

PRRELIMINARY REPORT
CAMBRIA AMD TASK FORCE
PASSIVE TREATMENT SYSTEM EVALUATION

ACID MINE DRAINAGE ABATEMENT PROJECT
LITTLE MILL CREEK
CLARION TOWNSHIP, CLARION COUNTY, PA

Prepared By:
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PROJECT NO: AMD 16(1175)101.1
PROJECT NAME: LITTLE MILL CREEK (Site A *aka* Hanlon and Site B *aka* Kotchey B)
PROJECT LOCATION: Clarion Township, Clarion County
RECEIVING STREAM: Unnamed tributary to and Little Mill Creek

PROJECT GOALS:

- Improve Water Quality in Little Mill Creek and Mill Creek.
- Restore aquatic life and recreational activities to the receiving streams.
- Abate water pollution from two separate discharges known as the Hanlon and Kotchey discharges.

PROJECT INFORMATION:

- Project was designed by Jeffrey J. Westrick P.E., and Max Scheeler, BAMR, Cambria office.
- Plans were sealed by Eric E Cavazza P.E.
- Contractor: Neiswonger Construction Inc., Strattanville, PA
- BAMR Construction engineer: Tom Malesky P.E
- Inspector supervisor: Allen Pletcher
- Project inspector: Lawrence Alexander
- Construction period: June 21, 2002 – December 28, 2002
- Final construction cost of \$505,371.10

PROJECT DESIGN INFORMATION:

- A successive alkalinity producing system (SAPS) was constructed on Site A. The system consists of a collection pond discharging to two Vertical flow ponds (VFW) and sedimentation ponds in series. Treated water then flows into a through a wetland and discharged to a grass lined waterway. A flushing pond is constructed to flush either VFW.
 1. *Design life of twenty (20) years with a design flow of xxx gallons per minute (gpm)*
 2. *System capable of hydraulically handling a flow of xxxx gpm*
 3. Influent pH ranges from 4.2. to 7.0
 4. Influent flow ranges from 3.5 to 45 gpm
 5. Influent acidity concentration ranges from -1.2 to 150.2 mg/l
 6. Influent iron concentration ranges from .08 to 2.09 mg/l
 7. Influent aluminum concentration ranges from .36 to 22.67 mg/l
- A passive treatment system consisting of a sandstone collection sump discharging to an anoxic limestone drain (ALD) with a settling pond on Site B was constructed.
 1. Design life of twenty (25) years with a design flow of 175 gallons per minute (gpm)
 2. *System capable of hydraulically handling a flow of xxxx gpm*

3. Influent pH ranges from 6.0 to 7.0
4. Influent flow ranges are unknown.
5. Influent acidity concentration ranges from -34.6 to 152 mg/l
6. Influent iron concentration ranges from 71.1 to 118 mg/l
7. Influent aluminum concentration ranges from .5 to 1.0 mg/l

PROJECT DESCRIPTION:

- Treatment system schematic is shown in Appendix A for the Site A.
 1. AMD discharge is directed to a collection pond.
 2. A flow control structure controls the discharge to a Vertical flow pond (VFW).
 3. The water then flows to a sedimentation (9sed) basin.
 4. A second VFW is in place to treat the water.
 5. Flow from the VFW is measured at the flow control structure then discharging to a second sedimentation basin.
 6. A flushing pond is capable of flushing either VFW 1 or VFW 2.
 7. Water from the VFW's passes through a wetland prior to discharging.
- Treatment system schematic is shown in Appendix B for the Site B.
 1. AMD discharge from an abandoned gas well and unidentified mining source is collected in a sandstone sump and directed to an anoxic limestone drain (ALD).
 2. Influent flow is measured at the end of the center pipe.
 3. Effluent from the ALD is directed to a sedimentation basin; then discharged.
 4. Lagoon baffles were installed in the sediment pond to increase detention time due to increased water flow through the system.

