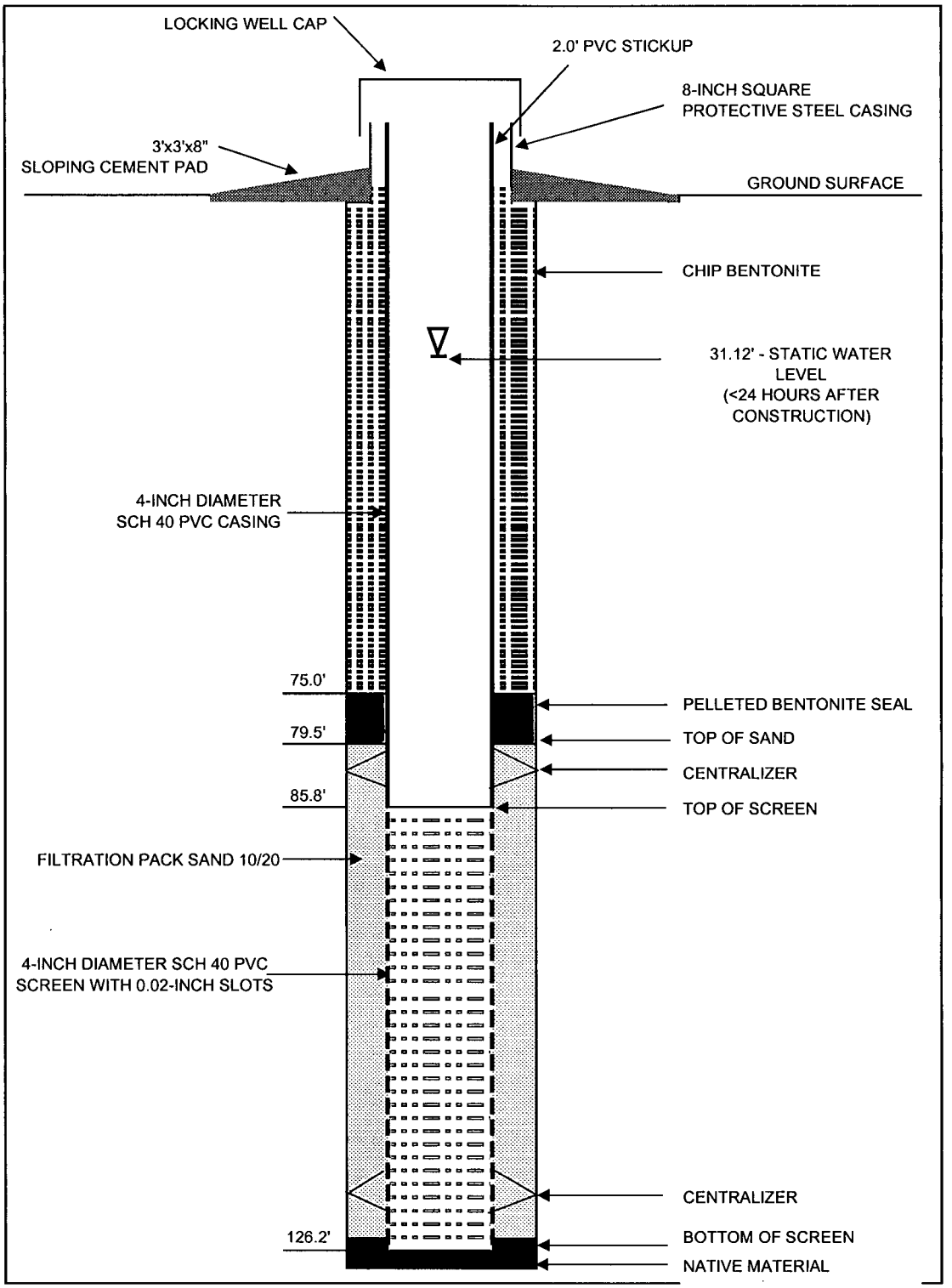
Converse County, WY

Project No.: 85598

Appendix B

Well Completion Diagrams

BBL®
an ARCADIS company

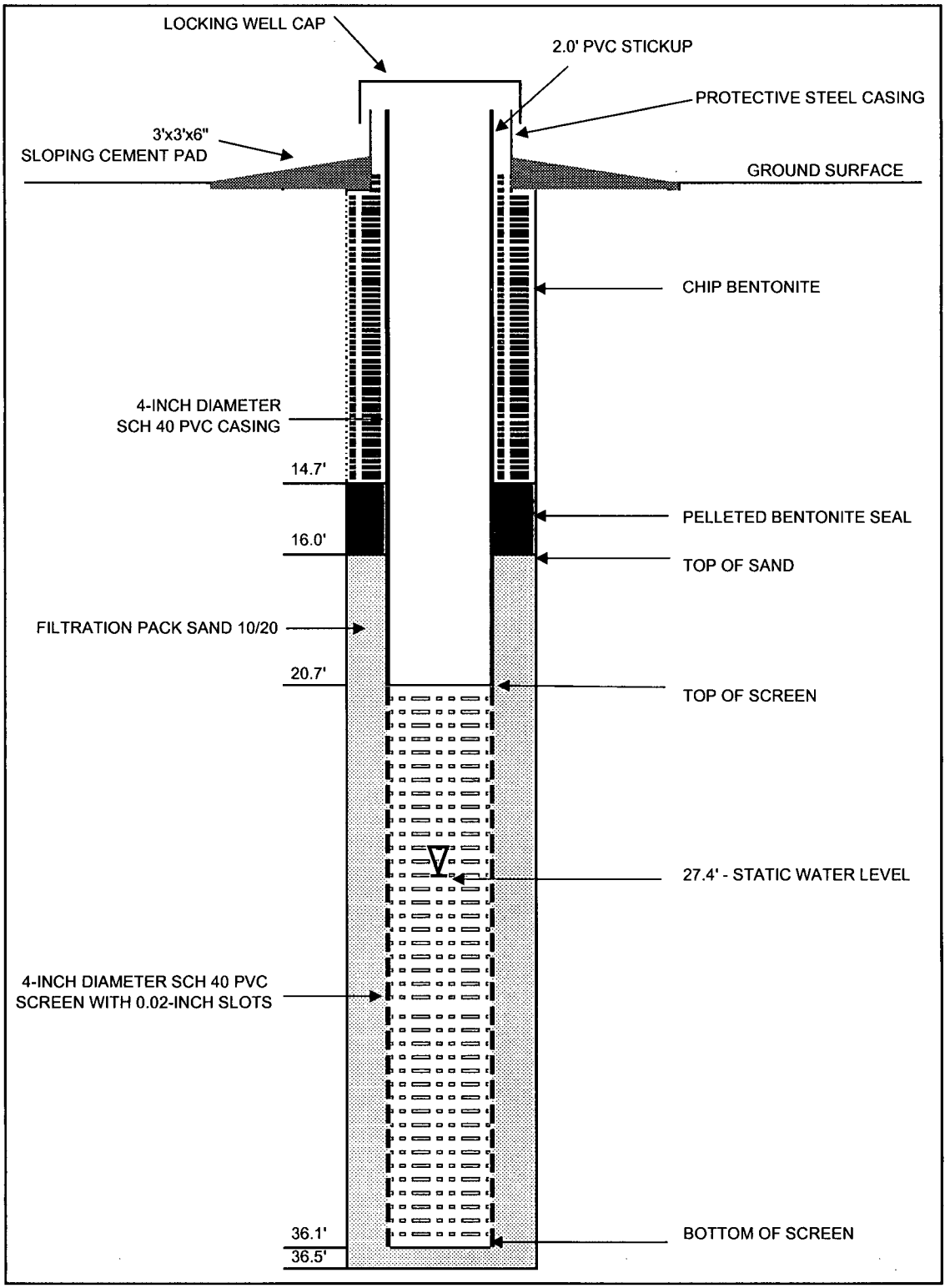


BBL an ARCADIS company

MONITORING WELL BBL - 1 COMPLETION DETAIL

DATE: AUGUST 2006
PROJECT: 85598
NOT TO SCALE

