Contractor: Taylor Drlg. - Conway | Coordinates: | Project: Gilt Edge | Hole No.: BED-4

Drill Type: Porta Drill - air hammer | Casing Depth: | State: South Dakota | Sheet 6 of 9

Hole Size: 8" | Bearing: | Inclination: 0° | Date Started: 11-7-87 | Property:

Collar Elev.: | Final Depth: 305' | Date Completed: 11-11-87 | Hole Surveyed:

DISTANCE (feet)	GRAPHIC LOGS: ALTERATION (1 Weak, 2 Moderate, 3 Strong)	TOTAL SULFIDES (vol %)	ROCK TYPE & STRUCTURE	DOWN HOLE LOCATION: DISTANCE DOWN HOLE (feet)	ELEVATION	GEOLOGIC NOTES: ROCK TYPE	DESCRIPTION: MINERALOGY, ALTERATION, TEXTURES, GRAIN SIZE, FRAGMENT SIZE	MINERALIZATION: DISTRIBUTION (Massive, Disseminated, Veinfill, Replacement)	TYPE
175				175		Hornfels	variegated lt.-med green with occasional gray-brown - no visible pyrites - no fractures		
180				180			As Above		
				182		porphyry	Lt green as before, some pyrite		
185				185			As Above but getting darker	Stop for nite @ 185'	
				188		Hornblend Trachyte	much darker - white inclusions (quartz?) and dark inclusions (feldspars or Hornblend?)		
190				190			fair pyrite content		
195				194		Hornfels	med-gray-brown to med. green		
				195					
				198		H. Trachyte	lt. green - white inclusions (quartz?) chips of cloudy white quartzite		
200				200		Hornfels	- med gray-brown @ 200'		
				202			clean contact @ 202' dk. brown platy fragments		
205				205				Making 10+ GPM	
						H. Trachyte	dk green with black inclusions - good pyrite content - some oxidation - some lt. green chips		
210									

DRILL CUTTING LOG

Logged by: MARTIN ELMORE

Contractor: Taylor Drlg - Conway | Coordinates: | Project: Gelt Edge | Hole No.: BED-4

Drill Type: Forta Drill - air hammer | Casing Depth: | State: South Dakota | Sheet 7 of 9

Hole Size: 8" | Bearing: | Inclination: 0° | Date Started: 11-7-87 | Property:

Collar Elev.: | Final Depth: 305' | Date Completed: 11-11-87 | Hole Surveyed:

DISTANCE (feet)	GRAPHIC LOGS: ALTERATION (1 Weak, 2 Moderate, 3 Strong)	TOTAL SULFIDES (vol %)	ROCK TYPE & STRUCTURE	DOWN HOLE LOCATION: DISTANCE DOWN HOLE (feet)	ELEVATION	ROCK TYPE	GEOLOGIC NOTES: DESCRIPTION (MINERALOGY, ALTERATION, TEXTURES, GRAIN SIZE, FRAGMENT SIZE)	MINERALIZATION: DISTRIBUTION (Massive, Disseminated, Veinfill, Replacement)	TYPE
210				210		Hornfels	Med green - med gray-brown small chips - no fracturing - no pyrite		
215				215		Hornfels	dk gray-brown - platy surfaces little pyrite		
220				220		Hornfels	As Above		
225				225			some dark chips in water - smaller fragments - mod. pyrite on fracture surfaces - oxidation on some fracture surfaces		
230				228		H. Trachyte	Med. green with black inclusions		
				230			As Above		
				232		Hornfels	dk. gray-brown, platy Hornfels scarce pyrite		
235				235		H. Trachyte	Lt. green to dk green varigated occasional quartzite chip - some chips show a bright yellow deposit on fracture surfaces - moderate pyrite on dk green chips	yellow is probably fresh sulphide deposit	
240				240			As Above		
245									