PROJECT OPERATION, MAINTENANCE AND REPLACEMENT (OM&R) INFORMATION:

- System water sampling is performed quarterly.
- Flow data is not available for all sampling dates.
- Sampling point IDs are shown in Appendixes C and F.
- Sampling point locations are shown in Appendixes A and B.
- *System flushing is performed two (2) to three (3) times per year.*
- An Assessment of the Markle Passive Treatment System (Site B; Kotchey) was completed by Hedin Environmental through a Trout Unlimited Technical Assistance Program (TUTAG-27) The study was submitted to BAMR in June 2007. A copy of the consultant report can be found on the OM&R server site for Little Mill Creek. The report provided 5 options for repair and modification of the treatment system. A summary of the options follows:
 - Option 1. Control of the flow of water from the gas well to lesson the amount of water that the system treats.
 - Option 2. Modify the system to more effectively remove iron.
 - Option 3. Enlarge the system to more effectively treat the discharge.
 - Option 4. Combine Options 2 & 3 which requires additional property for treatment.
 - Option 5. Aeration of the discharge to improve iron removal.

WATERSHED RESTORATION INFORMATION:

- This project was one of numerous projects completed in the Mill Creek watershed. The treatment projects in the watershed are part of a broader agenda to improve the water quality in the Clarion River Basin.
- Little Mill Creek provides 25% of the total flow of Mill Creek. It is the first major tributary to detrimentally impact Mill Creek near its headwaters. It contributes 30% of the iron, 68% of the manganese, 56% of the aluminum, 70% of the acidity and 60% of the sulfates found in Mill Creek. (Headwaters Charitable Trust WR-4).
- Funding Partners:
 1. Mill Creek Watershed Coalition
 2. PADEP 319 Grants
 3. Trout Unlimited
 4. Pennsylvania Coalition for Abandoned Mine Drainage

PROPERTY OWNER INFORMATION:

- Site A is currently owned by Robert and Vicky Ishman, Corsica, PA. BAMR does not have easements from the Ishman's. The property was originally owned by Marvin and Judy Hanlon.
- Site B site is owned by Michael A. and Charles T. Kotchey, Pittsburgh, PA.
- The Consent for Right of Entry agreements obtained for this project are standard construction easements for building the treatment system and contain language for perpetual treatment.

SYSTEM PERFORMANCE EVALUATION:

- Site A Inspection: Not completed due to snow cover and frozen discharges. Access to the site via snowmobile on 1/21/09 confirmed no flow.
- Completed By: Jeffrey J. Westrick, Douglas Stewart, Jon Smoyer
- Observations: To be noted after snow cover melts.
- Site B Inspection: Not completed due to snow cover and frozen discharges.
- Completed By: Jeffrey J. Westrick, Douglas Stewart, Jon Smoyer
- Observations: To be noted after snow cover melts.

Water Quality Trends and System Performance: Site A

1. Influent water quality has remained consistent.
2. System effluent pH ranges from 4.2 to 5.7.
3. System still removing 400 to 500 mg/l of acidity; 1 to 2 mg/l of iron and 30 to 40 mg/l of aluminum.

Water Quality Trends and System Performance: Site B

1. Influent water quality has remained consistent.
2. System effluent pH ranges from 4.2 to 5.7.
3. System still removing xx to xx mg/l of acidity; xx to xx mg/l of iron and xx to xx mg/l of aluminum.
4. System flow rates exceed design flow rates.

PROJECT SUCCESS:

1. Site A is performing as designed.
2. Site B passive treatment system is not currently producing water quality as good as originally anticipated.