G:\PROJECTS\ExxonMobil\85598 Highland\Groundwater\MW Installation 2006\data\BBL-1 Well Completion Detail.xls

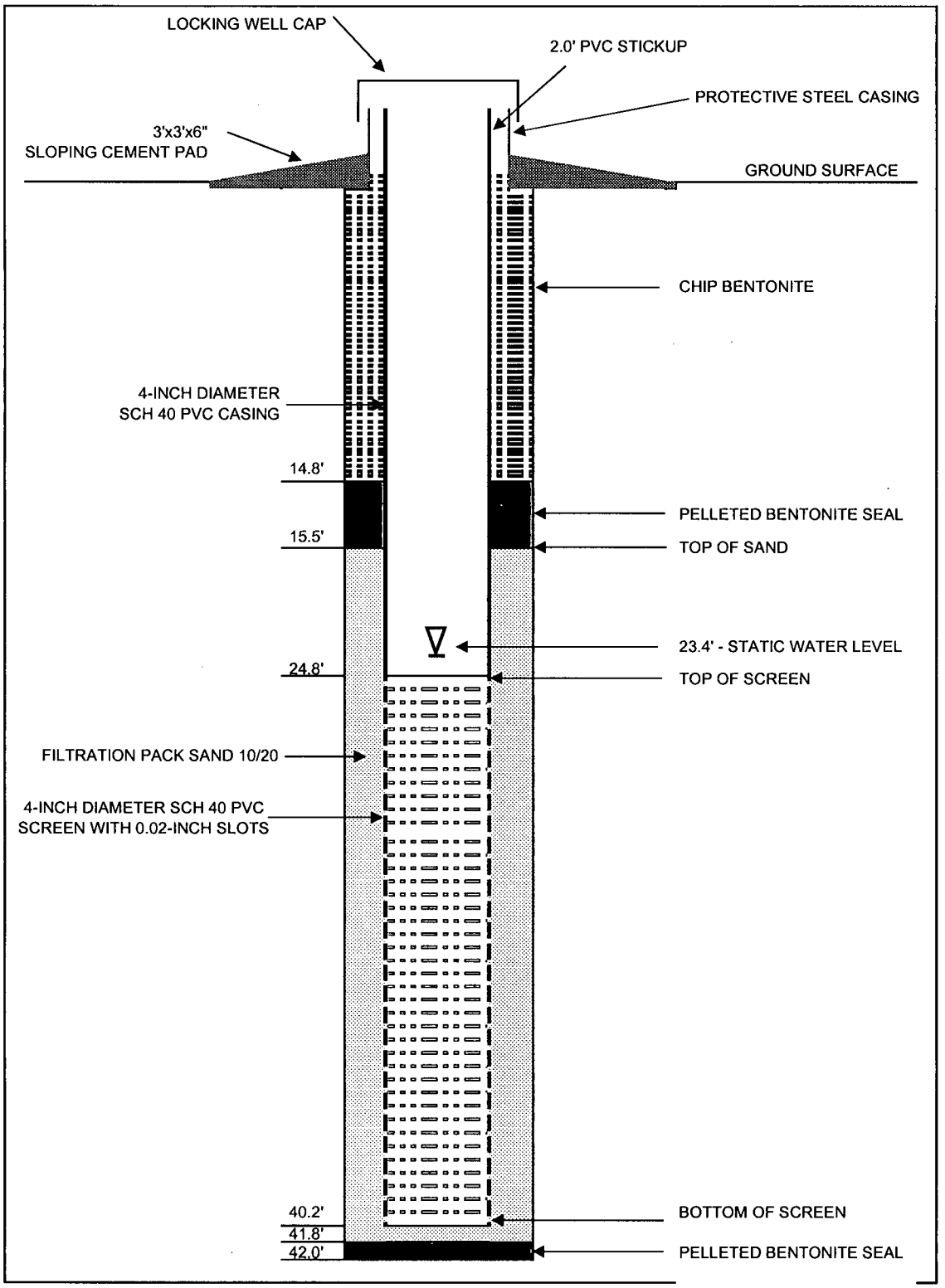


BBL an ARCADIS company

MONITORING WELL BBL - 2 COMPLETION DETAIL

DATE: AUGUST 2006
PROJECT: 85598
NOT TO SCALE

G:\PROJECTS\ExxonMobil\85598 Highland\Groundwater\MW Installation 2006\data\BBL-2 Well Completion Detail.xls