DRILL CUTTING LOG

Logged by: MARTIN ELMORE

Contractor: Taylor Drlg - Conway | Coordinates: | Project: Gilt Edge | Hole No.: BED-4

Drill Type: Porta Drill - Air hammer | Casing Depth: | State: South Dakota | Sheet 8 of 9

Hole Size: 8" | Bearing: | Inclination: 0° | Date Started: 11-7-87 | Property:

Collar Elev.: | Final Depth: 305' | Date Completed: 11-11-87 | Hole Surveyed:

DISTANCE (feet)	GRAPHIC LOGS: ALTERATION (1 Weak, 2 Moderate, 3 Strong)	TOTAL SULFIDES (vol %)	ROCK TYPE & STRUCTURE	DOWN HOLE LOCATION: DISTANCE DOWN HOLE (feet)	ELEVATION	GEOLOGIC NOTES: ROCK TYPE	DESCRIPTION: MINERALOGY, ALTERATION, TEXTURES, GRAIN SIZE, FRAGMENT SIZE	MINERALIZATION: DISTRIBUTION (Massive, Disseminated, Veinlill, Replacement)	TYPE
245				245					
				246		H. Trachyte	Med Green with black inclusions moderate pyrite		
250				250			As Above		
								⇒Short sample - very fine chips and sand-size particles	
255				255			As Above		
							increase in pyrite		
260				260			As Above		
265				264 / 265			Solid black chips coming up		
				268		H. Trachyte	Varigated green to tan		
270				270			to med gray-brown		
							Chips are "grainy" similar to a quartzite		
275				275			As Above		
							Color changed to: varigated white to dk green to black		
280							gray/white chips evident also		

DRILL CUTTING LOG

Logged by: MARTIN ELMORE

Contractor: Taylor Drlg - Conway | Coordinates: | Project: Gilt Edge | Hole No.: BED-4

Drill Type: ~~Porta Drill - Airhammer~~ | Casing Depth: | State: South Dakota | Sheet 9 of 9

Hole Size: 8" | Bearing: | Inclination: 0° | Date Started: 11-7-87 | Property:

Collar Elev.: | Final Depth: 305' | Date Completed: 11/11/87 | Hole Surveyed:

Distance (feet)	Graphic Logs: Alteration (1 Weak, 2 Moderate, 3 Strong)	Total Sulfides (vol %)	Rock Type & Structure	Down Hole Location: Distance Down Hole (feet)	Elevation	Rock Type	Geologic Notes: Description (Mineralogy, Alteration, Textures, Grain Size, Fragment Size)	Mineralization: Distribution (Massive, Disseminated, Veinlill, Replacement)	Type
280				280		H. Trachyete	varigated: white - gray - dk green with occasional bright green chips "quartz - like"		
285				285			dk green with black & white inclusions	⇒ Still making 10 GPM	
				288		H. Trachyete	Lt green to white varigations		
290				290			Some black chips - some pyrite Med. green - good pyrite		
				293		Quartzite	Lt gray, very hard,		
295				295			much pyrite in single cubes scattered thruout quartzite		
				297			Lt green to gray - good pyrite		
				298			Lt. gray only - good pyrite		
300				299			Lt. green to Lt. gray - better pyrite		
				300		Quartzite	Lt gray only - good pyrite		
							Some green chips - some TAN chips		
305				305			TD 305		

DRILL CUTTING LOG

Logged by: MARTIN ELMORE

BOREHOLE/WELL CONSTRUCTION LOG

.TE ID: BED-04 LOCATION ID: BED-04 FIELD REP: M. ELMORE

04

APPROX. SITE COORDINATES (FT.): N _____ E _____

GROUND ELEVATION (FT. MSL): _____ COMPLETION DATE: 11-11-87

BOREHOLE SUMMARY

DRILLER: TAYLOR

RIG TYPE: AIR ROTARY HAMMER

BIT TYPE	HOLE DIA.* (in.)	END DEPTH ● (ft.)	FLUID TYPE
BUTTON	8"	305	AIR/WATER
	10 5/8	33	"