TASK FORCE RECOMMENDATIONS: Site A and Site B

- As-Built Drawings need to be completed and recorded; particularly relating to the piping systems and critical system elevations.
- Any changes made during OM&R operations to the piping systems, valves, cleanouts, water levels, etc. need to be added to the original As-Built Drawings and recorded as revised As-Built with dates.
- System water sampling needs to be performed consistently and at regular time intervals to provide for reliable system analysis.
- Accurate flow data needs to be collected at the same time as system water sampling to provide for reliable system analysis.
- Water sampling data needs to be recorded in one (1) central location and reviewed on a regular basis by the O&M Section to monitor system performance.
- Flow measurements, sample collection and data recording should be done by one (1) or two (2) people in the O&M Section to ensure reliability and accountability.
- All Right of Entry agreements; As-Built Drawings, sampling location points and descriptions, SIS IDs, sampling data and analysis, OM&R operations, system changes, dates, costs, etc. for each treatment system need to be recorded in one (1) central location by the O&M Section.
- A continuous flow recorder should be installed at any future site during project development to provide more accurate flow data to the project designer and could be reused over and over.
- A continuous flow recorder should be designed and built into the treatment system to provide more accurate and reliable flow data for system analysis by the O&M Section.

It must be considered in the final analysis of recommendations that an evaluation of Sites A and B utilizing the Risk Analysis Matrix presented in the *Mine Drainage Treatability and Project Selection Guidelines* June 10, 2008 would classify the risk of treatment as “very high”.

SCOPE OF WORK RECOMMENDED: Site A

- Evaluation to be completed after snow cover melts.

SCOPE OF WORK RECOMMENDED: Site B

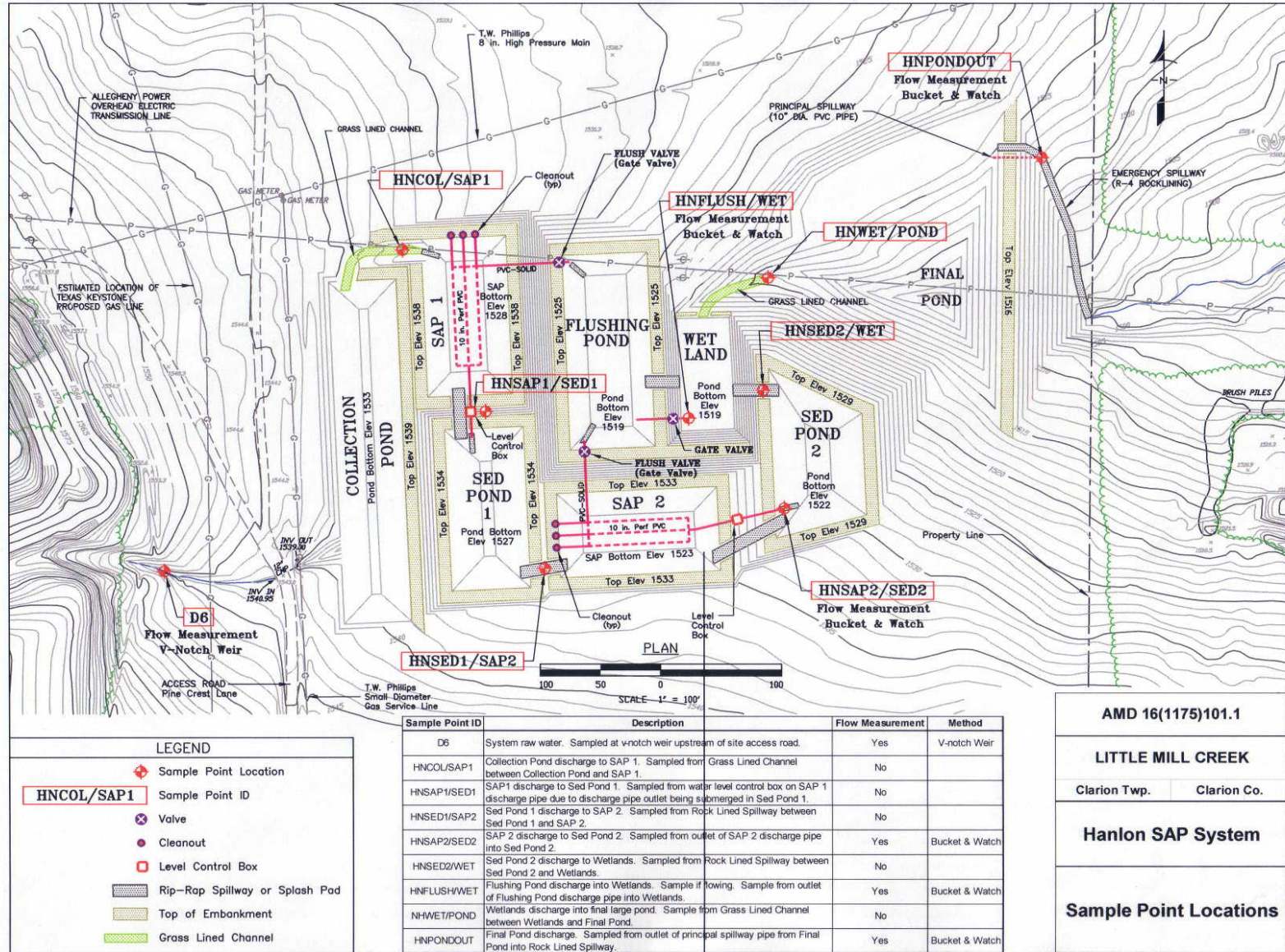
- Evaluation to be completed after snow cover melts.

