

December 23, 2010

Mr. Leo Francendese On-Scene Coordinator U.S. Environmental Protection Agency 61 Forsyth Street, SW 11th Floor Atlanta, Georgia 30303

Subject: Final Letter Report

Barite Hills Nevada Goldfields Site

McCormick, McCormick County, South Carolina

Contract No. EP-W-05-053

Technical Direction Document (TDD) No.: TNA-05-003-0049

Dear Mr. Francendese:

Oneida Total Integrated Enterprises (OTIE), Superfund Technical Assessment and Response Team (START), prepared this Final Letter Report detailing activities performed in support of the Barite Hills Nevada Goldfields site (the site) investigation under Contract Number (No.) EP-W-05-053, Technical Direction Document (TDD) No. TNA-05-003-0049. All activities and procedures were performed in accordance with the EPA Science and Ecosystems Support Division (SESD) Region 4 Field Branches Quality System and Technical Procedures dated November 2007, and the EPA-approved site-specific Quality Assurance Project Plan (QAPP).

Under this work assignment, START was tasked with providing water sampling of the main pit lake, Hawes Creek tributary (the creek), and monitoring wells at various intervals. These letter reports can be found on the internet at http://www.epaosc.org/site/doc_list.aspx?site_id=2768 under the Barite Hill Nevada Goldfields site name.

In addition, START was also tasked with adding 3,500 gallons of a 50% solution of sodium hydroxide (NaOH) to the main pit lake in order to try and neutralize the acidity of the lake. Water quality parameters collected during various times of the NaOH addition can be found in Table 1. Logbook notes can be found in Attachment A.

Sodium Hydroxide Addition Letter Report Barite Hills site Page 2 of 3

Site Background

The site is an abandoned pit mine located approximately 3 miles south of McCormick, McCormick County, South Carolina between US Highway (Hwy) 378 and US Hwy 221 on the northern side of Road 30. The site is located in a relatively remote area; there are no buildings, homes, or commercial buildings within 0.5 mile of the site boundary. The site is located along a topographic high ridge area forming the headwaters of the creek. The topography of the area consists of rolling hills with ridgelines at an elevation of about 500 feet above mean sea level (amsl). Within the site, the ridgeline comprising the site has a high point of about 510 feet amsl and an average elevation of approximately 480 feet amsl.

The Main Pit from the mining operations remains. When the mine was abandoned, the Main Pit flooded. The waste rock stockpiles previously surrounding the eastern and southeastern portions of the Main Pit were a source of acid rock drainage. The pit contains approximately 60 million gallons of water with an historical pH of 2 and a high dissolved metal content.

Field Activities

On July 13, 2010, START mobilized to the site. Field activities consisted of incrementally adding a 50% solution of NaOH and measuring water quality parameters in the Main Pit lake. A HASP was developed for the site prior to fieldwork activities.

START collected the first set of water quality parameters after the addition of approximately 240 gallons of 50% NaOH at 11:25am on July 13, 2010. The lake water column was measured every meter from the surface to the bottom (see Table 1). Readings were collected again after the addition of approximately 800 gallons of 50% NaOH at 5:35pm on July 13, 2010.

On July 14, 2010, water quality parameters were collected at 9:00am (addition of 800 Gallons of 50% NaOH) as well as 5:30pm (addition of 660 Gallons of 50% NaOH).

The last set of water quality parameters were collected on the morning of July 15, 2010 at 8:35am after a final 1,000 Gallons of 50% NaOH was added overnight. A total of 3,500 gallons of 50% NaOH solution was pumped into the Main Pit lake over a period of 72 hours.

START remobilized back to the site on October 14, 2010 at 10:16am in order to perform a site walk and collect a final set of water quality parameters.

If you have any questions or comments regarding this Letter Report or require any additional information, please contact me at (678) 355-5550 ext. 5707.