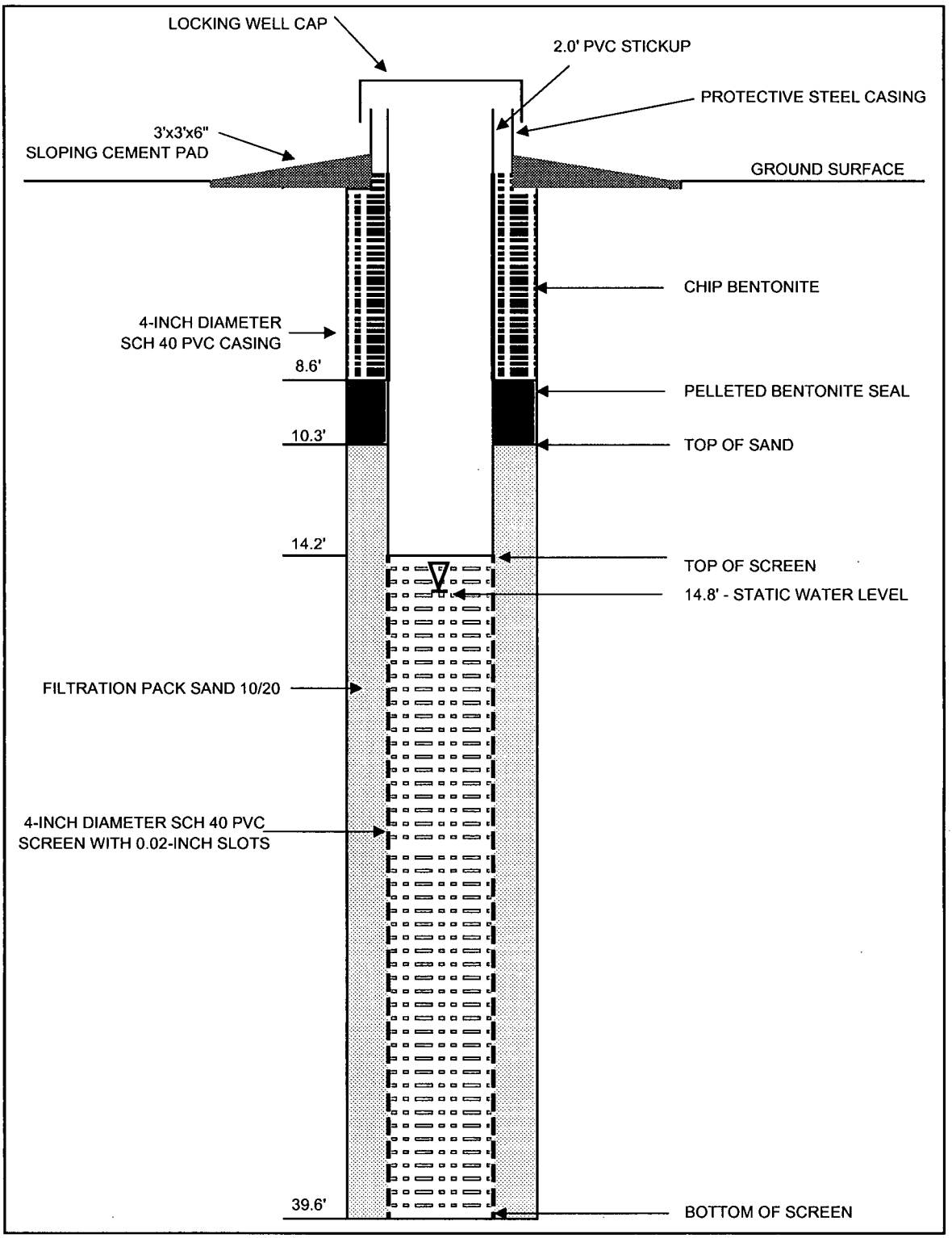


BBL an ARCADIS company

MONITORING WELL BBL - 3 COMPLETION DETAIL

DATE: AUGUST 2006
PROJECT: 85598
NOT TO SCALE

G:\PROJECTS\ExxonMobil\85598 Highland\Groundwater\MW Installation 2006\data\BBL-3 Well Completion Detail.xls



BBL an ARCADIS company

MONITORING WELL BBL - 4 COMPLETION DETAIL

DATE: AUGUST 2006
PROJECT: 85598
NOT TO SCALE

G:\PROJECTS\ExxonMobil\85598 Highland\Groundwater\MW Installation 2006\data\BBL-4 Well Completion Detail.xls

consulting
scientists and
engineers

MEMORANDUM

MFG PROJECT: 180548

TO: **Clint Strachan**

FROM: **Joe Reed, MFG, Inc.**

DATE: November 16, 2004

SUBJECT: **Monitor Well Installation at the ExxonMobil Highlands Site**

This report covers the installation and development of three monitoring wells at the Exxon Mobil Highland Reclamation Project Site located near Douglas, Wyoming. Three monitoring wells were drilled using hollow stem augers/air rotary drilling and were completed in three different sandstone formations at the site. Figure 1 shows the location of the new monitoring wells and Table 1 presents the survey data. The monitoring well installation started October 4, 2004 and was completed October 7, 2004.