CASING SUMMARY

CASING TYPE*	DESCRIPTION	DIA. (in.)	END DEPTH ✚ (ft.)
B	SDR 17 BELLED END PVC	4.5	75
S	.020 SDR 17 BELLED END	4.5	115
B	AS ABOVE		195
S	"		225
B	"		245
S	"		305

* P-Protective S-Screen B-Blank O-Open N-None

✚ Depth from Top of Casing

WELL CONSTRUCTION

TYPE CODE*	DESCRIPTION	END DEPTH ● (ft.)
S	1/2 BENT. PELLETS	55-57
S	"	155-157
S	"	185-190
F	10-20 SILICA - COLO	57-155
F	"	190-305
B	TYPE II CEMENT	55
B	CUTTINGS	157-185

* B - Backfill S - Seal F - Filter Pack

● Depth from Ground Surface

CONSTRUCTION TIME LOG

ACTIVITY	START DATE	START TIME	END TIME
DRILLING	11-7 to 11-11	0800	
CASING	11-11		
FILTER PACK	11-11		
SEAL	11-11		
BACKFILL	11-11		
DEVELOPMENT	11-11		1700
OTHER			

WELL DEVELOPMENT

SWAB & AIR LIFT @
4:45 2+ GPM
TURBID

COMMENTS: _____

05

WELL COMPLETION RECORD

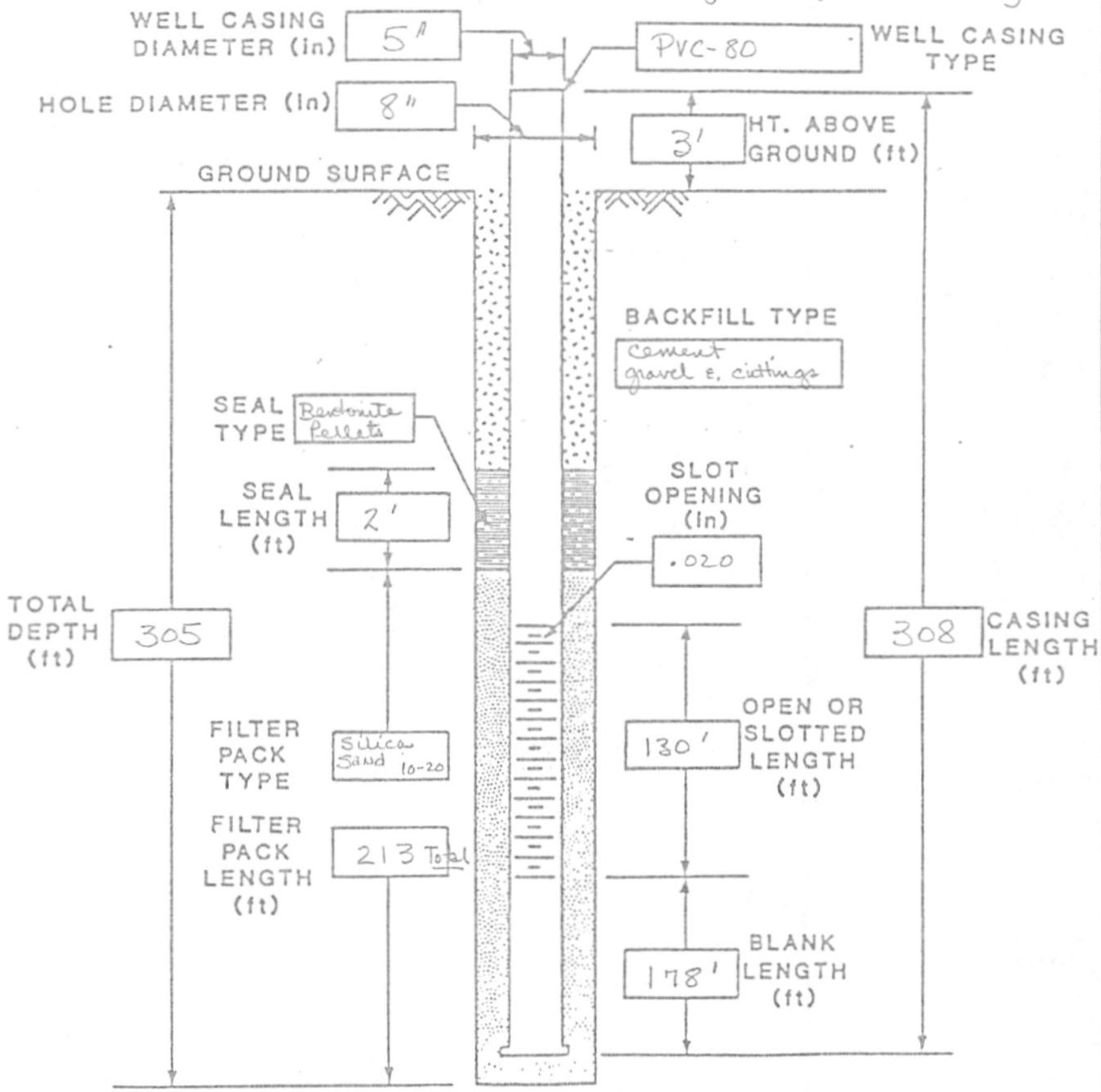
SITE ID: Gilt Edge LOCATION ID: BED-04 DATE INSTALLED: 11/11/87

