Kennecott Eagle Minerals
1004 Harbor Hills Dr. Suite 103 Marquette, MI 49855

Foth
Foth Infrastructure & Environment, LLC
2737 S. Ridge Road, Suite 600
P.O. Box 12326 • Green Bay, WI 54307-2326

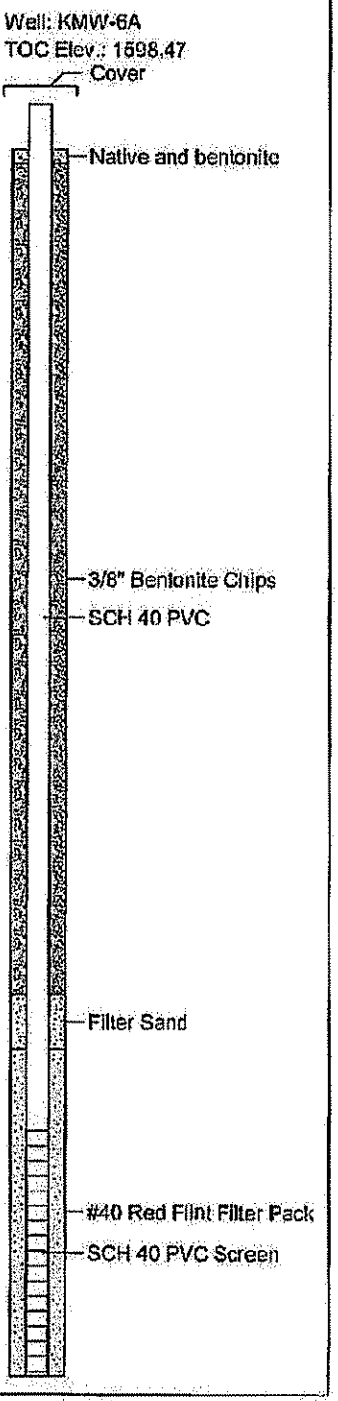
LOG OF BORING KMW-6A

(Page 1 of 1)

Date Started	: 10/3/2006
Date Completed	: 10/3/2006
Hole Diameter	: 6"
Drilling Method	: Sonic
Sampling Method	: Continuous Core/blind drill
Scope	: 06W003

Northing (State Plane)	: 621641.17
Easting (State Plane)	: 28019348.2
Ground Elev. (ft msl)	: 1596.78
Stickup (feet)	: 1.69
Completion type	: Monument
Drilling Company	: Boart Longyear
Driller	: Matt White
Logged by	: JSL
Checked by	: JSL
Well Diameter	: 2 inches

Depth in Feet	Surf. Elev. 1596.78	USCS	GRAPHIC	DESCRIPTION	PID	Recovery (feet)	Sample Interval (feet)
0	1596	GP		GRAVEL with sand cover: (7.5YR, 3/4) loose.			
		GW		SAND and fine GRAVEL with ~20% hematite iron formation cobbles: (Gley, 3/5PB)		4	0-4
		GW		Stiff, black with hematite flecks, very fine grained, cohesive, looks like it has irregular layers of tar-like substance in iron ore concentrate.			
		GW					
5	1591	GW					
		FILL		Stiff, reddish-purple iron ore concentrate with debris.		4	4-9
				Loose, black, iron ore concentrate with taconite pellets and intervals of tar-like substance above.			
10	1586	FILL		Mixed fill-loose, well graded dark reddish brown gravel with fines, large round to angular cobbles to chunks of concrete and some iron ore concentrate.		--	9-14
				Not Sampled			
15	1581			Hematite iron formation (lean) rocks and partially cored pieces from larger boulder. Any fines that may have been in this interval were washed away during drilling - Not sampled.		--	14-19
20	1576						
25	1571	FILL					
30	1566					--	19-46
35	1561						
		SW-SM		KMW-6A (36-46') WELL GRADED SAND with SILT: (7.6YR, 2.5/2) very dark brown.			
40	1556						
45							



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Boart-Longyear Environmental Drilling

FIELD BORING LOG

Sheet 1 of 1

Job No. 34101340

Boring No. KMW-6a

FOR Foth & Van Dyke South Eagle

LOCATION Marquette, MI Elev.

GROUND WATER: While drilling ____ Time after drilling ____; Before casing removal ____ Depth to water ____; After casing removal ____ Depth to cave-in ____

Start 10-3-06

Unit 1411

Chief M. White

Sample No.	Moisture	Blows on Sampler 0/6 12/18	Blows on Sampler 6/12 18/24	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Casing/Probe Weight Drop	Symbol	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						TOPSOIL							Sonic
						Sandy ROCKS							
						5		5					
						10		10					
						15		15					
						20		20					
						25		25					
						C SAND							
						30		30					
						35		35					
						40		40					
						45		45					
						EOB 46.0'							
						Well Set 46.0'							

FIELD_BORING_LOG 34101340.GPJ BOART.GDT 11/15/06

BOART LONGYEAR
Well Construction Report

Job Name	South Eagle	Well Name	KMW-6a
Job Number	34101340	Driller	M. While
Location	Marquette, MI	Date Installed	10/03/06

Type of Well:
- x Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground 2.0 ft.

B. Diameter of Well Casing 2.0 in.

C. Surface Seal Bottom 0.5 ft.

D. Well Casing: Flush Threaded PVC
- x Schedule 40
- ___ Schedule 80
- ___ Other ___

E. Bentonite Seal Top 0.5 ft.

F. Fine Sand Top 31.0 ft.

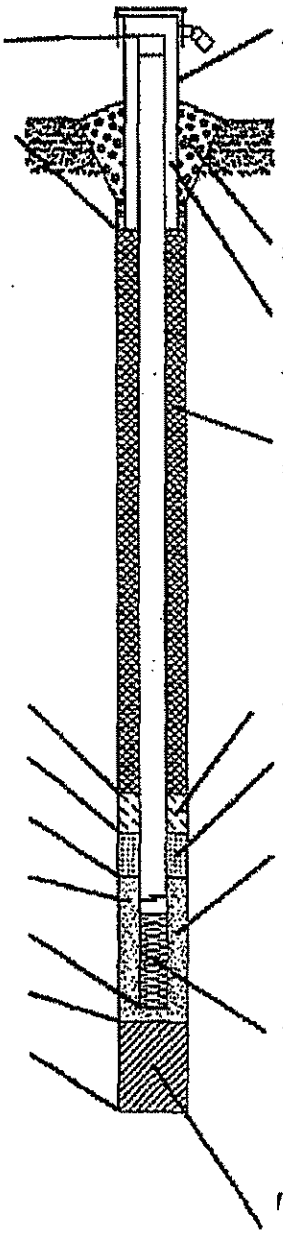
G. Filter Pack Top 33.0 ft.

H. Screen Joint Top 36.0 ft.

I. Well Bottom 46.0 ft.

J. Filter Pack Bottom 46.0 ft.

K. Borehole Bottom 46.0 ft.



1. Locking Cap? x Yes ___ No
2. Protective Cover:
   a. Inside diam. 4.0 in.
   b. Length 7.0 ft.
   c. Material
      - x Steel
      - ___ Other ___
   d. Bumper Post ___ ___ 3" ___ 4"
3. Surface Seal:
   - x Bentonite
   - ___ Concrete
   - ___ Other ___
4. Material between Casing and Protop:
   - ___ Bentonite
   - x Other Sand
5. Annular Space Seal:
   - x Granular Bentonite
   - ___ Bentonite Slurry
   - ___ Bentonite-Cement Grout
   - ___ Other ___

   How Installed:
   - x Gravity
   - ___ Tremie Pumped
6. Bentonite Seal:
   - ___ Granules
   - x Pellets
7. Type of Fine Sand: #70 Badger
8. Type of Filter Pack: #40 Badger
9. Screen Material: PVC
   - Type: x Factory Cut; ___ Continuous Slot
   - Slot Size: 0.010 in.
   - Length: 10.0 ft.
10. Backfill Material: (Below filter pack)
    - x None
    - ___ Other ___

Boart Longyear
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Fax (715) 355-5715

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LOG OF BORING KMW-7

(Page 1 of 1)

Date Started	: 9/21/2006
Date Completed	: 9/21/2006
Hole Diameter	: 6"
Drilling Method	: Sonic
Sampling Method	: Continuous Core
Scope	: 06W003

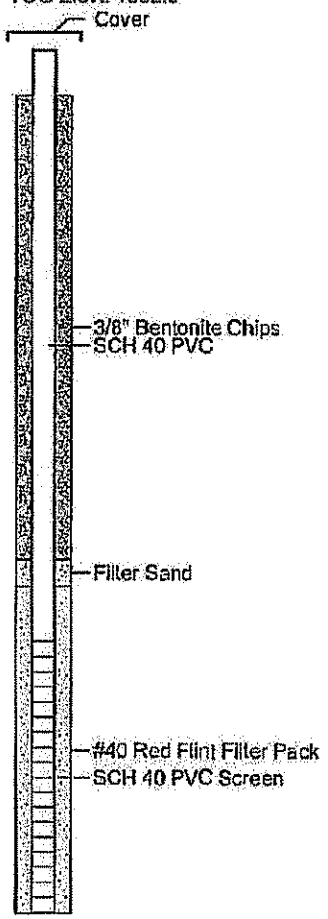
Northing (State Plane)	: 621378.12
Easting (State Plane)	: 26019393.02
Ground Elev. (ft msl)	: 1580.37
Stickup (feet)	: 2.13
Completion type	: Monument
Drilling Company	: Boart Longyear
Driller	: Matt White
Logged by	: JSL
Checked by	: JSL
Well Diameter	: 2 inches