Monitor Well Installation

Boreholes were drilled by Drilling Engineers Inc., of Fort Collins, Colorado. A CME 75 drill rig utilizing hollow stem augers and air rotary drilling was used to drill the boreholes. Hollow stem augers (8.25-inch inside diameter and 12.25-inch outside diameter) were advanced to 15 feet below ground surface (bgs) and were then utilized as temporary surface casing. Air rotary drilling (using a 7 7/8-inch diameter roller bit) was then used to advance the boreholes to total depth. The boreholes were sampled during drilling by observation of drill cuttings. Borehole logs are presented in Figures 2, 3, and 4.

Table 2 presents well completion summary data and Figures 5, 6, and 7 are monitoring well completion diagrams. The 4-inch diameter monitoring wells were constructed from Boart Longyear's Trilock Schedule 40 PVC. Slotted well screen (0.020-inch) and cap was installed at the depths specified in Table 2. A centralizer was installed in the middle of the screen interval of MFG-2 and MFG-3 and two centralizers were installed at the top and bottom of the screen interval of well MFG-1. Oglebay Norton Corporation's 10-20 filter pack was installed to 3-6 feet above the screen. A Cetco coated pelleted bentonite seal was installed above the filter pack. Chip bentonite was installed above the pelleted bentonite seal to near ground surface. The 4-inch diameter PVC was capped with a 4-inch diameter slip cap. The surface completion for each well consisted of a lockable protective steel casing with a sloping cement pad.

Monitoring Well Pump Installation and Development

Wells were first developed by surging and bailing throughout the screened interval. Grundfos 5SQ3A, ½ horsepower, 240 volt electric submersible pumps were installed in each of the monitoring wells by Pronghorn Pump and Repair of Glenrock, Wyoming. The pump was installed at 51 feet bgs in MFG-1, at 90 feet bgs in MFG-2 and at 139 feet in MFG-3.

Pronghorn Pump then further developed the wells by pumping. MFG-1 was pumped dry more than 30 times, 1100 gallons was purged from MFG-2, and 1800 gallons was purged from MFG-3. MFG-1 easily pumps dry but quickly recovers, MFG-2 and MGF-3 can be pumped continuously at 5 gallons per minute.

Development water and drill cuttings were spread on the ground at the well site. All downhole drilling and development equipment was decontaminated by power washing with tap water and Liquinox prior to drilling the first borehole.

The monitoring wells are registered with the State of Wyoming and have been assigned the following permit numbers:

MFG-1 Permit No. U.W. 162572
MFG-2 Permit No. U.W. 162573
MFG-3 Permit No. U.W. 162571

Table 1 Survey Data

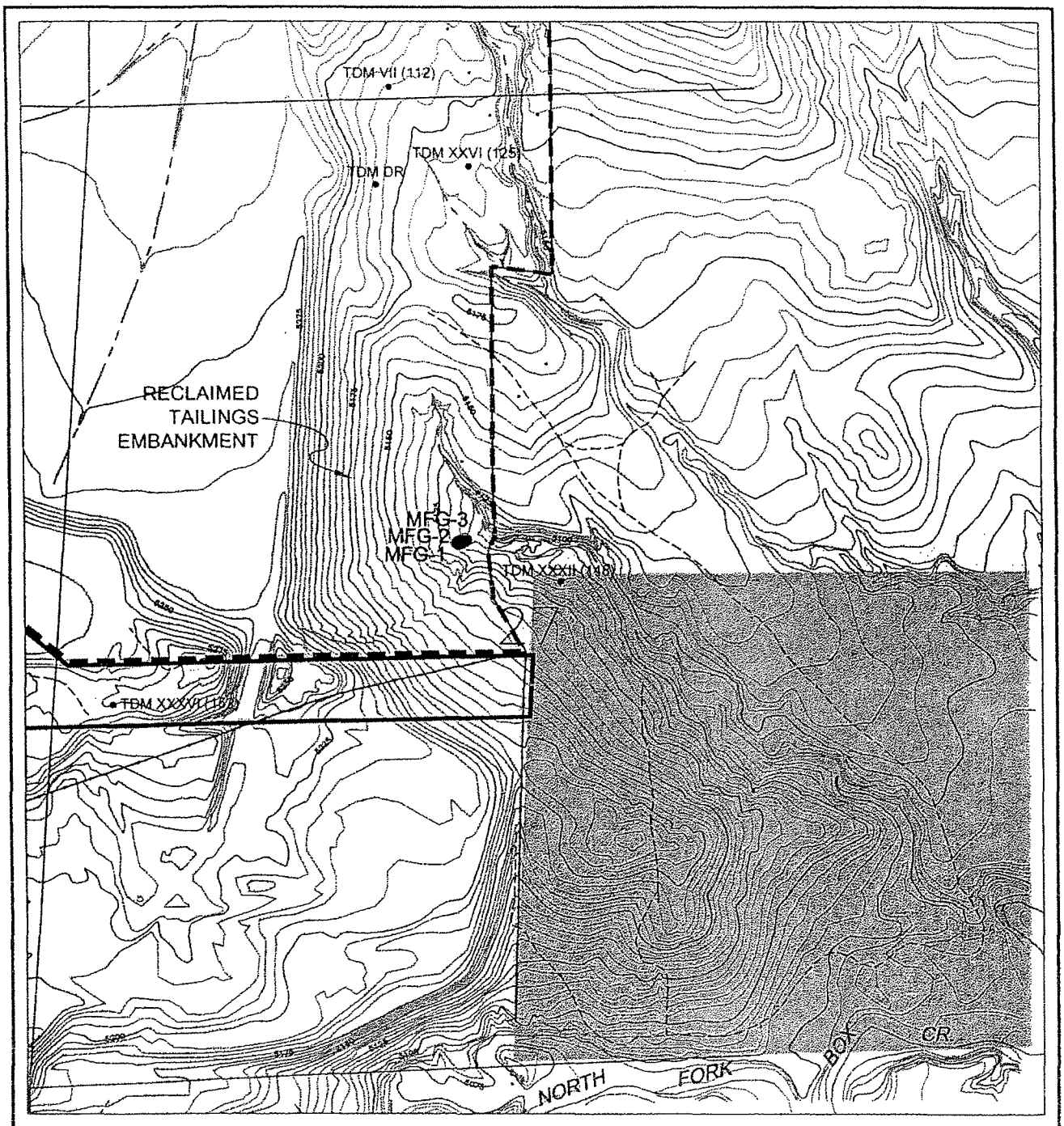
Well	Northing	Easting	Latitude	Longitude	Elevation (Top of PVC)
MFG-1	874029.53	414525.549	43° 03' 53.51532"	105° 29' 13.69021"	5117.827
MFG-2	874038.33	414543.504	43° 03' 53.60295"	105° 29' 13.44878"	5116.744
MFG-3	874047.28	414561.693	43° 03' 53.69204"	105° 29' 13.20420"	5115.079