Sodium Hydroxide Addition Letter Report Barite Hills site Page 3 of 3

Sincerely,

Russell Henderson Project Manager

Oneida Total Integrated Enterprises (OTIE)

Superfund Technical Assessment and Response Team (START)

Enclosures

Table 1

Attachment A – Logbook Notes

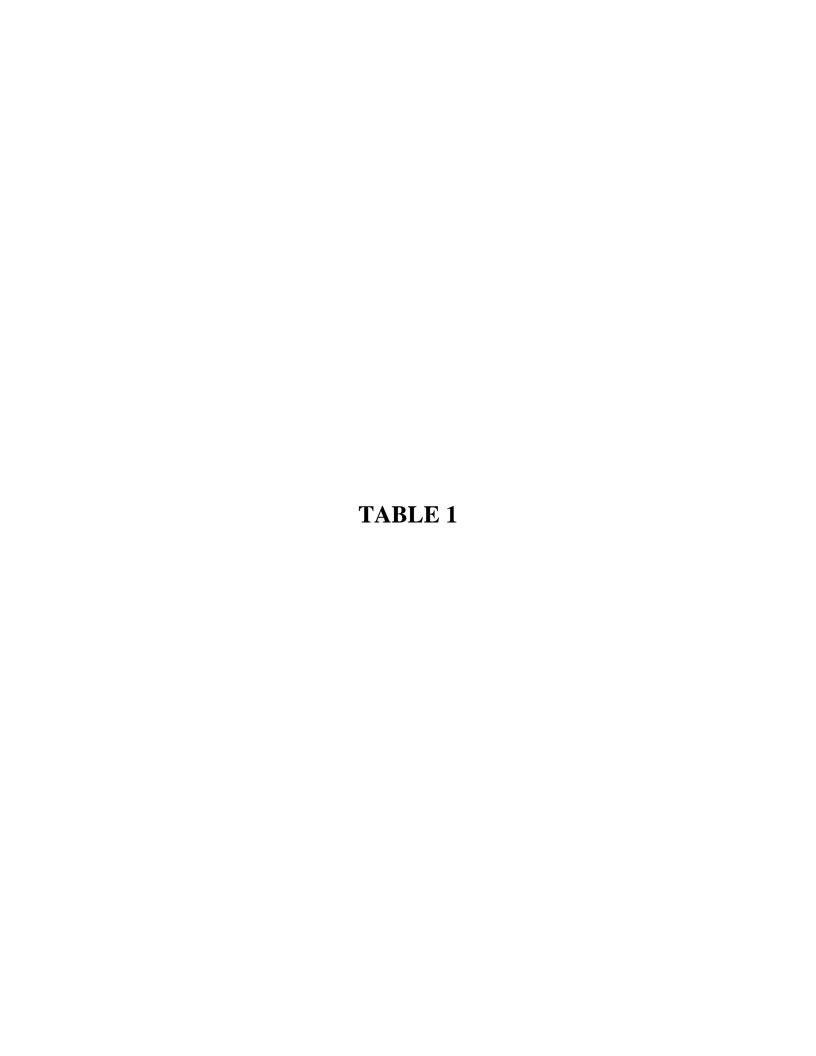


Table 1 Barite Hills/Nevada Goldfields Main Pit Lake Water Quality Readings during Sodium Hydroxide (NaOH) Addition July 2010

Horbia U-22 (approximately 240 gallons 50% NaOH added)