APPROX. SITE COORDINATES: (FT.) N _____ E _____

OPEN AREA PER LINEAL FT. ($IN^2/FT.$) _____

FORMATION OF COMPLETION: Deadwood quartzite

FIELD REP.: MARTIN ELMORE DRILLER: Taylor Drlg - Frank Conway



COMMENTS: — See reverse side —

Air lift = 2+ GPM of red-brown water

Contractor Taylor Drlg - Conway
Coordinates N. 49040.1612 E. 22119.3472
Project Gilt Edge
Hole No. BED-5
Drill Type Porta Drill - air hammer
Casing Depth
State South Dakota
Sheet 1 of 4
Hole Size 8"
Bearing
Inclination 1°
Date Started 10-26-87
Property
Collar Elev. 5394.5
Final Depth 125'
Date Completed 10-28-87
Hole Surveyed

DISTANCE (feet)	GRAPHIC LOGS: ALTERATION (1 Weak, 2 Moderate, 3 Strong)	TOTAL SULFIDES (vol %)	ROCK TYPE & STRUCTURE	DOWN HOLE LOCATION: DISTANCE DOWN HOLE (feet)	ELEVATION	GEOLOGIC NOTES: ROCK TYPE	DESCRIPTION: MINERALOGY, ALTERATION, TEXTURES, GRAIN SIZE, FRAGMENT SIZE	MINERALIZATION: DISTRIBUTION (Massive, Disseminated, Veinlill, Replacement)	TYPE
				0	0-30 NS	Colluvial gravel interbedded w/thin shales	banded chert pebbles, porphyry pebbles few white quartz pebbles		
							very dry		
				5			few shale stringers are damp and plastic		
				10					
				15					
				20					
							Deadwood Fm.		
				25		H. Trachyte	Badly weathered - fractured		
				30			As Above		

DRILL CUTTING LOG

Logged by: MARTIN FLMORE

Contractor: Taylor Drlg - Conway | Coordinates: | Project: Gilt Edge | Hole No.: BED-5
Drill Type: PortaDrill - air hammer | Casing Depth: | State: South Dakota | Sheet 2 of 4
Hole Size: 8" | Bearing: | Inclination: 1° | Date Started: 10-26-87 | Property:
Collar Elev.: | Final Depth: 125' | Date Completed: 10-28-87 | Hole Surveyed:

DISTANCE (feet)	GRAPHIC LOGS: ALTERATION (1 Weak, 2 Moderate, 3 Strong)	TOTAL % SULFIDES (vol %)	ROCK TYPE & STRUCTURE	DOWN HOLE LOCATION: DISTANCE DOWN HOLE (feet)	ELEVATION	GEOLOGIC NOTES: ROCK TYPE	DESCRIPTION: MINERALOGY, ALTERATION, TEXTURES, GRAIN SIZE, FRAGMENT SIZE	MINERALIZATION: DISTRIBUTION (Massive, Disseminated, Veinlill, Replacement)	TYPE
				35		H. Trachyte	As Above		
						-	few fresh chips to surface		
				40		H. Trachyte	fresh sample gray-green matrix, quartz phenocrysts and well developed Hornblend small amount of pyrite		
				45			As Above		
				50		Hornfels	varigated lt. green to black		
				55			As Above		
				60		H. Trachyte	gray-green matrix, quartz and Hornblend phenocrysts, badly weathered heavy oxidation on all samples		
				65			As Above		

DRILL CUTTING LOG

Logged by: MARTIN ELMORE

Contractor: Taylor Drlg - Conway
Drill Type: PortaDrill - air hammer
Hole Size: 8"
Collar Elev.:
Coordinates:
Casing Depth:
Bearing: Inclination: 1°
Final Depth: 125'
Project: Gilt Edge
State: South Dakota
Date Started: 10-26-87
Date Completed: 10-28-87
Hole No.: BED-5
Sheet 3 of 4
Property:
Hole Surveyed:

DISTANCE (feet)	GRAPHIC LOGS: ALTERATION (1 Weak, 2 Moderate, 3 Strong)	TOTAL SULFIDES (vol %)	ROCK TYPE & STRUCTURE	DOWN HOLE LOCATION: DISTANCE DOWN HOLE (feet)	ELEVATION	GEOLOGIC NOTES: ROCK TYPE	DESCRIPTION: MINERALOGY, ALTERATION, TEXTURES, GRAIN SIZE, FRAGMENT SIZE	MINERALIZATION: DISTRIBUTION (Massive, Disseminated, Veinlill, Replacement)	TYPE
				70		H. Trachyte	gray-green matrix, quartz and hornblend phenocrysts, some lt green transparent phenocrysts		
							Badly weathered - oxidized		
				75					
							As Above		
				80					
							As Above		
				85					
							As Above		
				90		Hornfels	DK gray-brown fractured most chips show some oxidation		
				95			As Above but green in color		
				100		H. Trachyte	gray-green matrix - quartz and Hornblend phenocrysts, some fractures, no oxididation some pyrite		

DRILL CUTTING LOG

Logged by: MARTIN ELMORE

Contractor Taylor Drlg. - Conway | Coordinates | Project Gilt Edge | Hole No. BED-5

Drill Type Porta Drill - air hammer | Casing Depth | State South Dakota | Sheet 4 of 4

Hole Size 8" | Bearing | Inclination 1° | Date Started 10-26-87 | Property

Collar Elev. | Final Depth 125' | Date Completed 10-28-87 | Hole Surveyed

DISTANCE (feet)	GRAPHIC LOGS: ALTERATION (1 Weak, 2 Moderate, 3 Strong)	TOTAL SULFIDES (vol %)	ROCK TYPE & STRUCTURE	DOWN HOLE LOCATION: DISTANCE DOWN HOLE (feet)	ELEVATION	GEOLOGIC NOTES: ROCK TYPE	DESCRIPTION: MINERALOGY, ALTERATION, TEXTURES, GRAIN SIZE, FRAGMENT SIZE	MINERALIZATION: DISTRIBUTION (Massive, Disseminated, Veinlill, Replacement)	TYPE
				105		H. Trachyte	As Above		
							some oxidation		
				110					
							fresh sample - no oxidation		
				115					
							some oxidation		
				120					
							fresh sample - no oxidation		
				125					
							125' TD 10-28-87		