Datum: WGS 84

Table 2 Well Completion Summary

Well	Total Depth	Bottom of PVC	Top of Screen	Top of Filter Pack	Top of Bentonite Pellets	Top of Bottom Bentonite Seal	PVC Stickup
MFG-1	51.5	50.9	20.5	14.5	10.5		2
MFG-2	96	92	76.6	72.7	68	93	2
MFG-3	151.5	140.57	130.17	127	121.5		2

All Measurements Below Ground Surface



LEGEND

- EXXONMOBIL
- BONER
- PERIMETER OF DEQ PERMIT AREA
- PROPOSED DOE LONG-TERM CARE BOUNDARY
- EXISTING MONITORING WELL LOCATIONS
- MFG MONITORING WELL LOCATIONS

NORTH

SCALE IN FEET

0 800

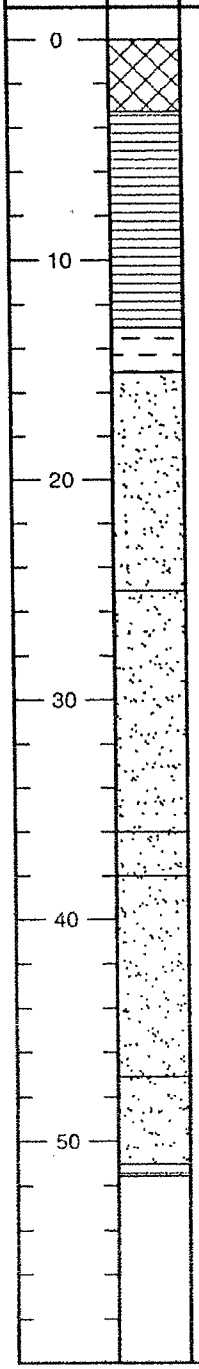
MFG, Inc. *consulting scientists and engineers*	FIGURE 1 MONITORING WELL LOCATIONS	Date: NOVEMBER 2004 Project: 180548-3 File: MFG-WELLS

BORING LOG

MFG, Inc.
consulting scientists and engineers

BORING NO.
MFG-1

PROJECT: EXXONMOBIL HIGHLANDS PAGE: 1 of 1
PROJECT NO.: 180548 DATE: 10/6/04
NORTHING: 874029.528 EASTING: 414525.549 GROUND ELEVATION: 5115.827
DRILLING COMPANY: DRILLING ENGINEERS DRILLING METHOD: HSA/AIR ROTARY
DRILLER: ANDY LOZANO LOGGED BY: JOE REED



DESCRIPTION/NOTES	
0 - 3.5'	TOPSOIL.
3.5' - 13.0'	Mixture of highly weathered shale, brown (10YR 5/3), and (~10%) weathered sandstone, fine grained, 10% silt, brown (10YR 5/3). At 10 ft. some silty clayey sand, brown (10YR 5/3), very slightly moist, fine sand.
13.0' - 15.0'	Silty sandy, clay, brown (10YR 5/3), very slightly moist, occasional fine gravel, less sand than above.
15.0' - 25.0'	Silty sand, brownish yellow (10YR 6/6), fine sand, <10% silt, occasional medium sand, dry.
25.0' - 36.0'	Fine sand, brown (10YR 5/3), <10% silt, dry.
36.0' - 38.0'	Sand, brown (10YR 5/3), 50% fine sand, 30% medium sand, 20% coarse sand, angular to sub rounded, slightly moist, occasional shale.
38.0' - 47.0'	Fine sand, gray (10YR 5/1), <5% silt, wet.
47.0' - 51.0'	Sand, brown (10YR 5/3), 40% fine sand, 40% medium sand, 20% coarse sand, wet.
51.0' - 51.5'	Shale, gray (10YR 5/1), at 65 ft. some coal, wet.

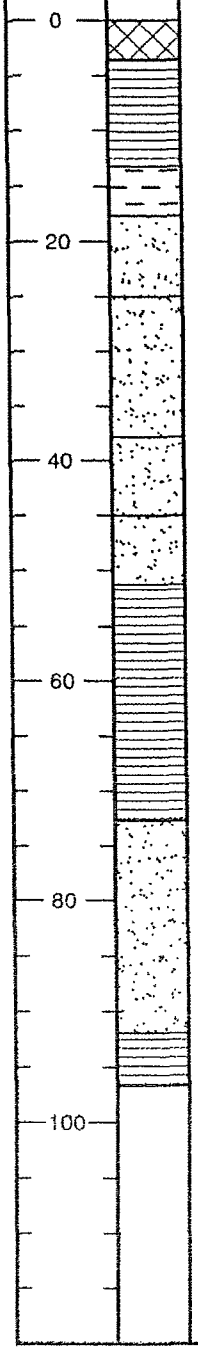
FIGURE 2

BORING LOG

MFG, Inc.
consulting scientists and engineers

BORING NO. MFG-2

PROJECT: EXXONMOBIL HIGHLANDS PAGE: 1 of 1
PROJECT NO.: 180548 DATE: 10/7/04
NORTHING: 874038.331 EASTING: 414543.504 GROUND ELEVATION: 5114.744
DRILLING COMPANY: DRILLING ENGINEERS DRILLING METHOD: HSA/AIR ROTARY
DRILLER: ANDY LOZANO LOGGED BY: JOE REED