ATTACHMENTS:

- Appendix A: Site A Schematic And Sample Point Locations.
- Appendix B: Site B Schematic And Sample Point Locations.
- Appendix C: SIS Sampling Point IDs for the Site A.
- Appendix D: SIS Sampling Point Inventory Form for the Site A.
- Appendix E: Water quality Summary sheet for the Site A.
- Appendix F: SIS Sampling Point IDs for the Site B.
- Appendix G: SIS Sampling Point Inventory Form for the Site B.
- Appendix H: Water quality Summary sheet for the Site B.
- Appendix I: Little Mill Creek Location Map
- Appendix J: Directions to the Project Site

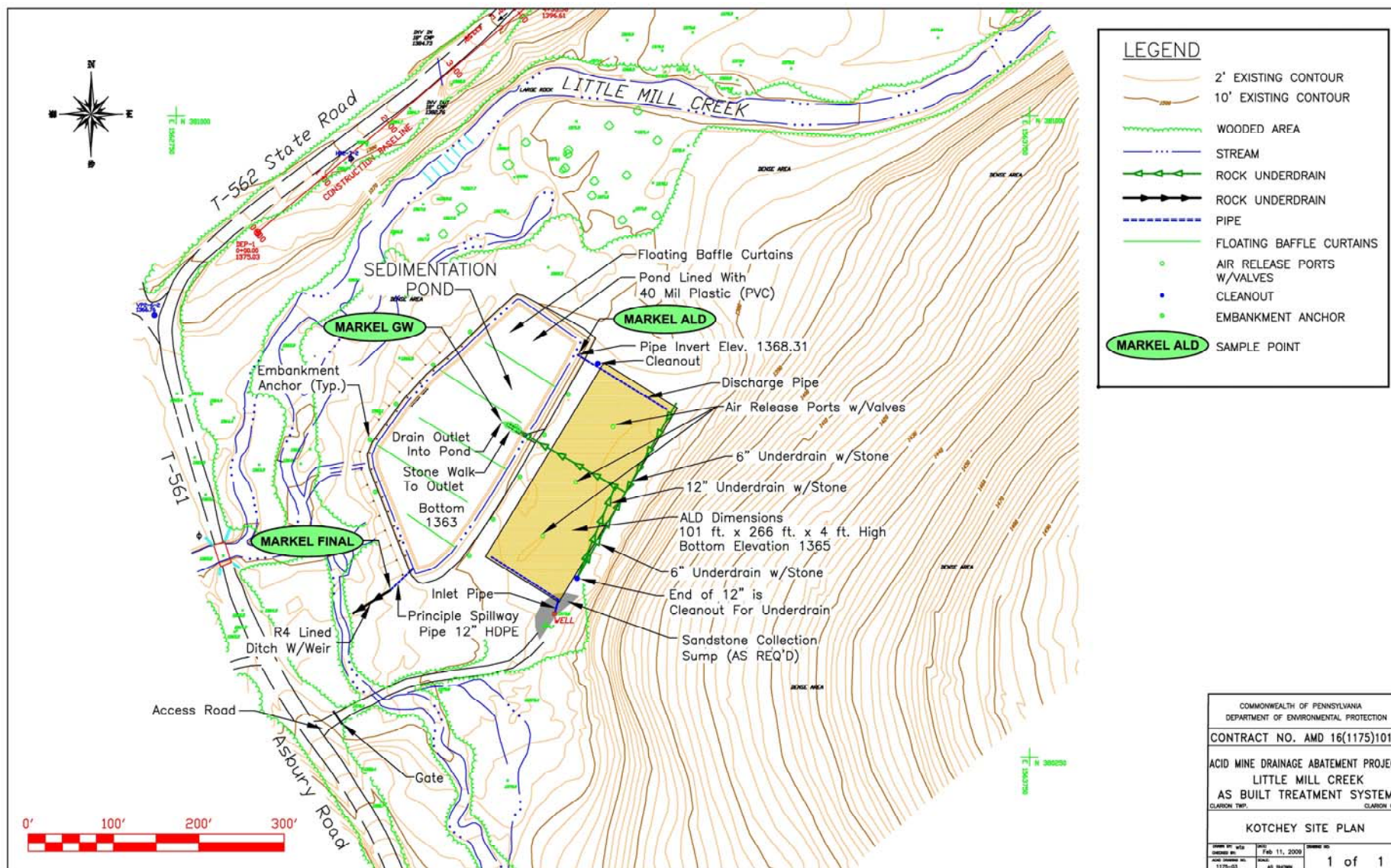
APPENDIX A

SITE A SCHEMATIC AND SAMPLE POINT LOCATIONS



APPENDIX B

SITE B SCHEMATIC AND SAMPLE POINT LOCATIONS



Appendix J



Directions to Site:

Start – 286 Industrial Park Rd, Ebensburg, PA

- Turn left at Mini Mall Road 0.3 mi
- Turn left at US-22 0.1 mi
- Take the ramp onto US-219 N 1.8 mi
- Take the US-219 Bus exit toward Ebensburg 0.4 mi
- Turn left at US-422 49.5 mi
- Take the PA-28 N ramp to New Bethlehem 0.6 mi
- Merge onto PA-28 N 30.9 mi
- Turn left at Summerville / Corsica Rd. 3.9 mi
- Turn left at US-322 2.4 mi
- Turn right at PA-558 / Potter Rd. 0.6 mi
- Turn right at Asbury Rd. / TR-561 0.2 mi
- In one quarter mile turn left at an unnamed dirt road
- Site A is about a half mile up this road.
- To reach site B continue on TR-561 until you approach a bridge.
- The site is on the right. A yellow gate blocks the access.