Main Pit Lake

7/13/2010 11:25 hrs

Depth (m)	рН	ORP (mV)	DO (mg/L)	Temp (°C)	Conductivity (mS/cm)	Turbidity (NTU)
Surface	4.0	145	6.8	30.81	0.33	140
0.5	4.1	140	6.7	30.69	0.80	210
1.0	4.5	97	6.2	30.42	0.84	130
1.5	5.6	47	5.5	30.2	0.83	220
2.0	5.5	-13	4.30	29.82	0.86	270
3.0	6.1	-27	2.20	29.21	0.86	200
4.0	6.2	-221	0.30	21.80	0.41	11.0
5.0	6.2	-226	0.40	13.88	0.45	11.0
6.0	6.2	-226	0.50	11.37	0.46	7.0
7.0	6.2	-226	0.50	10.54	0.47	offscale
8.0	6.2	-227	0.50	10.32	0.46	offscale
9.0	6.2	-228	0.50	10.29	0.45	offscale
10.0	6.2	-228	0.50	10.29	0.45	offscale
11.0	6.1	-227	0.60	10.34	0.46	offscale
12.0	6.1	-222	0.60	10.5	0.45	offscale
13.0	6.1	-193	0.60	11.43	0.42	offscale
14.0	5.9	-189	0.60	12.09	0.39	offscale
15.0	5.9	-185	0.60	12.17	0.37	offscale

Horbia U-22 (approximately 800 gallons 50% NaOH added)

Main Pit Lake

7/13/2010 17:35 hrs

				- 40.00	Conductivity	Turbidity
Depth (m)	рН	ORP (mV)	DO (mg/L)	Temp (°C)	(mS/cm)	(NTU)
Surface	5.4	137	7.4	32.70	0.41	880
0.5	6.7	109	7.4	32.64	0.45	870
1.0	6.8	-42	7.0	31.74	0.48	910
1.5	7.0	-50	5.6	30.72	1.00	920
2.0	6.0	-52	4.8	30.46	1.20	950
3.0	6.2	-37	3.4	29.56	0.64	offscale
4.0	6.1	-198	0.40	22.53	0.57	offscale
5.0	6.1	-199	0.40	14.52	0.63	offscale
6.0	6.1	-198	0.40	11.39	0.64	offscale
7.0	6.1	-200	0.50	10.45	0.63	offscale
8.0	6.1	-200	0.60	10.32	0.62	offscale
9.0	6.1	-199	0.60	10.29	0.61	offscale
10.0	6.1	-194	0.60	10.33	0.59	offscale
11.0	6.1	-199	0.60	10.47	0.39	offscale
12.0	5.9	-199	0.60	11.10	0.54	offscale
13.0	5.9	-183	0.60	11.74	0.47	offscale
14.0	5.8	-183	0.60	12.18	0.40	offscale
15.0	5.9	-186	0.60	12.15	0.63	offscale

Table 1 Barite Hills/Nevada Goldfields Main Pit Lake Water Quality Readings during Sodium Hydroxide (NaOH) Addition July 2010

Horbia U-22 (approximately 800 gallons 50% NaOH added)

Main Pit Lake

7/14/2010 09:00 hrs

Depth (m)	рН	ORP (mV)	DO (mg/L)	Temp (°C)	Conductivity (mS/cm)	Turbidity (NTU)
Surface	8.7	-71	5.5	30.52	1.00	890
0.5	8.7	-74	5.3	30.44	1.00	910
1.0	8.6	-78	5.3	30.35	1.00	920
1.5	8.6	-87	5.0	30.31	1.00	960
2.0	8.6	-92	4.3	30.28	1.00	980
3.0	8.6	-103	4.7	30.17	1.10	offscale
4.0	8.4	-116	3.5	29.99	1.20	offscale
5.0	6.1	-187	0.8	17.99	1.50	offscale
6.0	6.1	-185	0.8	12.64	1.60	offscale
7.0	6.1	-182	0.8	10.78	1.70	offscale
8.0	6	-182	0.8	10.36	1.60	offscale
9.0	6	-183	0.8	10.29	1.60	990
10.0	5.9	-182	0.8	10.25	1.50	990
11.0	5.8	-182	0.9	10.34	0.97	970
12.0	5.7	-179	0.6	10.38	0.96	980
13.0	5.8	-153	0.6	10.82	0.85	980
14.0	5.9	-47	0.6	11.86	0.62	offscale
15.0	6.4	-99	0.6	12.57	offscale	offscale