Surf. Elev. 1580.37

Depth in Feet	USCS	DESCRIPTION	PID	Recovery (feet)	Sample Interval (feet)
0	FILL	Iron ore concentrate and taconite pellets. Total metals, pH, cyanide, TCLP RCRA metals samples collected (0-1')		5	0-5
	SW-SM				
	ML	Coarse SAND and GRAVEL with fines: (10YR, 3/4) loose.			
5		SILT: (10YR, 3/2) stiff, poorly graded.			
	SW-SM	Coarse SAND and GRAVEL with fines: (10YR, 3/4) loose, well graded, moist, sand looks darker due to abundant black lithics.		4	5-9
	ML	SILT: (2.5YR, 3/6) medium dense, laminated.			
10	SW-SM	Coarse SAND and GRAVEL with fines: (10YR, 3/4) loose.		5	9-14
	SP	Medium SAND with trace coarse gravel: (2.5YR, 4/2) loose, poorly graded.			
	SP				
	ML	GRAVEL: (10YR, 3/4) loose.			
15		SILT: (2.5YR, 3/6) medium dense, laminated.			
	SW-SM	Coarse SAND with GRAVEL, COBBLES, and FINES: (2.5YR, 4/2) some cobbles with intense oxidation.		5	14-19
20	SW	Coarse SAND with fine GRAVEL and trace fines: (2.5YR, 2.5/1) loose. Saturated at 23'.		1	19-24
25	SP	KMW-7 (24-29) - POORLY GRADED SAND: (7.5YR, 3/4) dark brown. As above but sand is coarser grained and will not stay in barrel. Advanced to 30' bgs, set well.		1	24-29

Elevations: 1580, 1575, 1570, 1565, 1560, 1555, 1550, 1545, 1540

Well: KMW-7
TOC Elev.: 1582.5



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Boart-Longyear Environmental Drilling

FIELD BORING LOG

Sheet 1 of 1

Job No. 34101340

Boring No. KMW-7

FOR Foth & Van Dyke South Eagle

LOCATION Marquette, MI Elev.

GROUND WATER				
While drilling	25.0'	Time after drilling		Start 9-21-06
Before casing removal		Depth to water		Unit 1411
After casing removal		Depth to cave-in		Chief M. White

Sample No.	Moisture	Blows on Sampler 0/6 12/18	Blows on Sampler 6/12 18/24	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Casing/Probe Weight Drop	Symbol	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						TOPSOIL							Sonic
						Sandy GRAVEL							
						5		5					
						10		10					
						15		15					
						20		20					
						25		25					
						30		30					
						EOB 30.0'							
						Well Set 30.0'							

FIELD_BORING_LOG 34101340.GPJ BOART.GDT 11/15/06

BOART LONGYEAR
Well Construction Report

Job Name	South Eagle	Well Name	KMW-7
Job Number	34101340	Driller	M. White
Location	Marquette, MI	Date Installed	09/21/06

Type of Well:
- x Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground 2.0 ft.

B. Diameter of Well Casing 2.0 in.

C. Surface Seal Bottom 0.0 ft.

D. Well Casing: Flush Threaded PVC
- x Schedule 40
- ___ Schedule 80
- ___ Other ___

E. Bentonite Seal Top 0.0 ft.

F. Fine Sand Top 17.0 ft.

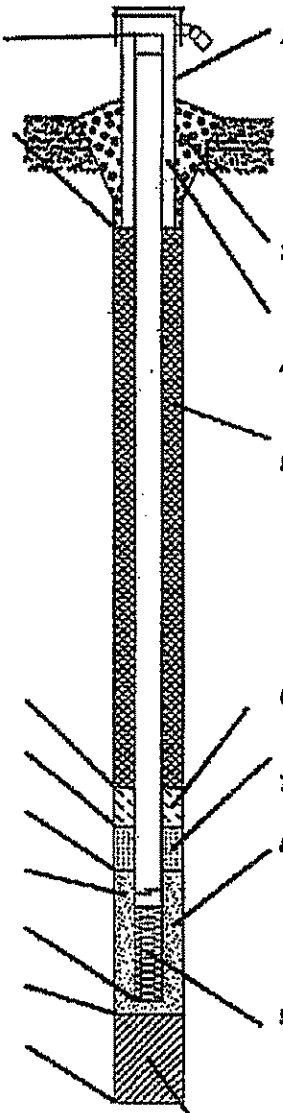
G. Filter Pack Top 18.0 ft.

H. Screen Joint Top 20.0 ft.

I. Well Bottom 30.0 ft.

J. Filter Pack Bottom 30.0 ft.

K. Borehole Bottom 30.0 ft.



1. Locking Cap? x Yes ___ No

2. Protective Cover:
- a. Inside diam. 4.0 in.
- b. Length 7.0 ft.
- c. Material
  - x Steel
  - ___ Other ___
- d. Bumper Post ___
  - ___ 3" ___ 4"

3. Surface Seal:
- x Bentonite
- ___ Concrete
- ___ Other ___

4. Material between Casing and Protop:
- ___ Bentonite
- x Other Sand

5. Annular Space Seal:
- x Granular Bentonite
- ___ Bentonite Slurry
- ___ Bentonite-Cement Grout
- ___ Other ___

How Installed:
- x Gravity
- ___ Tremie Pumped

6. Bentonite Seal:
- ___ Granules
- x Pellets

7. Type of Fine Sand: #70 Badger

8. Type of Filter Pack: #40 Badger

9. Screen Material: PVC
- Type: x Factory Cut
- ___ Continuous Slot
- Slot Size: 0.010 in.
- Length: 10.0 ft.

10. Backfill Material: (Below filter pack)
- x None
- ___ Other ___

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Phone (715) 359-7090
Fax (715) 355-5715

BOART LONGYEAR
WELL DEVELOPMENT REPORT

WELL NAME KMW-7

WELL DIAMETER 2"

(MEASUREMENTS BELOW FROM TOP OF CASING)

TOTAL DEPTH 32'

DEPTH TO WATER BEFORE DEVELOPMENT 24.9'

DEPTH TO WATER AFTER DEVELOPMENT _____'

JOB NO# 34101340

LOCATION Marquette, MI

DATE 9/29/2006

DEVELOPED BY M. White

DESCRIPTION OF DEVELOPMENT METHOD

(Check One)

- ☐ SURGED W/BAILER & BAILED
- ☐ SURGED W/BAILER & PUMPED
- ☐ SURGED W/BLOCK & BAILED
- ☐ SURGED W/BLOCK & PUMPED
- ☒ OTHER Jack

CAN THIS WELL BE PURGED DRY? ☐ YES ☒ NO

VOLUME OF WATER IN FILTER PACK AND WELL CASING	_____ Gallons
VOLUME OF WATER REMOVED FROM WELL	45 Gallons
CLARITY OF WATER BEFORE DEVELOPMENT	Brown
CLARITY OF WATER AFTER DEVELOPMENT	Cloudy, Clear
VOLUME OF WATER ADDED	None
SOURCE OF WATER ADDED	None
TIME SPENT FOR DEVELOPMENT 90 Minutes	START: 12:30 P.M. END: 2:00 P.M.

COMMENTS:

Kennecott Eagle Minerals
1004 Harbor Hills Dr. Suite 103 Marquette, MI 49855

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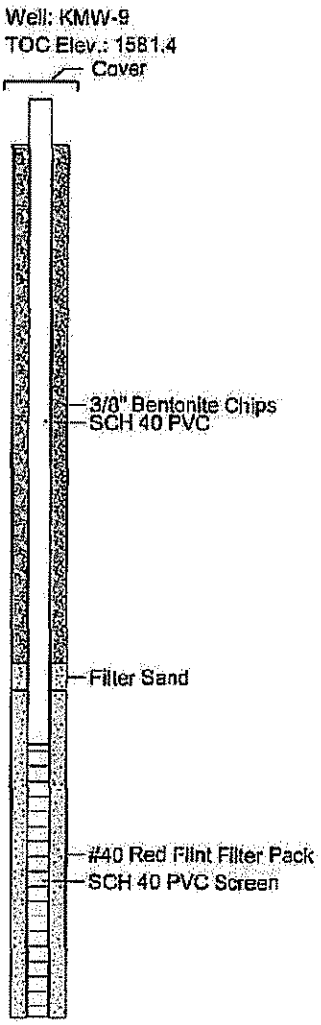
LOG OF BORING KMW-9

(Page 1 of 1)

Date Started	: 9/21/2006
Date Completed	: 9/21/2006
Hole Diameter	: 6"
Drilling Method	: Sonic
Sampling Method	: Blind drilled
Scope	: 06W003

Northing (State Plane)	: 621430.84
Easting (State Plane)	: 26019202.45
Ground Elev. (ft msl)	: 1579.54
Stickup (feet)	: 1.86
Completion type	: Monument
Drilling Company	: Boart Longyear
Driller	: Matt White
Logged by	: JSL
Checked by	: JSL
Well Diameter	: 2 Inches

Depth in Feet	Surf. Elev. 1579.54	USCS	GRAPHIC	DESCRIPTION	PID	Recovery (feet)	Sample Interval (feet)
0	1579			Blind drilled KMW-9. Located next to KMW-9P.			
5	1574						
10	1569	NS					
15	1564						
20	1559						
25	1554	SP		POORLY GRADED SAND (7.5YR, 3/3) dark brown.			
30	1549	NS		blind drilled.			
35	1544						
40	1539						
45							



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Boart-Longyear Environmental Drilling

FIELD BORING LOG

Sheet 1 of 1

Job No. 34101340

Boring No. KMW-9

FOR Foth & Van Dyke South Eagle

LOCATION Marquette, MI Elev.