DESCRIPTION/NOTES	
0 - 3.5'	TOPSOIL.
3.5' - 13.0'	Mixture of highly weathered shale, brown (10YR 5/3), and (~10%) weathered sandstone, fine grained, 10% silt, brown (10YR 5/3). At 10 ft. some silty clayey sand, brown (10YR 5/3), very slightly moist, fine sand.
13.0' - 18.0'	Silty sandy, clay, brown (10YR 5/3), very slightly moist, occasional fine gravel, less sand than above.
18.0' - 25.0'	Silty sand, brownish yellow (10YR 6/6), fine sand, <10% silt, occasional medium sand, dry.
25.0' - 38.0'	Fine sand, brown (10YR 5/3), <10% silt, dry.
38.0' - 45.0'	Fine sand, gray (10YR 5/1), <5% silt, wet.
45.0' - 51.0'	Sand, brown (10YR 5/3), 40% fine sand, 40% medium sand, 20% coarse sand, wet.
51.0' - 73.0'	Shale, gray (10YR 5/1), at 65 ft. some coal, wet.
73.0' - 92.0'	Sands, gray (10YR 5/1), 30% fine sand, 40% medium sand, 30% coarse sand, rock at 82 ft.
92.0' - 96.0'	Shale, gray (10YR 5/1).

FIGURE 3

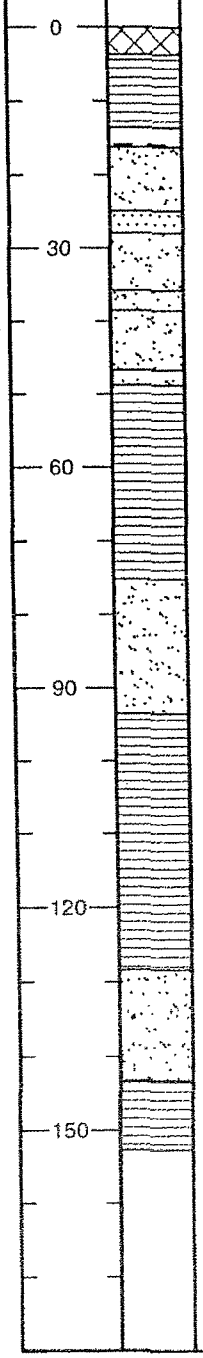
100548\BH_MFG1-3.DWG

BORING LOG

MFG, Inc.
consulting scientists and engineers

BORING NO.
MFG-3

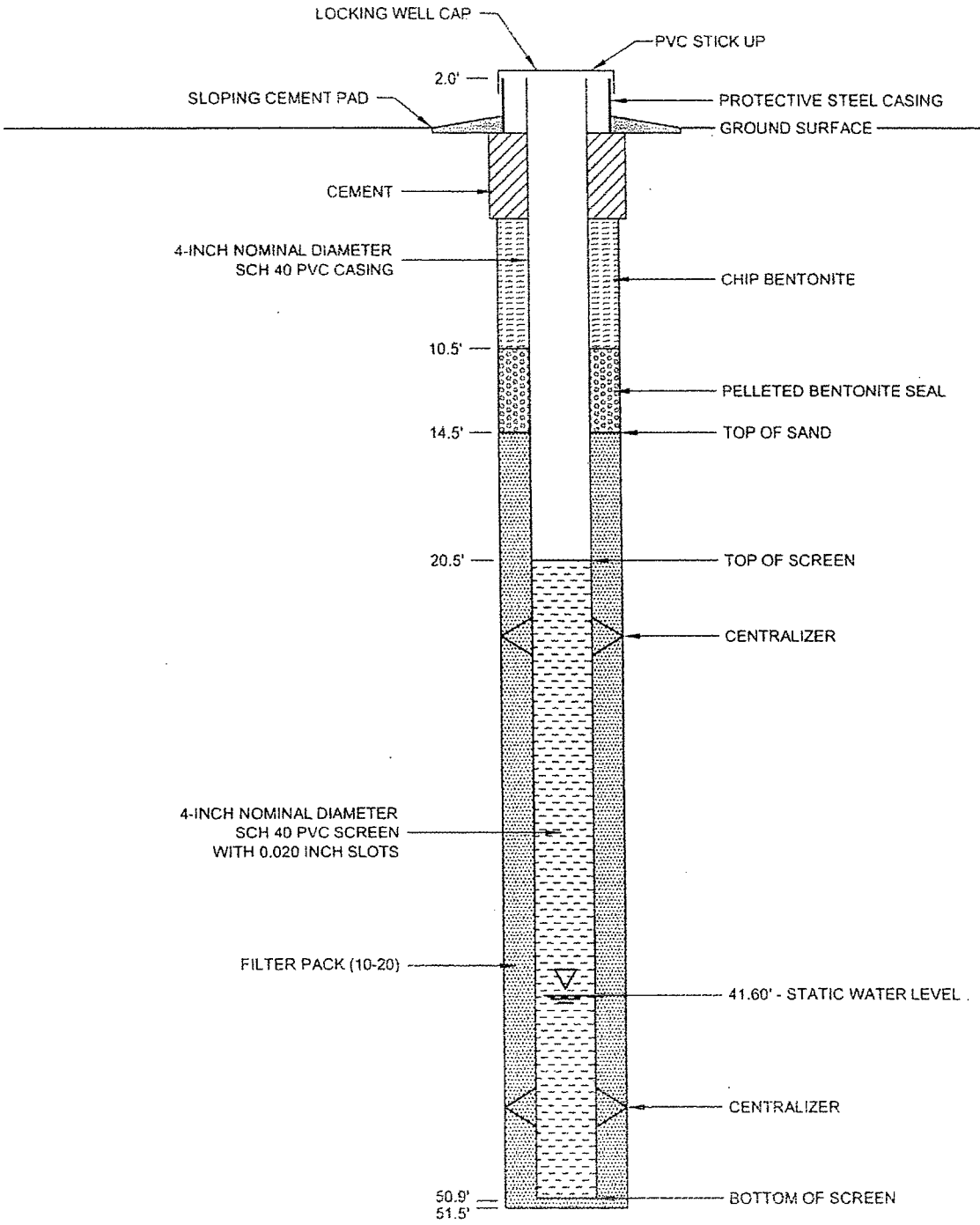
PROJECT: EXXONMOBIL HIGHLANDS PAGE: 1 of 1
PROJECT NO.: 180548 DATE: 10/7/04
NORTHING: 874047.281 EASTING: 414561.693 GROUND ELEVATION: 5113.079
DRILLING COMPANY: DRILLING ENGINEERS DRILLING METHOD: HSA/AIR ROTARY
DRILLER: ANDY LOZANO LOGGED BY: JOE REED