DRILL CUTTING LOG

Logged by: MARTIN ELMORE

BOREHOLE/WELL CONSTRUCTION LOG

04

.TE ID: BED-02 LOCATION ID: BED-02 FIELD REP: G. CURTISS / K. BRUSER

APPROX. SITE COORDINATES (FT.): N _____ E _____

GROUND ELEVATION (FT. MSL): _____ COMPLETION DATE: 12-12-87

BOREHOLE SUMMARY

DRILLER: TAYLOR – FRANK CONWAY

RIG TYPE: PORTADRILL TRT-1 AIR ROTARY

BIT TYPE	HOLE DIA.* (in.)	END DEPTH● (ft.)	FLUID TYPE
BUTTON/AIR	8"	40	AIR/WATER
HAMMER			
CABLE TOOL	±10"	±20	—

CASING SUMMARY

CASING TYPE*	DESCRIPTION	DIA. (in.)	END✚ DEPTH (ft.)
STEEL	TEMPORARY SURF.	8"	20+
	PIPE		

* P–Protective S–Screen B–Blank O–Open N–None

✚ Depth from Top of Casing

CONSTRUCTION TIME LOG

ACTIVITY	START DATE	START TIME	END TIME	
DRILLING	12-10-87	1130	1700	
	12-11-87	0800	1700	
	12-12-87	0800	1330	
CASING	12-12	1300	1400	
FILTER PACK	12-12	1400	1500	
	12-13	0800	0930	
SEAL	12-13	0950	1000	
BACKFILL	12-13	1015	1050	
DEVELOPMENT	12-13	1100	1130	SWAB
	12-13	1200	1330	AIRLIFT
OTHER				

WELL CONSTRUCTION

TYPE CODE*	DESCRIPTION	END● DEPTH (ft.)
S	SDR 17 .020 THREAD PVC	395½
B	SUMP – SLIP CAP ON BOTT.	401
B	SDR 17 FLUSH JT THREAD PVC	315½
F	10-20 COLO SILICA	401
S	½" VOLCLAY BENT PELLETS	130
B	TYPE II CEMENT GROUT	126½
	CENTRALIZERS @ 40'	
	INTERVALS	

* B – Backfill S – Seal F – Filter Pack

● Depth from Ground Surface

WELL DEVELOPMENT

(40') SWABBED / AIR LIFTED W/ TREMIE AT 395'

(SWAB BROKE IN COLD WATER)