GROUND WATER				
While drilling	25.0'	Time after drilling		Start 9-21-06
Before casing removal		Depth to water		Unit 1411
After casing removal		Depth to cave-in		Chief M. White

Sample No.	Moisture	Blows on Sampler 0/6 12/18	Blows on Sampler 6/12 18/24	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Casing/Probe Weight Drop	Symbol	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
						TOPSOIL							Sonic
						Sandy GRAVEL							
						EOB 32.0'							
						Well Set 32.0'							

FIELD_BORING_LOG 34101340.GPJ BOART.GDT 11/15/06

BOART LONGYEAR
Well Construction Report

Job Name	South Eagle	Well Name	KMW-9
Job Number	34101340	Driller	M. White
Location	Marquette, MI	Date Installed	09/21/06

Type of Well:
- x Water Table Observation
- ___ Piezometer
- ___ Other ___

A. Height of Well Casing above ground 2.0 ft.

B. Diameter of Well Casing 2.0 in.

C. Surface Seal Bottom 0.0 ft.

D. Well Casing: Flush Threaded PVC
- x Schedule 40
- ___ Schedule 80
- ___ Other ___

E. Bentonite Seal Top 0.0 ft.

F. Fine Sand Top 19.0 ft.

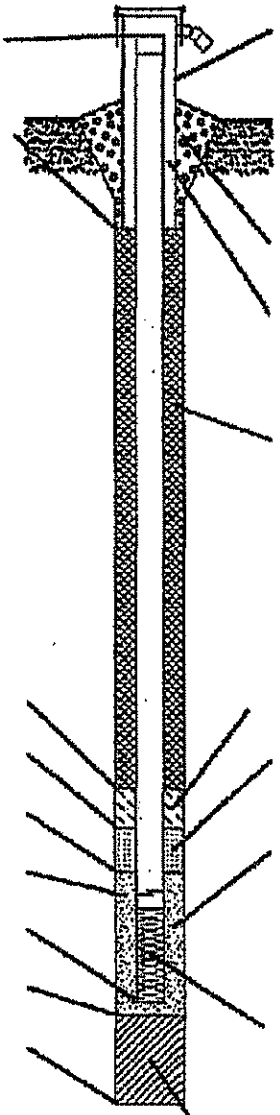
G. Filter Pack Top 20.0 ft.

H. Screen Joint Top 22.0 ft.

I. Well Bottom 32.0 ft.

J. Filter Pack Bottom 32.0 ft.

K. Borehole Bottom 32.0 ft.



1. Locking Cap? x Yes ___ No

2. Protective Cover:
- a. Inside diam. 4.0 in.
- b. Length 7.0 ft.
- c. Material
  - x Steel
  - ___ Other ___
- d. Bumper Post ___ 3" ___ 4"

3. Surface Seal:
- x Bentonite
- ___ Concrete
- ___ Other ___

4. Material between Casing and Protop:
- ___ Bentonite
- x Other Sand

5. Annular Space Seal:
- x Granular Bentonite
- ___ Bentonite Slurry
- ___ Bentonite-Cement Grout
- ___ Other ___

How Installed:
- x Gravity
- ___ Tremie Pumped

6. Bentonite Seal:
- ___ Granules
- x Pellets

7. Type of Fine Sand: #70 Badger

8. Type of Filter Pack: #40 Badger

9. Screen Material: PVC
- Type: x Factory Cut
- ___ Continuous Slot
- Slot Size: 0.010 in.
- Length: 10.0 ft.

10. Backfill Material: (Below filter pack)
- x None
- ___ Other ___

Boart Longyear
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Schofield WI 54476
Phone (715) 359-7090
Fax (715) 355-5715

BOART LONGYEAR
WELL DEVELOPMENT REPORT

WELL NAME KMW-9

WELL DIAMETER 2"

(MEASUREMENTS BELOW FROM TOP OF CASING)

TOTAL DEPTH 34'

DEPTH TO WATER BEFORE DEVELOPMENT 24.8'

DEPTH TO WATER AFTER DEVELOPMENT 25.3'

JOB NO# 34101340

LOCATION Marquette, MI

DATE 9/29/2006

DEVELOPED BY M. White

DESCRIPTION OF DEVELOPMENT METHOD

(Check One)

- ☐ SURGED W/BAILER & BAILED
- ☐ SURGED W/BAILER & PUMPED
- ☐ SURGED W/BLOCK & BAILED
- ☐ SURGED W/BLOCK & PUMPED
- ☒ OTHER Jack

CAN THIS WELL BE PURGED DRY? ☐ YES ☒ NO

VOLUME OF WATER IN FILTER PACK AND WELL CASING	Gallons	
VOLUME OF WATER REMOVED FROM WELL	50 Gallons	
CLARITY OF WATER BEFORE DEVELOPMENT	Brown	
CLARITY OF WATER AFTER DEVELOPMENT	Cloudy, Clear	
VOLUME OF WATER ADDED	None	
SOURCE OF WATER ADDED	None	
TIME SPENT FOR DEVELOPMENT 145 Minutes	START: 9:45 A.M.	END: 12:00 P.M.

COMMENTS:

SCR ENVIRON
SERVICES DIVISION

SOIL BORING LOG

Job Number:90 - 384

Job Name:CALLAHAN

Drillers:COLEMAN/DAN/ROY

Date:8/15/91

Sample Number	Depth or Elevation From	Depth or Elevation To	Sampling Method	Blow Count 6"	6"	6"	6"	Length Recovered	PID	Strata Change	Sketch / Sample Description
	0	.5	HS								BITUMINOUS PAVEMENT
S - 1	.5	2	SS	7	7	7		8"	20		LARGE GRAVELY SAND, WELL SORTED,
											FILL.
	.5	5	HS								SAA
S - 2	5	6.5	SS	9	6	4		8"	114		MOSTLY CLAY, LITTLE GRAVEL, WELL
											GRADED, TILL; ODOROUS.
	5	10	HS								
S - 3	10	11.5	SS	5	6	4		10"	2		SAA, VERY MOIST
	10	15	HS								
S - 4	15	16.5	SS	3	6	7		14"	49		MOSTLY SILT/CLAY, SOME FINE SAND,
											ORGANICS, PEAT, ODOROUS, WET.
EOB											WELL SET AT 15.5'
											SEE WELL DIAGRAM FOR MW - 5

WATER LEVEL DATA

WL: WS OR WD

WL: BCR

WL: AFTER HOURS

SURVEY DATA

TOP OF CASING

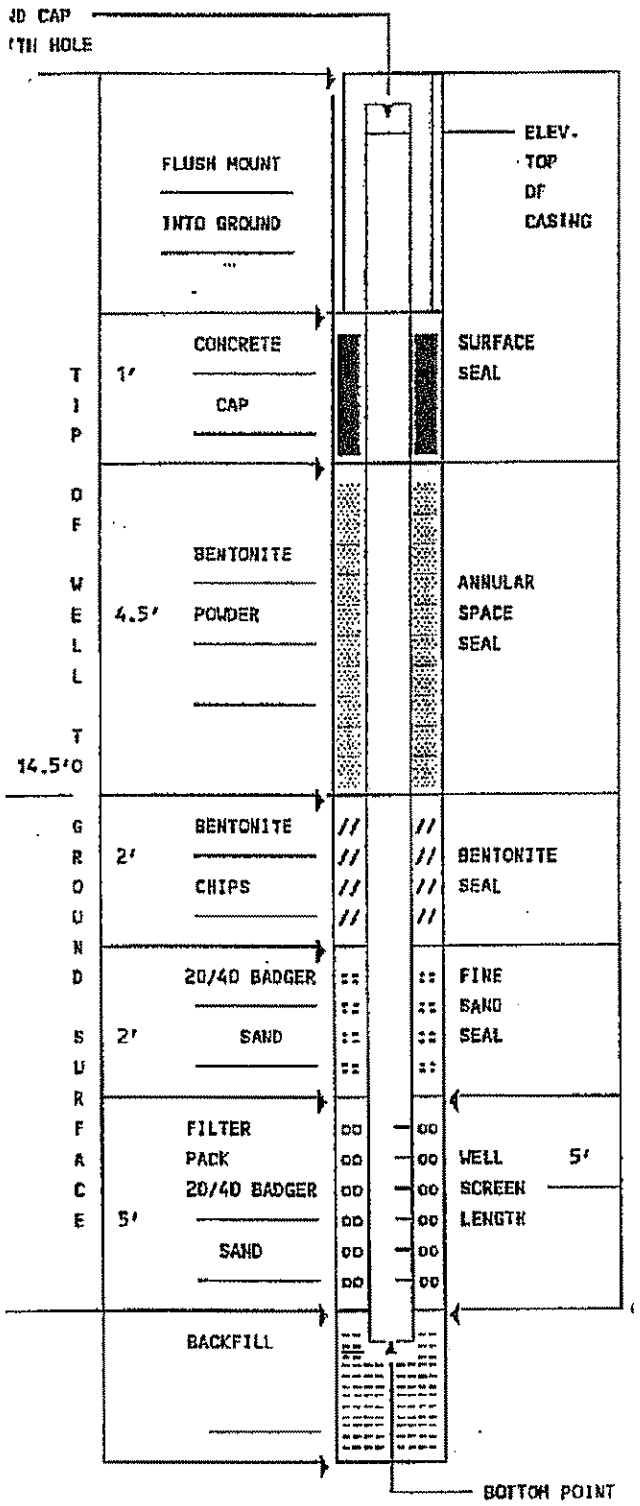
SURFACE ELEVATION

BENCHMARK

ABBREVIATIONS

SS - SPLIT SPOON
SS* - 3" SPLIT SPOON
ST - SHELBY TUBE
PA - POWER AUGER
HS - HOLLOW STEM
RB - ROCK BIT (ROTARY)
SAA - SAME AS ABOVE
EOB - END OF BORING

MW-5



1.) TYPE OF PIPE: SCHED. 40 (if pvc used)

[PVC], GALVANIZED, STAINLESS, OTHER

2.) TYPE OF JOINTS:

[THREADED], OTHER

3.) TYPE OF WELL SCREEN:

[PVC], GALVANIZED, STAINLESS, OTHER

4.) SCREEN SIZE: # 10

5.) INSTALLED PROTECTOR PIPE WITH LOCK:

YES [NO]

6.) WAS DRILLING MUD USED:

YES [NO]

7.) DEPTH OF WELL FROM TOP OF PVC: 14.5' FT

8.) TYPE OF AUGER USED: 3/4"

SOLID, [HOLLOW STEM], OTHER

9.) FILTER PACK: NO. OF BAGS 1

10.) FINE SAND SEAL: NO. OF BAGS

11.) BENTONITE SEAL: NO. OF [BAGS] OR PAILS 3

12.) ANNULAR SPACE SEAL: NO. OF [BAGS] OR PAILS

13.) SURFACE SEAL: NO. OF BAGS

14.) WATER LEVEL FROM TOC: 6.89' FT 8/16/91 DATE

9.24 FT 1/15/92 DATE

10.31 FT 2/11/92 DATE

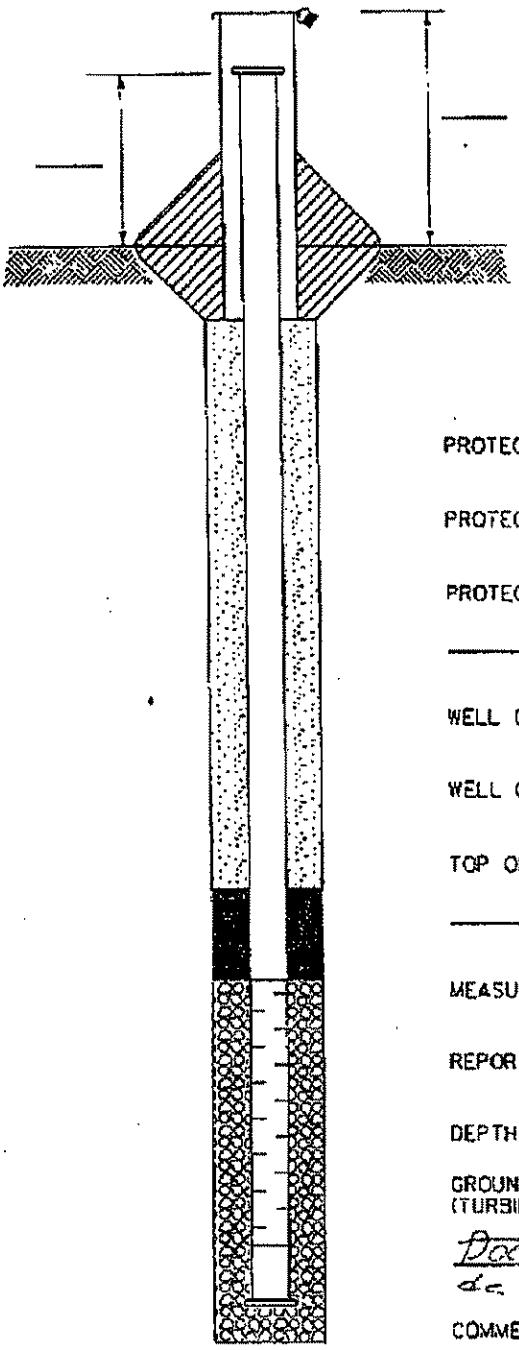
WELL ID. MW - 5 DATE INSTALLED 8/16/91 DRILL RIG

DRILLER DAN DRILL CREW ROY (COLEMAN ENGINEERING)

CLIENT CALLAHAN SCA JOB # 90 - 384

SCA/ESD FORM 427

WELL ID MW-5



LOCK NO.

LOCK CONDITION: Not lockable

SURFACE SEAL TYPE: Black top

CONDITION OF SURFACE SEAL: HARD

PROTECTOR PIPE TYPE: Flush Mount

PROTECTOR PIPE SIZE: 8"

PROTECTOR PIPE CONDITION: Rusted Cap

WELL CASING TYPE: PVC

WELL CASING DIAMETER: 2"

TOP OF PROTECTOR PIPE TO ANNULAR SPACE SEAL:

MEASURED TOTAL DEPTH: 14.90

REPORTED TOTAL DEPTH:

DEPTH TO STANDING LIQUID: 8.43

GROUNDWATER OBSERVATION: (TURBIDITY, COLOR, ODOR, ETC.): Petroleum odor

~~Does not appear to be~~ No free product detected with interface probe or bailer.

COMMENTS: Well open 6/13/06

Foth & Van Dyke			
REVISED	DATE	BY	DESCRIPTION
CHECKED BY:	JSA	DATE:	DEC. 05
APPROVED BY:	SVD	DATE:	DEC. 05
APPROVED BY:		DATE:	

Kennecott Eagle Minerals Company

WELL INVENTORY FORM

Scale: NOT TO SCALE | Date: DECEMBER, 2005

Prepared By: Foth & Van Dyke | Rev. ...ON | 04W018

SCA ENVIRO[illegible]
SERVICES DIV.[illegible]ON

SOIL BORING LOG

Job Number:90 - 384

Drillers:STS

Job Name:CALLAHAN

Date:1/14/92

Sample Number	Depth or Elevation From	Depth or Elevation To	Sampling Method	Blow Count 6"	Blow Count 6"	Blow Count 6"	Blow Count 6"	Length Recovered	PID	Strata Change	Sketch / Sample Description
1	0	1.5	SS	11	5	5		7"	1.1		FINE TO MEDIUM SAND, TRACE OF
											GRAVEL, ANGULAR, FILL
	1.5.	5	HS								
2	5	6.5	SS	5	4	5		10"	1.9		FINE TO MEDIUM BROWN SAND, TRACE
											OF SILT, FILL
	6.5	10	HS								
3	10	11.5	SS	3	6	4		12"	1.1		SAA
	11.5	15	HS								
	15	16.5	SS	5	4	4					GRAVEL IN TIP - RESAMPLED
4	15	16.5	SS					6"	1.1		MEDIUM TO COARSE SAND, LITTLE
											GRAVEL; TILL
	16.5	20	HS								
5	20	21.5	SS	23	4	14		6"	0		SAA
	21.5	22	HS								REFUSAL AT 22', MOVED 3' EAST
	0	25	HS								WET WHILE DRILLING - 23'

WATER LEVEL DATA

WL: 23' WS OR WD

WL: 8CR

WL: AFTER HOURS

SURVEY DATA

TOP OF CASING

SURFACE ELEVATION

BENCHMARK

ABBREVIATIONS

SS - SPLIT SPOON
SS* - 3" SPLIT SPOON
ST - SHELBY TUBE
PA - POWER AUGER
HS - HOLLOW STEM
RB - ROCK BIT (ROTARY)
SAA - SAME AS ABOVE
EOB - END OF BORING

MW-9

SCA ENVIRO[illegible]L
SERVICES DIVISION

SOIL BORING LOG

Job Number:90 - 304

Drillers:STS

Job Name:CALLAHAN

Date:1/14/92

Sample Number	Depth or Elevation From	Depth or Elevation To	Sampling Method	Blow Count 6"	Blow Count 6"	Blow Count 6"	Blow Count 6"	Length Recovered	PID	Strata Change	Sketch / Sample Description
6	25	26.5	SS	10	17	10		10"	46		SMALL GRAVEL, SATURATED
	26.5	28	HS								
7	28	28.5	SS	50				10"	48		SAA
EOB											SEE WELL DIAGRAM FOR MW - 9

WATER LEVEL DATA

WL: WS OR WD

WL: BCR

WL: AFTER HOURS

SURVEY DATA

TOP OF CASING

SURFACE ELEVATION

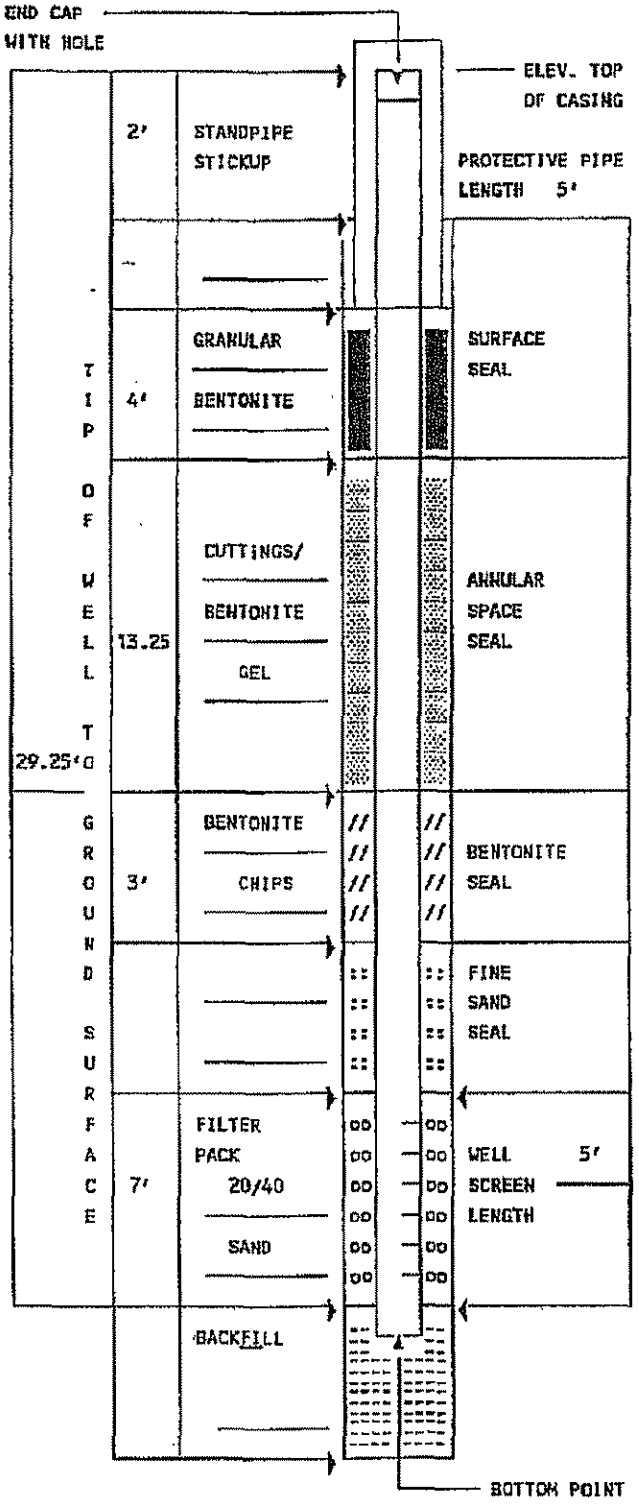
BENCHMARK

ABBREVIATIONS

SS - SPLIT SPOON
SS* - 3" SPLIT SPOON
ST - SHELBY TUBE
PA - POWER AUGER
HS - HOLLOW STEM
RB - ROCK BIT (ROTARY)
SAA - SAME AS ABOVE
EOB - END OF BORING