DESCRIPTION/NOTES	
0 - 2.5'	TOPSOIL.
2.5' - 13.0'	Mixture of highly weathered shale, brown (10YR 5/3), and (~10%) weathered sandstone, fine grained, 10% silt, brown (10YR 5/3). At 10 ft. some silty clayey sand, brown (10YR 5/3), very slightly moist, fine sand.
13.0' - 15.0'	Silty sandy, clay, brown (10YR 5/3), very slightly moist, occasional fine gravel, less sand than above.
15.0' - 25.0'	Silty sand, brownish yellow (10YR 6/6), fine sand, <10% silt, occasional medium sand, dry.
25.0' - 27.5'	Hard cemented sandstone.
27.5' - 36.0'	Fine sand, brown (10YR 5/3), <10% silt, dry.
36.0' - 38.0'	Sand, brown (10YR 5/3), 50% fine sand, 30% medium sand, 20% coarse sand, angular to sub rounded, slightly moist, occasional shale.
38.0' - 47.0'	Fine sand, gray (10YR 5/1), <5% silt, wet.
47.0' - 49.0'	Sand, brown (10YR 5/3), 40% fine sand, 40% medium sand, 20% coarse sand, wet.
49.0' - 75.0'	Shale, gray (10YR 5/1), at 65 ft. some coal, wet.
75.0' - 92.0'	Sands, gray (10YR 5/1), 30% fine sand, 40% medium sand, 30% coarse sand.
92.0' - 129.0'	Shale, gray (10YR 5/1).
129.0' - 143.0'	Sands, gray (10YR 5/1), 30% fine sand, 40% medium sand, 30% coarse sand, at 130 ft. interbedded sands and shales - mostly sand.
143.0' - 151.5'	Shale, gray (10YR 5/1).