Horbia U-22 (approximately 660 gallons 50% NaOH added) Main Pit Lake

7/14/2010 17:30 hrs

Depth (m)	рН	ORP (mV)	DO (mg/L)	Temp (°C)	Conductivity (mS/cm)	Turbidity (NTU)
Surface	8.8	-65	7.2	34.01	0.71	520
0.5	9.2	-75	6.3	33.35	2.2	530
1.0	9.5	-82	6.0	33.86	1.3	880
1.5	9.5	-111	5.2	30.94	1.3	930
2.0	9.3	-123	4.5	30.65	1.4	970
3.0	7.8	-142	2.9	29.99	1.6	offscale
4.0	6.5	-224	0.6	20.92	1.7	offscale
5.0	6.5	-194	0.7	12.85	1.8	970
6.0	6.4	-187	0.8	10.82	1.7	940
7.0	6.4	-185	0.8	10.44	1.6	930
8.0	6.4	-186	0.9	10.32	0.98	930
9.0	6.4	-185	0.9	10.28	0.95	930
10.0	6.3	-185	0.9	10.29	0.90	930
11.0	6.3	-183	0.9	10.32	0.86	940
12.0	6.1	-180	1.0	10.33	0.77	940
13.0	5.8	-170	1.0	10.38	0.70	940
14.0	4.9	-134	1.2	10.61	0.59	990
15.0	6.8	-19	2.0	11.81	0.66	650

Table 1 Barite Hills/Nevada Goldfields Main Pit Lake Water Quality Readings during Sodium Hydroxide (NaOH) Addition July 2010

Horbia U-22 (approximately 1,000 gallons 50% NaOH added)

Main Pit Lake

7/15/2010 08:35 hrs

Depth (m)	рН	ORP (mV)	DO (mg/L)	Temp (°C)	Conductivity (mS/cm)	Turbidity (NTU)
Surface	9.4	-62	9.3	30.40	33	offscale
0.5	9.5	-66	4.4	30.53	6.1	25
1.0	9.5	-73	5.3	30.51	4.8	24
1.5	9.4	-85	5.1	30.45	5.0	25
2.0	9.3	-98	5.2	30.38	3.8	26
3.0	8.8	-113	4.1	30.10	3.2	31
4.0	6.4	-197	0.8	17.42	1.7	26
5.0	6.3	-179	0.8	13.81	1.8	offscale
6.0	6.3	-171	0.9	11.93	1.8	offscale
7.0	6.2	-165	0.9	10.92	1.8	offscale
8.0	6.2	-164	1.0	10.37	1.7	960
9.0	6.1	-163	1.0	10.30	1.6	960
10.0	6.1	-160	1.1	10.28	0.98	950
11.0	6.0	-158	1.1	10.30	0.93	990
12.0	5.9	-154	1.2	10.32	0.89	offscale
13.0	5.7	-149	1.3	10.39	0.82	offscale
14.0	5.2	-129	1.4	10.64	0.70	offscale
15.0	6.1	-7	1.6	11.76	0.78	920

7/15/2010 07:55 hrs

bottom	6.8
mid	7.0
surface	8.8

These points collected at shallow end of pit lake, near 6" pump intake, 35 ' out.