SCA ENVIRONMENTAL SERVICES DIVISIONS

STICKUP WELL INSTALLATION DIAGRAM



1.) TYPE OF PIPE SCH. 40 (if pvc used)

[PVC] GALVANIZED, STAINLESS, OTHER ____

2.) TYPE OF JOINTS

[THREADED] OTHER ____

3.) TYPE OF WELL SCREEN

[PVC] GALVANIZED, STAINLESS, OTHER ____

4.) SCREEN SIZE # 10

5.) INSTALLED PROTECTOR PIPE WITH LOCK

[YES] NO

6.) WAS DRILLING MUD USED

YES [NO]

7.) DEPTH OF WELL FROM TOP OF PVC 29.25 FT

8.) TYPE OF AUGER USED: 3/4"

[SOLID] HOLLOW STEM, OTHER ____

9.) FILTER PACK: NO. OF BAGS 2

10.) FINE SAND SEAL: NO. OF BAGS 1

11.) BENTONITE SEAL: NO. OF BAGS OR PAILS 2

12.) ANNULAR SPACE SEAL: NO. OF BAGS OR PAILS 3

13.) SURFACE SEAL: NO. OF BAGS 1

14.) WATER LEVEL FROM TOC 23.89 FT 1/14/92 DATE

24.39 FT 1/16/92 DATE

23.66 FT 2/11/92 DATE

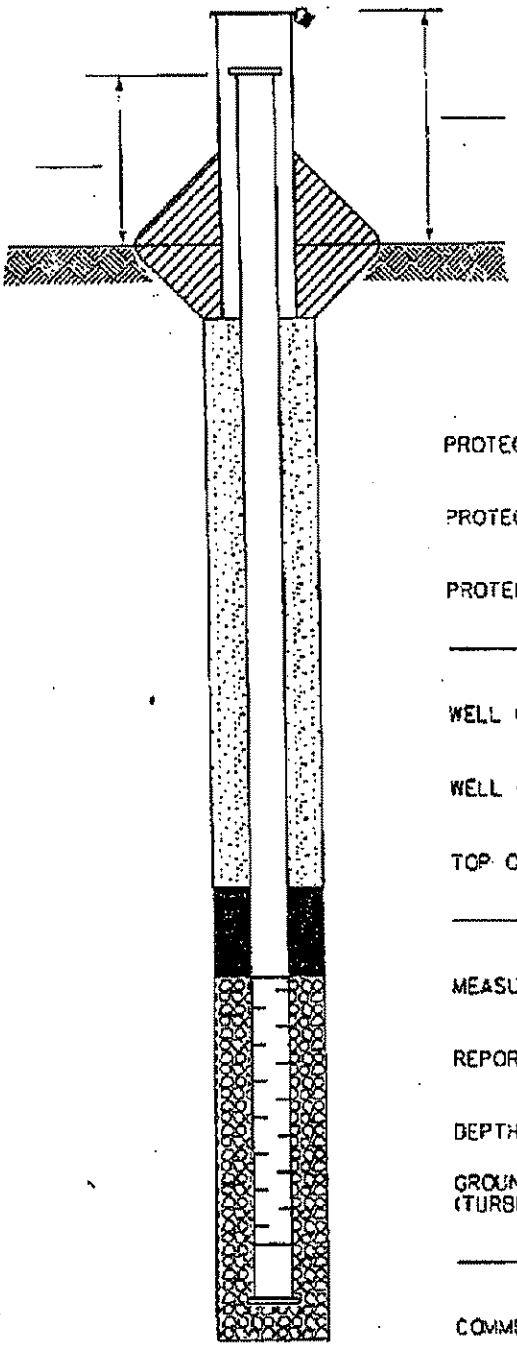
WELL ID. MW - 9 DATE INSTALLED 1/14/92 DRILL RIG CME - 45

DRILLER STS DRILL CREW JIM & JOHN

CLIENT CALLAHAN SCA JOB NO. 90 - 384

SCA/ESD FORM 426

WELL ID MW-9



LOCK NO. _____

LOCK CONDITION: Not Lockable

SURFACE SEAL TYPE: Bentonite

CONDITION OF SURFACE SEAL: Loose

PROTECTOR PIPE TYPE: Steel Round

PROTECTOR PIPE SIZE: 3"

PROTECTOR PIPE CONDITION: Rusted - Cap Broke

WELL CASING TYPE: PVC

WELL CASING DIAMETER: 2"

TOP OF PROTECTOR PIPE TO ANNULAR SPACE SEAL: _____

MEASURED TOTAL DEPTH: 29.20

REPORTED TOTAL DEPTH: _____

DEPTH TO STANDING LIQUID: 23.86

GROUNDWATER OBSERVATION: (TURBIDITY, COLOR, ODOR, ETC.): Clear, no odor

COMMENTS: 6/13/06 Well open - Clear

Foth & Van Dyke			
REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	LSK	DATE:	DEC. 05'
APPROVED BY:	SVDI	DATE:	DEC. 05'
APPROVED BY:		DATE:	

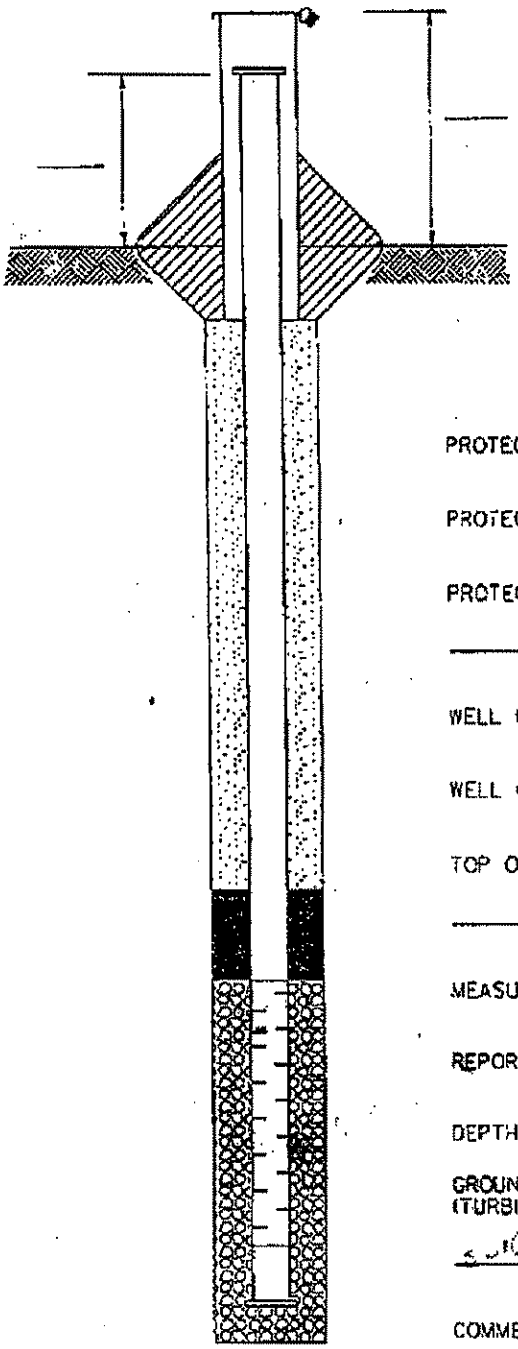
Kennecott Eagle Minerals Company

WELL INVENTORY FORM

Scale: NOT TO SCALE | Date: DECEMBER, 2005

Prepared By: Foth & Van Dyke | By: JOW | 04K015

WELL ID MW-11



LOCK NO. _____

LOCK CONDITION: ~~Unlocked~~ Replaced

SURFACE SEAL TYPE: Concrete

CONDITION OF SURFACE SEAL: cracked

PROTECTOR PIPE TYPE: Steel

PROTECTOR PIPE SIZE: 3 1/2 Square

PROTECTOR PIPE CONDITION: Rusted

WELL CASING TYPE: PVC

WELL CASING DIAMETER: 2"

TOP OF PROTECTOR PIPE TO ANNULAR SPACE SEAL: _____

MEASURED TOTAL DEPTH: 15.20

REPORTED TOTAL DEPTH: —

DEPTH TO STANDING LIQUID: 7.77

GROUNDWATER OBSERVATION: (TURBIDITY, COLOR, ODOR, ETC.): swampy hydrogen sulfide odor - clear

COMMENTS: 6/13/06 Cannot lock with Plastic Cap - Not enough clearance. Removed plastic cap.