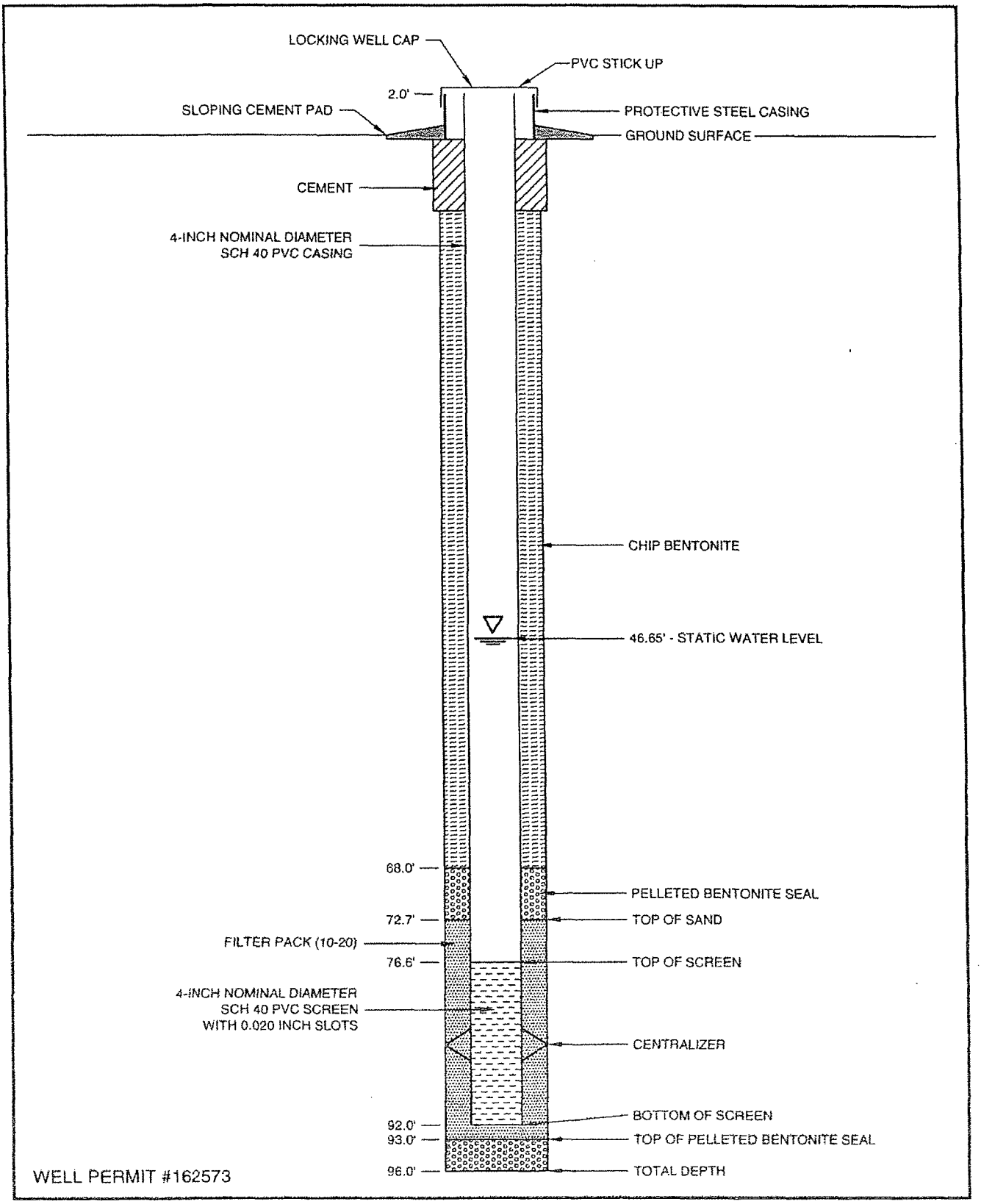
FIGURE 4

100548\BH_MFG1-3.DWG

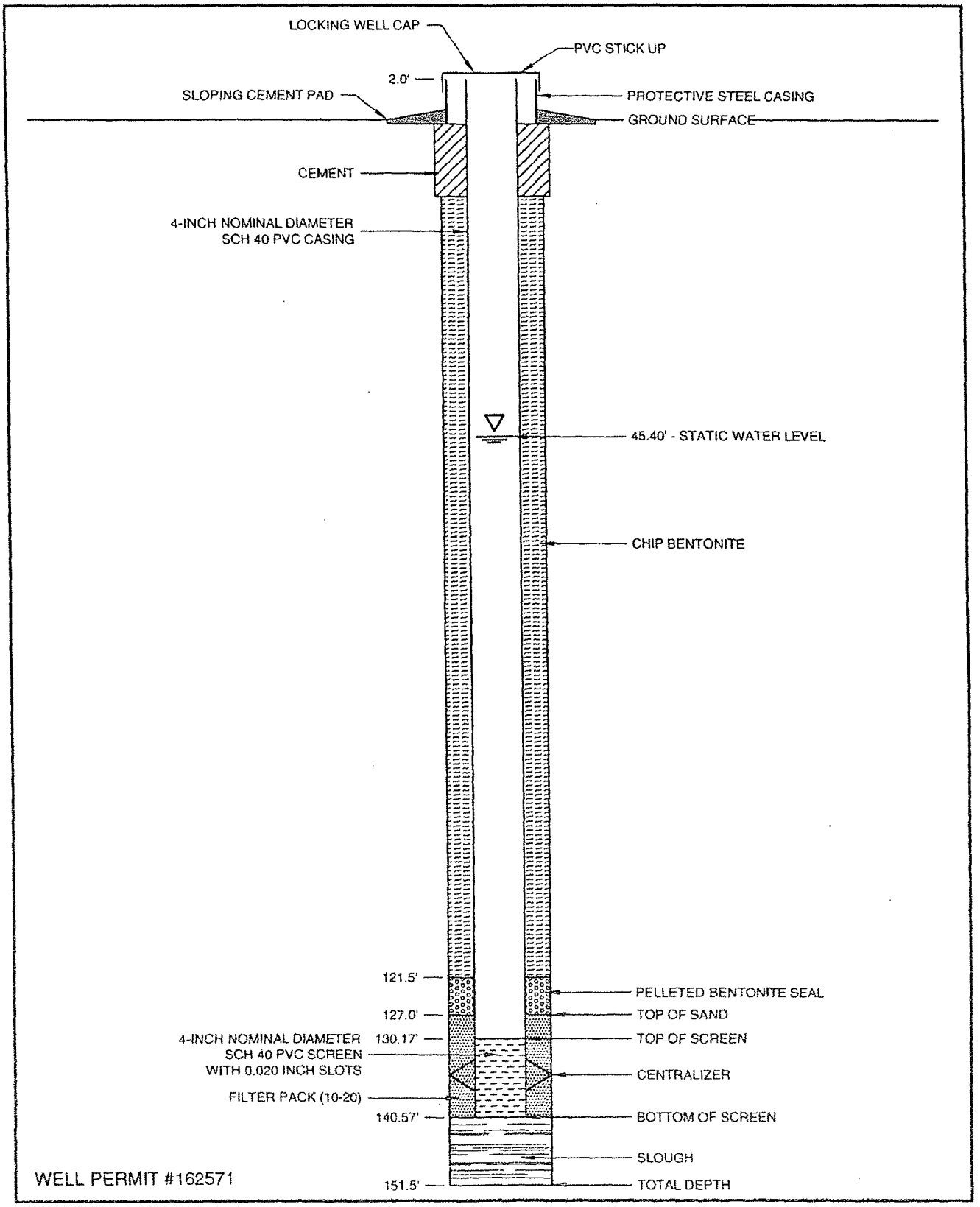


WELL PERMIT #162572

MFG, Inc. *consulting scientists and engineers*	FIGURE 5 WELL MFG-1 COMPLETION DETAIL	Date: NOVEMBER 2004 Project: 180548 File: WC-SUM.DWG



MFG, Inc. *consulting scientists and engineers*	FIGURE 6 WELL MFG-2 COMPLETION DETAIL	Date: NOVEMBER 2004 Project: 180548 File: WC-SUM.DWG



MFG, Inc. *consulting scientists and engineers*	FIGURE 7 WELL MFG-3 COMPLETION DETAIL	Date: NOVEMBER 2004 Project: 180548 File: WC-SUM.DWG