Horbia U-22

Main Pit Lake

10/14/2010 10:16 hrs

				- 40.00	Conductivity		
Depth (m)	рН	ORP (mV)	DO (mg/L)	Temp (°C)	(mS/cm)	Turbidity (NTU)	
Surface	6.5	5	6.50	22.46	0.33	19	
0.5	6.5	-6	6.40	22.33	0.33	34	
1.0	6.4	-15	6.40	21.88	0.33	80	
2.0	6.4	-28	4.40	20.64	0.34	offscale	
3.0	6.3	-49	2.40	19.11	0.35	110	
4.0	6.1	-180	0.22	15.55	0.38	offscale	
5.0	6.0	-151	0.00	12.11	0.38	offscale	
6.0	6.0	-145	0.00	11.50	0.38	offscale	
7.0	6.0	-142	0.00	11.18	0.39	offscale	
8.0	6.0	-135	0.00	11.15	0.39	750	
9.0	6.0	-133	0.00	11.24	0.40	offscale	
10.0	6.0	-134	0.00	11.37	0.40	offscale	
11.0	6.0	-133	0.00	11.68	0.43	92	
12.0	5.9	-132	0.00	12.03	0.49	130	
13.0	5.9	-130	0.00	12.31	0.48	88	
14.0	5.8	-126	0.00	12.74	0.47	130	
15.0	5.7	-124	0.00	12.93	0.43	48	

ATTACHMENT A LOGBOOK NOTES

4.+ 82° F (lear

10:00 Arrive on site meet with J. Harrington of Alexco + Kenny From CMC. Systen is already pumping Noot into be pump recirculating inthepit lake. Approximately 1.5 gallons por Anute being discharged to lake at this time. 10:15 toe Herrister OFFrite Fox con Ference Calls. Keny Smith OF CMC + My self go For First, round of realist From pitlake. Cond Turb DO TEMP ORP antaopth of iff scale 040 12.17 0.37 5.9 " " 0.60 12.09 -189 5.9 0.39 " 060 11.43 - 193 0.42 6.1 " " 0.60 10.5 0.45 12

0.44

0.46

0.47

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6.2

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10

1. 0.60 10.34

" -DSD D-32

" 0.60 10.54

0.45 11 11 0.50 10. 29

0.45 " " 0.50 10.29

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- 228

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-226

Project/Client EPA STA

Hot Surry 930 t										
Depth	D#	[Cond '	Just	100	Temp	ORP				
4	6.7	0.46	7.0	0.5	11.37	_ əəç				
5	6.2	0.45	11.0	0.40	13.88	-996				
4	4.2	0.41	11.0	0.30	21.80	- 991				
3	6.1	0.86	260	20	16.PG	-27				
2	5.5	0.84	270	4.3	29.83	- ₁₃				
1.5	5.4	0.83	220	5.5	30.2	47				
1.0	4.5	6.84	130	6.3	30.42	97				
6.5	4,1	0.80	210	6.7	30.69	140				
Surface	4.0	o. 33	140	6.8	30.81	145				

2100 he return to land
and lunch.

13:00 Keturn From lunch
he M.Ke Various aljustant
te pump t tanker. Stick
level indicate a drop of

11" total at this point a
the decision is make to
Fuel up the 6" trush pump
t let the 55st. ran offenpt to
introlue the 3500 gallon,
v. Kin 22 hours.

Location Bavite Hills her Date 7/13/10

Project/Client EPA START RH

Hot 97 F Survey

14:00 he regroup at Top or

hill by to-ker ofter family fam

14:45 Toe Harring to-returns

14:45 Toe Harring to-returns

and tells as hell leave that afternoon a non't return. he will take care of allisting atthis point.

16:45 he prepare for find sit of Realize For day,

<i>1173</i> つ・			_	_			ŧ
Deoth	-}	Cond.	Tuib		DO	Temp	077
15	5.9	0.63	offsca k	ا د	0.60	12.15	-184
14	5.8	0.40	**	.,	0.60	12.18	- 183
13	5.9	0.47	/4	٠, ا	0.60	11.74	-183
17	5.9	0.54	11		0.60	11.10	-199
10	4.1	0.39	**	"	0.60	10.47	-199
10	4.1	0.59		<i>,</i> ,	0.60	10.33	-194
9	6.1	0.61	"	٠,	0.60	10.29	-199
8	6.1	0.67		٠,	0.60	10.3>	- 900
		0.63	.,	٠,	0.50	10.45	- 900
7	6.1	0.64	v	,,	0.40	11.39	-198
6	6.1	0.63	· ·	,,	0.40	14.52	-199
5	6.1		٠,	••		as 53	-198
4	6.	0.57			0.70	ربها	