Foth & Van Dyke			
REVISED	DATE	BY	DESCRIPTION
CHECKED BY:		USA	DATE: DEC. 05
APPROVED BY:		SAD	DATE: DEC. 05
APPROVED BY:			DATE:

Kennecott Eagle Minerals Company

WELL INVENTORY FORM

Scale: NOT TO SCALE | Date: DECEMBER, 2005

Prepared By: Foth & Van Dyke | Rev. 1CN 040018

North Jackson Company
Groundwater Sampling Log

Proj. Name: Humboldt Mill BEA
Weather: Sunny, ~70°s F
Sample ID: MW-11, DUP002

Date: 6/26/06
Sampler(s): AJM/DWW
Sampling time: 1215

Odor: Hydrogen sulfide
Appearance: Some color, slightly foamy

Temperature (°C): 20
Spec. Cond. (µmhos/cm @ 25°C): 2399
Conductivity (µmhos): 2201
pH (SU): 6.8
D.O. (ppm): 0.1
ORP(mV): 4

Description of measuring point: Mark on PVC riser

Total depth: 15 ft
Approx. Depth to water: 8 ft
Water column in well: 7 ft
Volume/foot: 0.16 gal/ft
Well volume: 1.2 gal

Well diameter (in): 2

Gallons purged prior to sampling: ~7

Evacuation method: Dedicated submersible pump & tubing

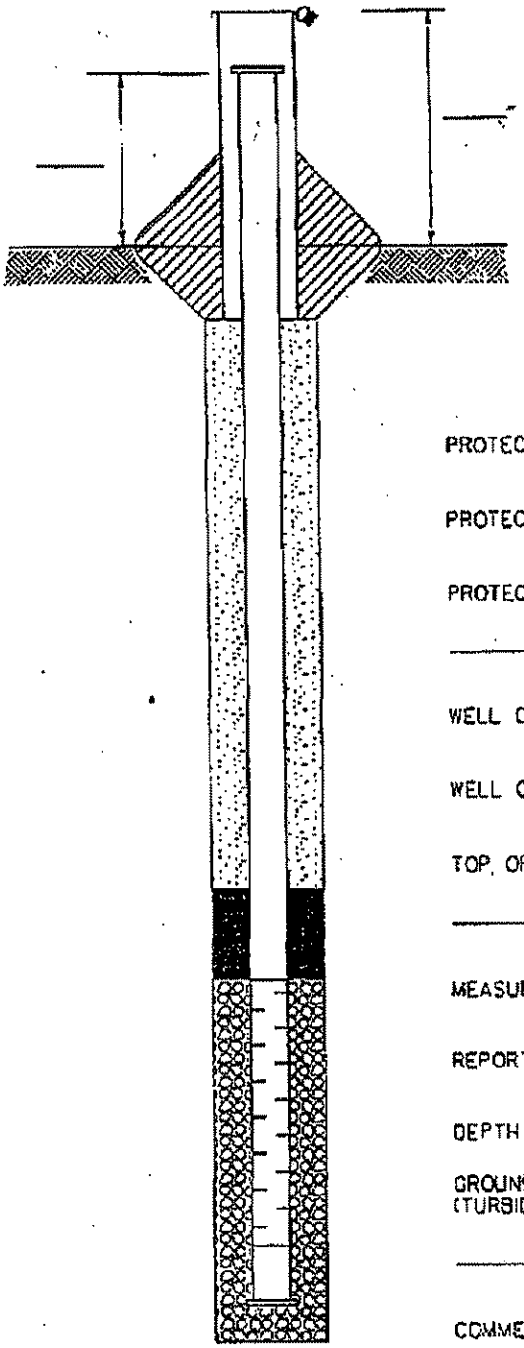
# Collected	Bottle	Preservative	Parameter
2	1 liter amber glass	none	SVOCs
1	500 ml plastic	HNO3	metals (filtered)
1	250 ml plastic	HNO3	metals (filtered)
1	250 ml plastic	none	general chemistry
1	250 ml plastic	NaOH	cyanide
3	40 ml glass	HCl	BTEX

Photographs: None

Remarks: Pump rate ~0.08 gpm, slowed to ~0.05 gpm at 1040. Collected DUP002. Some air bubbles entrained in hose when sampling DO.
Low-flow methodology used for well purge and sampling.

Stabilization Record:	Time	Temp (°C)	Spec. Cond. (µmhos/cm @ 25°C)	pH (SU)	D.O. (ppm)	ORP (mV)	Volume Removed (gal)	Depth to Water (ft)
Start	1004							6.8
	1010						0.5	8.1
	1025	16.0	2334	6.3	0.6	27	2	8.0
	1040	16.9	2330	6.3	0.5	23	3	8.8
	1055	16.7	2332	6.3	0.5	19	3	9.2
	1110	17.5	2329	6.6	0.3	17	4	8.8
	1125	18.6	2374	8.0	0.2	9	5	8.6
	1140	19.8	2381	7.1	0.1	5	6	8.8
	1155	19.8	2386	6.8	0.2	4	7	8.7
Sample	1215	19.9	2399	6.8	0.1	4	7	9.0

WELL ID MW-12



LOCK NO. _____

LOCK CONDITION: Replaced

SURFACE SEAL TYPE: Concrete

CONDITION OF SURFACE SEAL: Cracked

PROTECTOR PIPE TYPE: Steel

PROTECTOR PIPE SIZE: 5 1/2 Round

PROTECTOR PIPE CONDITION: Rusted

WELL CASING TYPE: PVC

WELL CASING DIAMETER: 2"

TOP OF PROTECTOR PIPE TO ANNULAR SPACE SEAL: _____

MEASURED TOTAL DEPTH: 15.20

REPORTED TOTAL DEPTH: —

DEPTH TO STANDING LIQUID: 3.27

GROUNDWATER OBSERVATION:
(TURBIDITY, COLOR, ODOR, ETC.): _____

COMMENTS: 6/13/06 Well open

Foth & Van Dyke			
REVISED	DATE	BY	DESCRIPTION
CHECKED BY:		JSK	DATE: DEC. 05
APPROVED BY:		SKD	DATE: DEC. 05
APPROVED BY:			DATE:

Kennecott Eagle Minerals Company

WELL INVENTORY FORM

Scale: NOT TO SCALE | Date: DECEMBER, 2005

Prepared By: Foth & Van Dyke | By: JOW | 04W01A

North Jackson Company
Groundwater Sampling Log

Proj. Name: Humboldt Mill BEA
Weather: Partly cloudy, breezy, dry, ~70°s F
Sample ID: MW-12

Date: 6/22/06
Sampler(s): AJM/DWW
Sampling time: 1623

Odor: None
Appearance: Clear

Temperature (°C): 10
Spec. Cond. (µmhos/cm @ 25°C): 321
Conductivity (µmhos): NM
pH (SU): 7.8
D.O. (ppm): <0.001
ORP(mV): -71

Description of measuring point: Top of steel casing

Total depth: 16 ft
Approx. Depth to water: 4.5 ft
Water column in well: 12 ft
Volume/foot: 0.16 gal/ft
Well volume: 1.9 gal

Well diameter (in): 2

Gallons purged prior to sampling: ~9

Evacuation method: Dedicated submersible pump & tubing

# Collected	Bottle	Preservative	Parameter
2	1 liter amber glass	none	SVOCs
1	500 ml plastic	HNO3	metals (filtered)
1	250 ml plastic	HNO3	metals (filtered)
1	250 ml plastic	none	general chemistry
1	250 ml plastic	NaOH	cyanide
3	40 ml glass	HCl	BTEX

Photographs: None

Remarks: Low-flow methodology used for well purge and sampling.
Pump rate ~0.26 gpm for 10 minutes, then reduced to ~0.13 gpm.
FB-001 and EQB-001 samples collected here 6/22/06.

Stabilization Record:	Time	Temp (°C)	Spec. Cond. (µmhos/cm @ 25°C)	pH (SU)	D.O. (ppm)	ORP (mV)	Volume Removed (gal)	Depth to Water (ft)
Start	1528							4.5
Reduce flow	1538	11.1	317	7.6	<0.001	-70	3	5.5
	1553	10.4	320	7.7	<0.001	-71	5	5.4
	1608	10.4	320	7.8	<0.001	-73	7	5.4
Sample	1623	10.2	321	7.8	<0.001	-71	9	5.4

SCA ENVIRONMENTAL

A Division of Sundberg, Carlson and Associates, Inc.

MW-101

SOIL BORING LOG

Facility/Project Name: Gallagher BEA	Drillers: Drill Rig: Drilling and Engineering, Inc.		Boring Number: MW-101
Site Address/Location: Former Ropes Milling Company Humboldt, Michigan	Technician/Geologist: Pete R.K. – SCA		Drilling Method:
	Project Number: 95-565	Groundwater Depth/Elevation: 12 feet	Casing Elevation: / Borehole Diameter:
	Well Name:	Local Grid Location (if applicable): N S Feet E W	
Site Owner (if Different From Above): Thomas Quigley, Minerals Processing Corporation	Start Date: 10-17-95	Completion Date: 10-17-95	Comments:

SAMPLE DATA: Number	Length Recovered (in)	Blow Count	Depth (feet)	Soil/Rock Description and Geologic Origin for Each Major Unit	USCS	PID	Well Diagram	Standard Penetration (ft)	Moisture Content	Graphic Log	Remarks
			0	Course materials(pellets, gravel, etc.)	GP						
			1	Brown fine sand with silt and cobbles	SM						
			2	Dark brown silt (sepcular hemitite tailings) Some angular gravel, cobbles, and boulders.	ML						
			3								
			4								
			5								
	9"	9 16 66	6	Dark brown, silty fine strained sand.	SM						
	12"	12 15 16	7	Dark brown, silty fine strained sand.							
			8	Dark brown, silty fine strained sand, with hemitite particles. Peat and Hemitite part.	PT						
			9	Dry brown silt.	ML						
			10	Dry brown silt.	ML						
	5"	12 15 7	11	Dark black organic peat.	PT						
14			12								
	9"	10 9 19	13	Dark brown course sand trace of medium gravel.	SP						
			14	Dark brown course sand with trace of medium gravel.	SP						
			15								
			16								
			17								
			18								
			19								5-T @?
			20	End of Boring							
			21								

Printed Name of Person Completing Soil Boring Log:

Signature of Person Completing Soil Boring Log:

SCA ENVIRONMENTAL

A Division of Sundberg, Carlson and Associates, Inc.