APPENDIX E

10/21/2008

Module 8.1A By Project

Project ID: PA1174

Monitoring Point: D6

Coll ID	Seq	Date Collected	Initial Flow	Final Flow	Determ Method	pH units	ALK MG/L	HOT A MG/L	FE MG/L	MN MG/L	AL MG/L
7451	028	01/30/2001	4	4	Meas	3.2	0.0	476.0	23.6	15.6	65.2
7451	103	03/22/2001	12	12	Meas	3.0	0.0	472.0	8.8	16.4	69
7451	134	04/19/2001	26	26	Meas						
7434	006	05/22/2001	8	8	Meas	3.1	0.0	526.0	4.62	18.5	71.9
7451	189	06/19/2001	4.16	4.16	Meas	3.1	0.0	579.8	6.94	20.7	76.4
7451	263	07/24/2001	6	6	Meas	3.0	0.0	581.8	8.92	20.9	79.2
7451	309	08/21/2001				3.1	0.0	574.4	12.3	20.1	73.9
7412	072	11/29/2001	3	3	Meas	3.0	0.0	728.6	25.4	23.1	86.6
7451	028	01/24/2002	3	3	Meas	3.0	0.0	699.80	20.4	20.8	74.3
7411	040	02/28/2002	7	7	Meas	3.0	0.0	702.60	15.3	22	93.7
7411	040	04/30/2002	15	15	Meas	3.0	0.0	658.00	7.6	21.2	94.7
7411	040	06/27/2002	32	32	Meas	3.2	0.0	672.60	2.78	2.1	82.8
7411	040	07/25/2002	8	8	Meas	3.1	0.0	549.40	4.23	20.7	82.5
7411	040	10/24/2002	7	7	Meas	3.0	0.0	626.20	65.1	22.4	95
7411	040	11/26/2002	3.5	3.5	Meas	3.1	0.0	704.60	9.51	22.3	92.2
7411	040	12/20/2002	3.5	3.5	Meas	3.0	0.0	671.60	8.8	20.6	84.6
7486	419	01/06/2003	12	12	Meas	3.0	0.0	549.20	6.6	18.6	75.6
7411	183	04/15/2003	23	23	Meas	3.1	0.0	559.40	2.99	18	71
7411	183	05/29/2003	10	10	Meas	3.0	0.0	575.80	3.32	19.2	74.2
7411	183	07/01/2003				3.1	0.0	558.80	3.42	19	74.6
7411	183	08/06/2003	32	32		3.1	0.0	500.40	2.47	18.2	68.3
7411	183	10/07/2003	9	9	Meas	3.1	0.0	480.40	2.26	17.2	64.4
7411	183	11/06/2003	6	6	Meas	3.1	0.0	494.60	2.64	16.5	62.3
7411	183	12/16/2003	19	19		3.1	0.0	464.00	4.21	16.5	62.3
7411	183	03/11/2004				3.2	0.0	450.00	2.52	19.4	74.6
7411	183	04/15/2004	36	36	Meas	3.2	0.0	498.80	1.57	17.5	68.3
7411	183	05/27/2004	36	36		3.2	0.0	507.60	1.77	16.7	64.1
7411	183	07/29/2004	9	9	Meas	3.2	0.0	449.60	2.62	17.8	63.7
7411	183	08/31/2004	39	39	Meas	3.2	0.0	438.20	1.42	15.3	57.5
7411	183	10/27/2004	9	9	Meas	3.2	0.0	441.20	2.9	15.7	60.2
7411	183	12/08/2004	12	12	Meas	3.2	0.0	417.20	4.78	15.1	58.5
7411	183	02/15/2005				3.3	0.0	434.20	1.9	15.7	56
7411	183	03/31/2005	17	17	Meas	3.2	0.0	424.40	.958	14.8	53
7411	183	05/04/2005	17	17	Meas	3.3	0.0	414.00	1	15.8	56.6
7411	183	03/08/2006				3.2	0.0	419.80	1.41	14.3	52
7401	183	06/15/2006				3.2	0.0	383.60	1.32	13.3	50.8
7401	183	08/15/2006				3.2	0.0	389.40	1.64	15.8	53.4
7401	183	10/11/2006				3.2	0.0	372.80	1.28	14.4	56.2
7401	183	12/18/2006				3.2	0.0	416.20	.8	10.6	39.1
7401	183	03/14/2007				3.3	0.0	397.40	.82	13.7	52.9
7401	183	05/09/2007				3.3	0.0	444.80	.9	15.4	55.6
7401	183	08/08/2007				3.3	0.0	416.00	1.55	15.2	57.6
7401	183	10/09/2007				3.3	0.0	453.40	2.19	16.6	54.1
7401	183	12/12/2007				3.3	0.0	397.00	1.09	12.6	51.8
7401	183	06/11/2008				3.3	0.0	424.00	1.217	16.848	65.57
7401	183	09/10/2008				3.3	0.0	493.80	2.234	17.044	71.24