Project/Client EPA STAR R4

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Depth	#4	Cond	Tub.	DO	Temp.	9RP
3	4.2	0.64	offsale	3.4	29.56	- 37
a	6.0	1.30	950	4.8	30.46	-5>
1.5	7.0	1.00	920	5.6	30.72	- 50
)	4.8	6.48	910	7.0	31.74	-47
8.5	6.7	0.45	870	7.4	32,64	109
Surface	5.4	0.41	880	7.4	32.70	137

Side return to shove to slow flows look for overnisht de livery, he'll teturn between 07:00 tos:00 in the am. 18:45 Offrite

132

3/0

0500: START Bernos leffo (mob) to the site 0800: START Dernies arrived to the site and met with START Henderson 0800: 32 viches of 50% sofution of Na Ott total and a viches overnight 08:20 Coliberted Horse 06:30 Collectil Water Quality data. 0900: Monitoring readings 34 offscale fond 5.95 offscale offscal Depth DO Temp 0.60 -188-47 6.60 17.86 -193153 0-60 10.80 13 10.33 0.60 6-15.8 0 970 970 970 970 " 0.97" 10.34 0.90 6.35.9 " 1.50 " 0.80 10.35 (4.0 (4.0 10.29 0.80 1-60" 0.80 10.36 8 140" 1.40 0.80 1.60 0.80 1.50 0.80 1.30 0.80 1.30 4.70 1.00 4.70 1.00 4.70 10.98 (1.1) (1.2) 12.54 17.99 -97 -13-87 4.30

Location Me Cormick, SC Date 07/14/2000 Project / Client USA EPA Rogon & Bante Hills Doth PH 700 0.5 4.7 900 Surface 4.0 0.33 Cond Forts DO Temp. ORP 21:00 5:3 140 6:8 30.81 145

0950: START Berries began taking pictures Pictures taken from other side of the lake to capture Sill forces, boom like refer troin system (for runoff) and the Nast Lischarge system (with pump). Pump description - SP 150M

1010: DHEC arrived to the site

1030: START Berrios gave a brief update to DHEC personnel

1100: START Henderson gave all defails and updates to DHEC personnel in addition to explain the Chemistry is taking place at the lake with the 50% Solution of Nath. 1145: STATET Henderson gave wheeters instruetions to follow after his conversation with works Joe Carrington

(to START Bernos & Kenny Smith from CMC Inc.)

1200: START Henderson left site (Demob) 1215: STATET Derrios took 15 min lunch break

12:30 henry from the took measurement of amounts of base solution in the tank (with a designated Duc tube)

1245: NaOH (50%) sepution had 8 inches (gallons) less in the tank

1400: START took surface pH readings close to the plume (avg 8.87H)

1445: Na Off Solution released another, ~ 10 inches Hauk I into the lake (

1530: STATET took pictures of the plume

1600: START took surface pH readings close to the plume (3 areas) and the aug. 74 was 9.5

			(She	allou) e (nd)		
1702:	Readin	as call	ected	betw	een	phim	e and	rack
	7H_							:
bottom	49							
mid	7.9							
5WF	9.2				· ·			
(maters)	H E	and Tu	ap.	70 0	Ter	m)(°C)	ORP (mV)