MONITORING WELL CONSTRUCTION DIAGRAM

MW-101

Facility/Project Name: Calumet	Facility Location/Address: Former Process Mining Plant, Hancock, Michigan	Client Name: Minerals Processing Corporation
Well Name: MW-101	Section Location of Well: ___ 1/4 or ___ 1/4 of Sec ___ T ___ N, R ___ E/W	Date Well Installed: 10-16-95
SCA Project Number: 95-565		Drill Crew: Drilling and Engineering Company
Type of Well: Water Table Observation Well X; Piezometer ___; Other ___	Location of Well: ___ Upgradient; ___ Downgradient; ___ Sidegradient; ___ Not Known	Geologist/Technician: Greg St. Onge

A. Protective Pipe, top elevation ___ ft.

B. Well casing, top elevation ___ ft.

C. Land surface elevation ___ ft.

D. Surface seal, bottom ___ ft.

12. USCS classification of soil near screen:

GP ___	GM ___	GC ___	GW ___
SW ___	SP ___	SM ___	SC ___
ML ___	MH ___	CL ___	CH ___
PT ___	BEDROCK ___		

13. Sieve analysis attached? ___ yes X no

14. Drilling method used: Rotary ___; H. Stem Auger X; Other ___

15. Drilling fluid used: Water ___ Air ___; Drilling Mud ___ None X

16. Drilling additives used? ___ yes X no

Describe ___

E. Bentonite seal, top 8 ft.

F. Fine sand, top — ft.

G. Filter pack, top 9 ft.

H. Screen joint, top 11.5 ft.

I. Well bottom 19 ft.

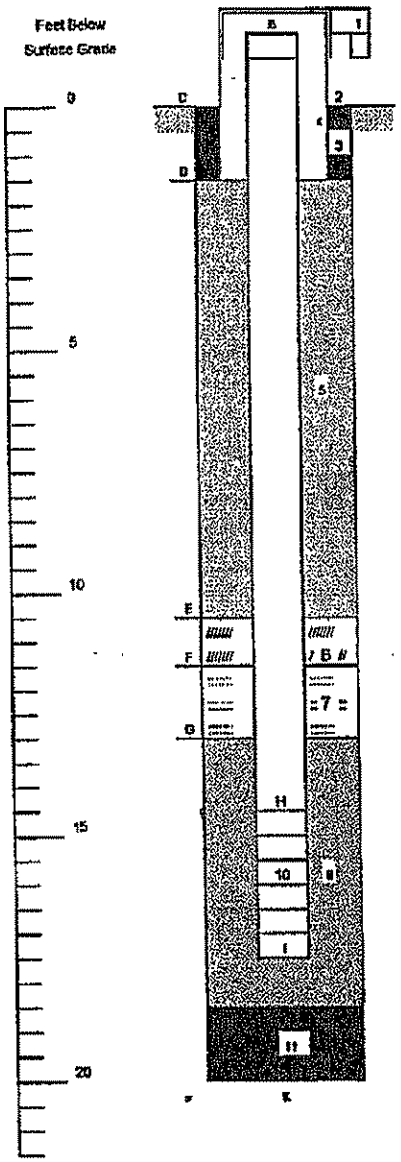
J. Filter pack, bottom 19 ft.

K. Borehole, bottom 19 ft.

L. Borehole, diameter 8.25 in.

M. O.D. well casing 2.375 in.

N. I.D. well casing 2.067 in.



1. Cap and Lock? X Yes ___ No

2. Protective cover pipe: X Yes ___ No
   a. Length: 5 ft.
   b. Material: Steel X; Other ___
   c. Additional protection? ___ Yes X No
   If yes, describe ___

3. Surface seal: Bentonite ___; Concrete ___; None ___; Other X

4. Material between well casing and protective pipe: Bentonite ___; Annular Space Seal X; Other ___

5. Annular space seal:
   a. Bentonite Chips ___
   b. Bentonite/Cuttings Mixture X
   c. Other ___

6. How installed: Tremie ___; Gravity X

7. Bentonite seal:
   a. Bentonite Chips X
   b. ___ 1/4in. ___ 3/8in Bent. Pellets ___
   c. ___ Other ___

8. Fine sand material: Manufacturer, product name and mesh size
   —

9. Filter pack material: Manufacturer, product name and mesh size
   Natural cave-in

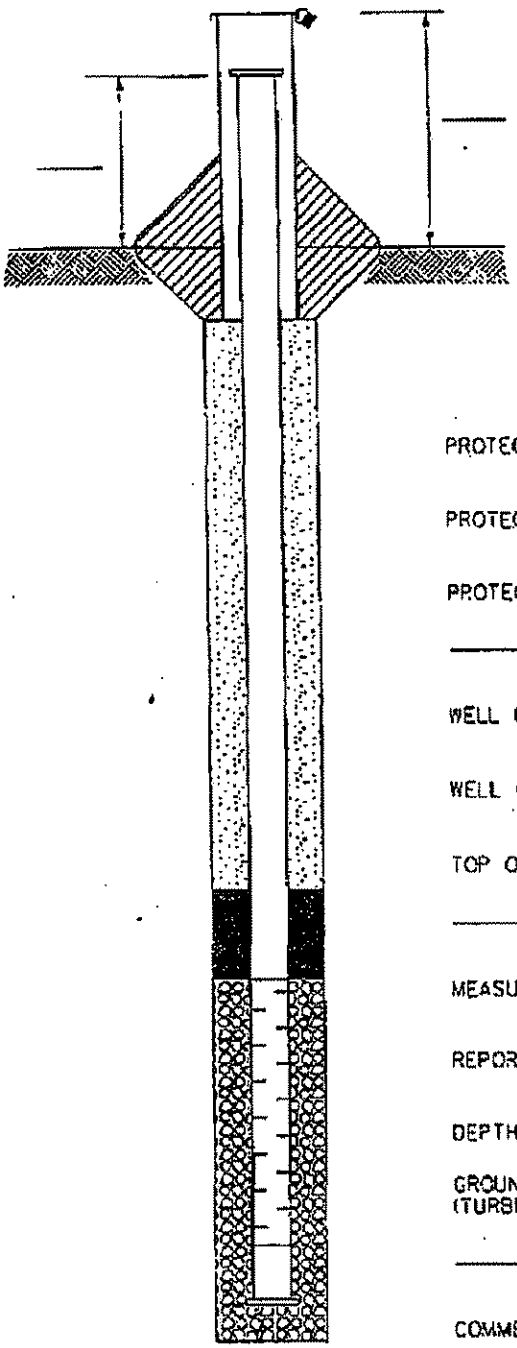
10. Well casing: Flush Threaded PVC schedule 40 X; Stainless Steel ___; Other ___

11. Screen material: PVC
   a. Screen type: Factory cut X; Other ___
   b. Slot size: 0.010 in.
   c. Slotted length: 5 ft.

12. Backfill Material (below filter pack): None X; Other ___

Printed Name of Person Completing Form	Signature

WELL ID MW-101



LOCK NO. —

LOCK CONDITION: Replaced

SURFACE SEAL TYPE: Concrete

CONDITION OF SURFACE SEAL: cracked

PROTECTOR PIPE TYPE: Steel

PROTECTOR PIPE SIZE: 3 1/2" Square

PROTECTOR PIPE CONDITION: Rusted

WELL CASING TYPE: PVC

WELL CASING DIAMETER: 2"

TOP OF PROTECTOR PIPE TO ANNULAR SPACE SEAL:

MEASURED TOTAL DEPTH: 21.6

REPORTED TOTAL DEPTH: —

DEPTH TO STANDING LIQUID: 4.19

GROUNDWATER OBSERVATION: (TURBIDITY, COLOR, ODOR, ETC.): Clear - No odor

COMMENTS: 6/13/06

Foth & Van Dyke			
REVISED	DATE	BY	DESCRIPTION
CHECKED BY:	JSK	DATE: DEC. 05'	
APPROVED BY:	SKD	DATE: DEC. 05'	
APPROVED BY:		DATE:	

Kennecott Eagle Minerals Company

WELL INVENTORY FORM

Scale: NOT TO SCALE | Date: DECEMBER, 2005

SCA ENVIRONMENTAL

A Division of Sundberg, Carlson and Associates, Inc.