10/21/2008

Module 8.1A By Project

Project ID: PA1174

Monitoring Point: HNCOL/SAP1

Coll ID	Seq	Date Collected	Initial Flow	Final Flow	Determ Method	pH units	ALK MG/L	HOT A MG/L	FE MG/L	MN MG/L	AL MG/L	SO4 MG/L
7486	420	01/06/2003				3.6	0.0	256.20	2.5	8.67	40.1	489.0
7411	184	04/15/2003				3.2	0.0	533.00	2.68	17.9	72.1	1203.5
7411	184	05/29/2003				3.3	0.0	491.60	14.8	16.4	9.96	1022.9
7411	184	07/01/2003				3.3	0.0	519.40	3	17.8	72	952.4
7411	184	08/06/2003				3.2	0.0	482.20	2.34	18.1	68.6	1083.7
7411	184	10/07/2003				3.3	0.0	435.60	1.95	15.9	61.6	943.8
7411	184	11/06/2003				3.3	0.0	428.20	2.07	14	54.4	995.2
7411	184	12/16/2003				3.2	0.0	420.00	1.8	15.5	58.5	927.9
7411	184	03/11/2004				3.3	0.0	474.20	1.63	18.5	72.7	1215.0
7411	184	04/15/2004				3.4	0.0	412.40	1.71	14.5	58.5	980.3
7411	184	05/27/2004	36	36		3.3	0.0	490.60	2.23	15.1	59.4	1102.9
7411	184	07/29/2004				3.4	0.0	387.00	2.55	14.8	55.8	870.4
7411	184	08/31/2004				3.3	0.0	384.20	2.64	12.5	47.6	1141.8
7411	184	10/27/2004				3.4	0.0	421.20	1.87	15.1	59.5	1029.5
7411	184	12/08/2004				3.5	0.0	272.80	1.63	10.1	39.2	613.0
7411	184	02/15/2005				3.6	0.0	326.00	1.01	10.9	39.8	669.1
7411	184	03/31/2005				3.4	0.0	399.00	1.14	13.7	50.4	1115.5
7411	184	05/04/2005				3.4	0.0	420.60	1.55	14.7	55.3	1103.1
7411	184	03/08/2006				3.4	0.0	385.80	1.24	13.1	46.6	937.5
7401	184	06/15/2006				3.3	0.0	374.60	2.13	13.2	50	973.5
7401	184	08/15/2006				3.4	0.0	351.80	1.93	14.1	48.9	924.1
7401	184	10/11/2006				3.3	0.0	412.80	5.57	14.1	60.1	914.8
7401	184	12/18/2006				3.3	0.0	409.00	.843	10.5	39.7	984.1
7401	184	03/14/2007				4.1	4.0	102.40	.362	3.31	12.4	268.7
7401	184	05/09/2007				3.4	0.0	417.20	1.34	15.7	60.4	1040.4
7401	184	10/09/2007				3.7	0.0	427.00	1.84	17.4	57.2	1089.4
7401	184	06/11/2008				3.4	0.0	403.40	2.406	15.873	62.983	914.4
7401	184	09/10/2008				3.4	0.0	461.80	1.61	16.705	66.986	1201.8