COMMENTS: STD BY 12-12-87 1530-1730 BECAUSE OF LACK OF SAND ON SITE

2.7' STICK-UP

NO SIGNIF. PRODUCING ZONES EVIDENT DURING DRILLING

05

WELL COMPLETION RECORD

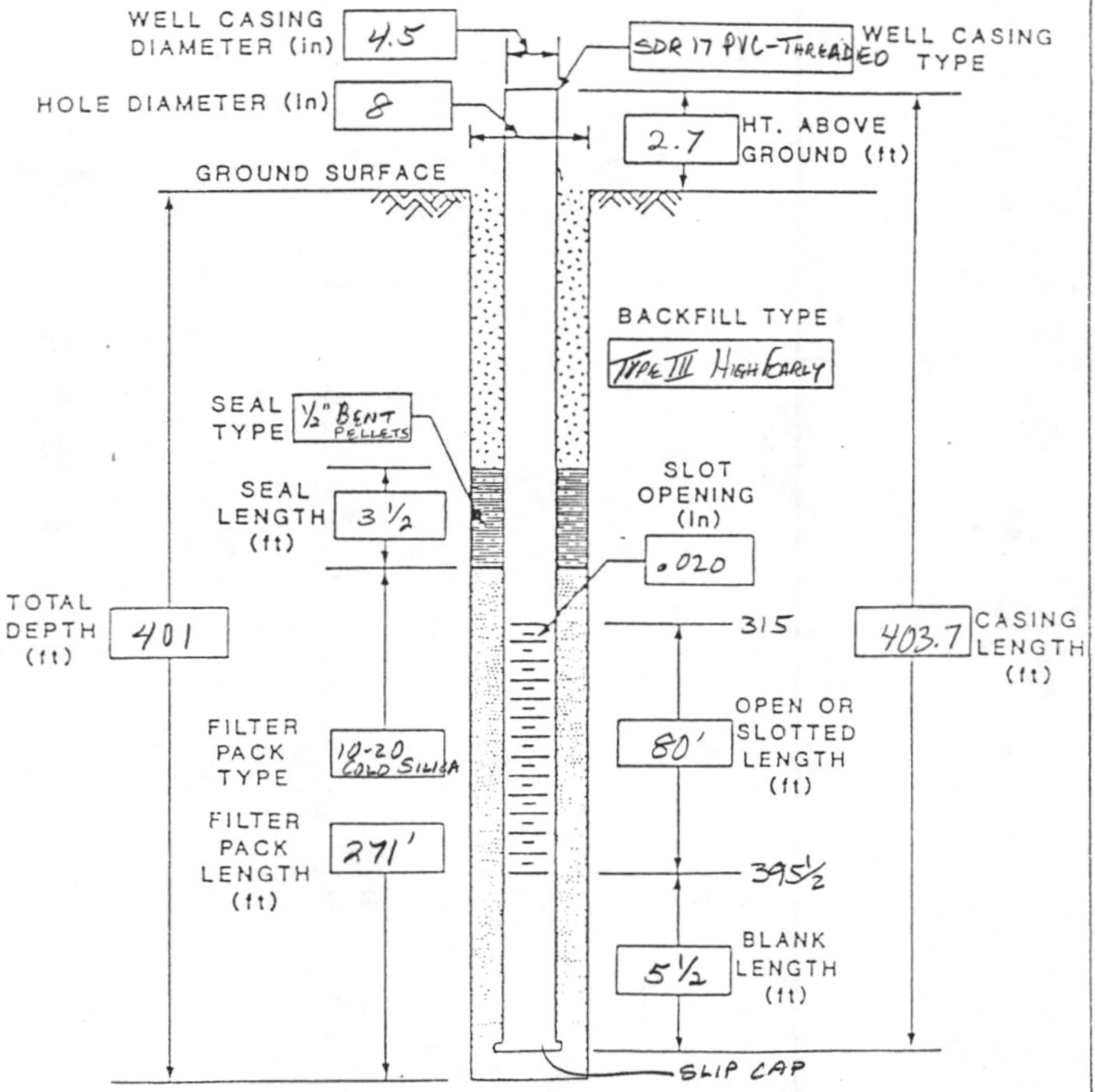
SITE ID: BED-02 LOCATION ID: BED-02 DATE INSTALLED: 12-13-87

APPROX. SITE COORDINATES: (FT.) N _____ E _____

OPEN AREA PER LINEAL FT. ($IN^2/FT.$) _____

FORMATION OF COMPLETION: _____

FIELD REP.: G. CURTISS / K. BEISER DRILLER: TAYLOR - FRANK CONWAY



COMMENTS: WELL MAY BE DRY - POSSIBLE WATER @ 170' AND 235'
BUT DRYNESS IS REASON FOR LONG SAND PACK

WELL MAINTENANCE RECORD

06

Problem	Corrective Action Taken	Date	Specific Capacity (gpm/ft of drawdown)	
			Before	After
INITIAL DEVELOP	SWAB 1/2 HR @ 40'	12/13/87	?	?
" "	AIR LIFT (MAY BE WATER IN STORAGE OF FRAC. (FROM Dal) BEFORE GROUTING WELL)	12/13/87	?	±2gpm
" "	AIR LIFT	12/13/87	±2gpm	