SOIL BORING LOG

MW-102

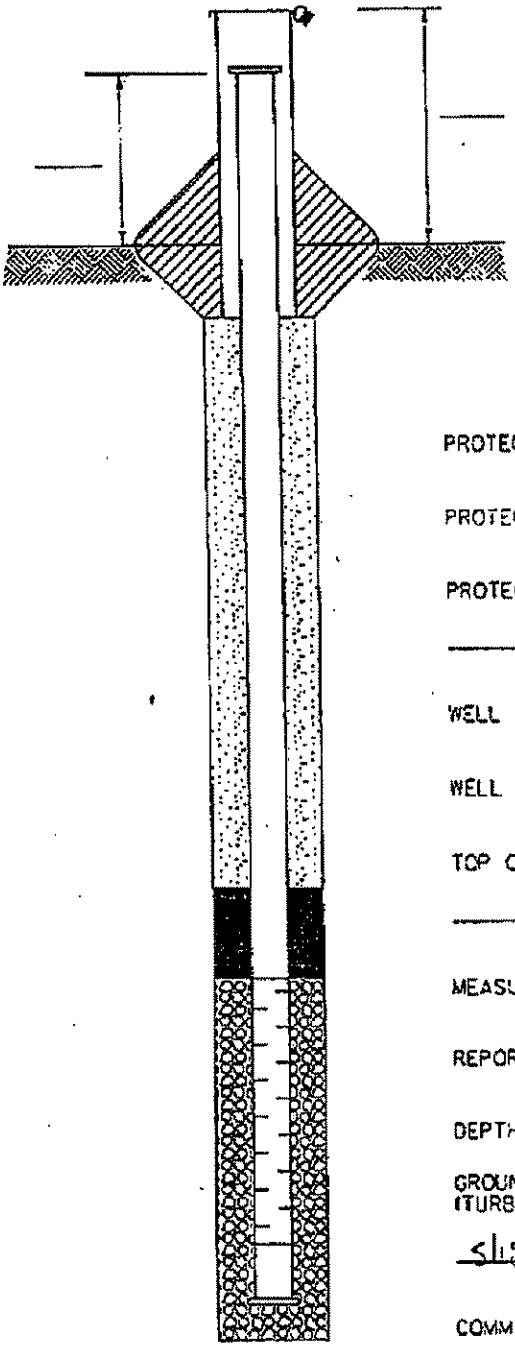
Facility/Project Name: Callahan RFA	Drillers: Drill Rig		Boring Number: MW-102
Site Address/Location: Former Ropes Milling Company, Humboldt, Michigan	Drilling and Engineering Jack		Drilling Method:
	Technician/Geologist: Ered S. - SDA		
	Project Number: 95-566	Groundwater Depth/Elevation: 4 feet	Ground Elevation: / Borehole Diameter:
	Well Name:	Local Grid Location (if applicable): 4 S, E Feet W	
Site Owner (If Different From Above): Thomas Quigley, Minerals Processing Corporation	Start Date: 10-16-95	Completion Date: 10-16-95	Comments:

SAMPLE DATA: NUMBER	LENGTH RECOVERED (ft)	BLOW COUNT	DEPTH (ft)	SOIL/ROCK DESCRIPTION AND GEOLOGIC ORIGIN FOR EACH MAJOR UNIT	USCS	PID	WELL DIAGRAM	SOIL PROPERTIES: STANDARD PENETRATION (ft)	MOISTURE CONTENT	GRAPHIC LOG	REMARKS
			0	Dark brown medium sand trace of gravel.	HS						
			1	Pirite float concentrate.	HS						
			2	Hemitite concentrate trace of sand.	HS						
			3								
			4								
			5								
	17"	17	6	Hemitite concentrate trace of sand.	HS						
		17									
		16	7	Hemitite concentrate trace of sand. Dark brown fine sand trace of hemitite concentrate.	HS						
			8								
			9								
			10	End of Boring ?							
			11								
			12								
			13								
			14								
			15								
			16								
			17								
			18								
			19	End of Boring ?							S-T @ ?
			20								
			21								

Printed Name of Person Completing Soil Boring Log:

Signature of Person Completing Soil Boring Log:

WELL ID MW-102



LOCK NO. _____

LOCK CONDITION: Replaced

SURFACE SEAL TYPE: Concrete

CONDITION OF SURFACE SEAL: cracked

PROTECTOR PIPE TYPE: steel

PROTECTOR PIPE SIZE: 3 1/2" square

PROTECTOR PIPE CONDITION: Rusted

WELL CASING TYPE: PVC

WELL CASING DIAMETER: 2"

TOP OF PROTECTOR PIPE TO ANNULAR SPACE SEAL: _____

MEASURED TOTAL DEPTH: 11.758

REPORTED TOTAL DEPTH: —

DEPTH TO STANDING LIQUID: 6.12

GROUNDWATER OBSERVATION: (TURBIDITY, COLOR, ODOR, ETC.): No odor slight color

COMMENTS: 6/13/06 Well open

Foth & Van Dyke			
REVISED	DATE	BY	DESCRIPTION
CHECKED BY:	JSK	DATE: DEC. 05'	
APPROVED BY:	SVDI	DATE: DEC. 05'	
APPROVED BY:		DATE:	

Kennecott Eagle Minerals Company

WELL INVENTORY FORM

Scale: NOT TO SCALE | Date: DECEMBER, 2005

Prepared By: Foth & Van Dyke | By: JOW | 04W015

SCA ENVIRONMENTAL

A Division of Sundberg, Carlson and Associates, Inc.

MW-103

SOIL BORING LOG

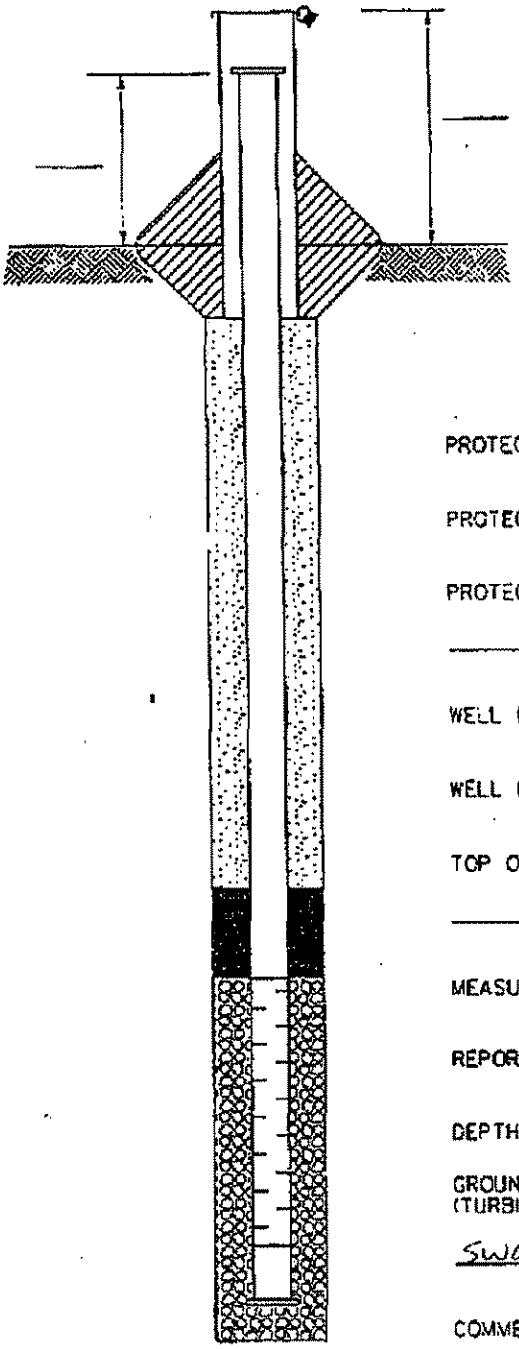
Facility/Project Name: Cattelman BFA	Driller, Drill Rig: Drilling and Engineering Team	Boring Number: MW-103
Site Address/Location: Former Ropes Milling Company Humboldt, Michigan	Technician/Geologist: Pete R. K. / SCA	Drilling Method:
	Project Number: 95-588 / Groundwater Depth/Elevation: 11 feet	Ground Elevation / Borehole Diameter
Site Owner (If Different From Above): Thomas Quigley, Minerals Processing Corporation	Well Name: / Local Grid Location (If applicable): N S E W	
	Start Date: 10-20-95 / Completion Date: 10-20-95	Caisson by

SAMPLE DATA: Number	Length Recovered (in)	Blow Count	Depth (feet)	Soil/Rock Description and Geologic Origin for Each Major Unit	USCS	PID	Well Diagram	Standard Penetration (in)	Moisture Content	Graphic Log	Remarks
			0	Light brown fine sand, trace of silt, gravel, and cobbles.							
			1	Iron ore concentrate							
			2								
			3								
			4								
			5								
			6								
			7								
			8	Brown silt, trace gravel, and organic.	ML						
			9								
			10	Brown silt, trace of gravel, and organic.							
	16"	7 12 8	11								
			12	Brown silt, trace of gravel, and organic							
			13								
			14	Peat							
			15	Peat, light brown silt.							
	18"	13 11 15	16	Fine sand and gravel.							
			17	Fine sand and gravel.							
			18								
			19	Large cobbles, or weathered bedrock.							
			20	End of Boring							Auger refusal, bedrock. Well set at 19.5'
			21								

Printed Name of Person Completing Soil Boring Log:

Signature of Person Completing Soil Boring Log:

WELL ID MW-103



LOCK NO. _____

LOCK CONDITION: Replaced

SURFACE SEAL TYPE: Bentonite

CONDITION OF SURFACE SEAL: ~~Loose~~ Soft

PROTECTOR PIPE TYPE: Steel - Square

PROTECTOR PIPE SIZE: 4"

PROTECTOR PIPE CONDITION: Good

WELL CASING TYPE: PVC

WELL CASING DIAMETER: 2"

TOP OF PROTECTOR PIPE TO ANNULAR SPACE SEAL: _____

MEASURED TOTAL DEPTH: 21.50

REPORTED TOTAL DEPTH: _____

DEPTH TO STANDING LIQUID: 8.08

GROUNDWATER OBSERVATION: (TURBIDITY, COLOR, ODOR, ETC.): Clear slightly swampy - hydrogen sulfide

COMMENTS: 6/13/06 Well Open

Foth & Van Dyke			
REVISED	DATE	BY	DESCRIPTION
CHECKED BY:	JSK	DATE:	DEC. 05
APPROVED BY:	SVDI	DATE:	DEC. 05
APPROVED BY:		DATE:	

Kennecott Eagle Minerals Company

WELL INVENTORY FORM

Scale: NOT TO SCALE | Date: DECEMBER, 2005

Prepared By: Foth & Van Dyke | Rev. 0W | 040018