	2mt			.			
47	Maters	hH H	cond	TUND.	DO -	Temp(°c)	ORP (mv)
	15	6.8	0.66	650	2.0	11.81	-19
	14	4.9	0.59	990	1.2	10-61	-134
	13	5.8	0.70	940	1.0	10.38	-170
	13	6.1	0.77	940	1.0	10.33	-180
	11	6.3	0.86	940	0.9	10.32	-183
	10	6.3	0.90	930	0.9	10.29	-185
1	9	G.4	0.95	930	0.9	10.28	-185
7	8	6.4	0.98	930	0.9	10.32	-186
	7	6.4	1.0	930	0.8	10.44	- 185
	6	6.4	1.7	940	0.8	10.83	-187
	5	6.5	1.8	970	0.7	12.85	- 196
	4	6.5	1.7	off	0.6	20.92	-224
	3	7.5	1.0	off	a. 9	29.99	-142
	2	9.3	1.4	970	4.5	30.65	-123
	16	9.5	1.3	930	5.2	30.94	-111
	1.0	9.5	1.3	9860 1300	6.0	33.8C	-85
	0.5	84°	2.2	530	¢.3	33.35	-75
N.	Surtoc	8.8	0.71	520	7.2	34.01	-65

Location Mc Cormick, SC Date 07/15/2010 27 Project/Client US EPA Region 4 | Barite Hills

1740: START Berno's consulted with PM readings collected 1820: START Berrios & Kenny from CMC set up de constic half way to discharge what is left in the NaOH (5090) tank, overnight This decision was consulted with STAILT Project Manager, Russell Hendenson. 1825: START & CMC are preparing to leave

the site.

note: START & CMC will meet at 0700 on site.

1900: START & come locking site's gates. START Berries is working on data

spread sheets to be sent to START Henderson.

STATE Berrios sent data spreadsheet to START Henderson.

weather: sunny and at 75°F the constict from the site and began detaching the constict from the Habit Jank at the Nath tank.

07-23: STATET I come Letached the caustic from the tank and rinsed it with DI water.

0755: Readings collected at the shallow end.

	Mic		4.0					
	surve	up 9	8.8					
The second	Depth	pH	Cond	Turb	PO	Temp	ORP	
	15	Q.1	0.78	920	1.6	11.74	, - 7	
	14	5.2	0.70	off	1.4	10.64	-139	
•	13	5.7	0.82	off	1-3	16.39		
•	حد	5.9	0.89	off	1.2	10.32	- 154	
21	11	6.0	0.93	990ff	1.1		-158	
	10	G-1	6.98	950	1.1	10.28	-160	
1	9	6.1	1.6	950	1.0	10.30		
	8	6-2	1.7	960	1.0	10.37	-164	
	7	6.2	1.8	off	0.9	10.92	-165	
1	6	6-3	1.8	0 f f	09	11.93	-171	

311111 1 1 129 1 1 1 2 2 2 2 2 2 2 2 2 2	f	1	1	1		1						
Depth	1 7H	Cond	Turb									
5	6.3	1-8	off	10.8	13.81	-179						
4	6.4	1.7	26	8.0	17.47	-197						
3	8.8	3.2	31	4.1	30.10	-113						
2	9.3	3.8	26	5.a	30.38	-98						
1.5	9.4	5.0	ř.		1 .							
1.0	9.5	4.8	24	5.3	30.51	-73						
0.5	9.5	5-3-1B										
Surface		33	off	9.3	30.40	-67						
0930: START taking rearings of and close												
to the plume: average of 8.0 in 3 areas.												
1010: START & Come getting prepared to												
1010: START & Come getting prepared to detach the hoses from the pump.												
1030: START & Conc defacting the												

11:00: START & (me affected pump to truck 1105: TEAC arrived to pick up the fank 1137: REAC left with the fank 1150: START and CMC moved the intaky Nose up to the hill (where it

was)

1200: START taking pictures of site after aethnities were timshed.

1230: STAFF Berrios & CMC Kenny Smith

_ocation Mc Cormick, SC Date 07/15/200 29 Project Client Barik Hills JUS EPA Zegion &

left the site. 1235: Began Demob

1440: START Berrios arrived to Atlanta area

1700: START Berniss sent data spreadsheet to START Henderson.