10/21/2008

Module 8.1A By Project

Project ID: PA1174

Monitoring Point: HNFLUSH/WET

Coll ID	Seq	Date Collected	Initial Flow	Final Flow	Determ Method	pH units	ALK MG/L	HOT A MG/L	FE MG/L	MN MG/L	AL MG/L	SO4 MG/L	TSS MG/L
7486	427	01/06/2003	4	4	Meas	6.4	9.8	11.60	1.99	.516	3.86	26.6	20
7411	189	04/15/2003	2	2	Meas	4.2	0.0	248.80	.429	13.8	35.6	798.9	<2
7411	189	05/29/2003	7	7		4.2	0.0	242.80	.835	17.3	31	809.1	14
7411	189	07/01/2003				4.2	6.4	217.80	1.46	17.2	25.5	795.1	20
7411	189	08/06/2003	7.5	7.5		4.2	6.0	228.20	1.34	16.4	31.2	669.1	62
7411	189	10/07/2003	6	6	Meas	4.1	5.0	252.60	.797	17.3	33.8	800.7	8
7411	189	11/06/2003	6	6	Meas	4.1	6.4	270.60	1.05	16.8	33.7	837.9	6
7411	189	12/16/2003				3.4	0.0	259.00	.997	15.9	33.8	719.2	6
7411	189	03/11/2004				4.3	8.8	208.00	5.46	15.3	33.8	658.3	328
7411	189	04/15/2004				4.4	9.4	190.60	1.26	15.8	29.6	820.7	28
7411	189	05/27/2004	10	10		4.2	7.4	207.80	1.04	12.8	26.6	640.8	12
7411	189	07/29/2004	8	8	Meas	4.1	6.2	238.20	1.83	16	31.7	772.0	28.0
7411	189	10/27/2004	6	6	Meas	4.1	8.0	238.60	2.02	16.6	35.7	944.9	12.0
7411	189	12/08/2004	12	12	Meas	4.3	11.0	183.60	5.43	13.2	31.3	634.2	48.0
7411	189	02/15/2005				4.5	9.2	102.00	.817	7.09	12.4	289.1	4.0
7411	189	03/31/2005	2	2	Est	4.2	7.6	213.20	.687	12.9	27.2	957.0	4.0
7411	189	05/04/2005	4	4	Meas	4.2	7.4	218.40	1.32	15.6	34.3	877.2	18.0
7411	189	03/08/2006				4.6	13.0	143.40	1.47	14.6	22.9	781.4	40.0
7401	189	06/15/2006				4.5	9.6	233.80	<.3	14.6	32.1	767.0	24.0
7401	189	08/15/2006				4.7	10.4	117.20	5.44	14.1	26.1	796.9	52.0
7401	189	10/11/2006				4.5	9.0	129.20	.431	11.9	20.1	730.5	<3
7401	189	12/18/2006				4.5	10.0	166.80	.745	6.75	14.7	546.3	24.0
7401	189	03/14/2007				4.6	11.2	64.20	.554	6.36	11.6	463.6	24.0
7401	189	05/09/2007				4.4	8.2	152.80	.356	12.7	21.3	792.8	4.0
7401	189	06/11/2008				3.8	0.0	225.40	6.764	15.841	34.995	743.3	122

Project ID: PA1174

Monitoring Point: HNPONDOUT

Coll ID	Seq	Date Collected	Initial Flow	Final Flow	Determ Method	pH units	ALK MG/L	HOT A MG/L	FE MG/L	MN MG/L	AL MG/L	SO4 MG/L	TSS MG/L	NA MG/L
7486	426	01/06/2003	45	45	Meas	6.7	46.4	0.00	2.09	3.82	4.43	400.3	56	
7411	191	04/15/2003	20	20	Meas	6.8	31.0	0.00	.553	10.9	.741	833.6	24	
7411	191	08/06/2003	4	4		7.0	50.0	0.00	.481	6.22	.369	577.9	14	
7411	191	10/07/2003				4.8	8.2	47.20	.233	7.818	4.383	750.4	18	
7411	191	11/06/2003	10	10	Meas	4.6	9.0	85.00	.143	9.75	7.9	722.6	18	
7411	191	12/16/2003	20	20		5.2	9.8	30.80	.204	7.77	2.03	645.7	16	
7411	191	03/11/2004				6.6	36.6	-0.20	.091	8.6	.948	542.3	6	
7411	191	04/15/2004				4.8	9.6	86.20	.757	14.4	6.82	890.9	16	
7411	191	05/27/2004	40	40		6.9	25.6	37.60	.404	11.1	.911	755.4	58	
7411	191	07/29/2004	3	3	Meas	5.3	10.2	35.40	<.3	11	1.48	760.1	6.0	
7411	191	08/31/2004	70	70	Meas	5.8	11.2	19.60	.475	7.23	.589	625.5	10.0	
7411	191	10/27/2004				4.6	11.2	87.00	<.3	14.3	6.89	899.7	6.0	
7411	191	12/08/2004	24	24	Meas	4.7	10.2	66.40	.356	10.6	5.85	668.0	<3	
7411	191	02/15/2005				4.5	10.0	132.60	<.3	8.38	16.1	529.3	10.0	
7411	191	03/31/2005	24	24	Meas	4.5	8.6	79.60	<.3	6.96	7.59	573.2	4.0	
7411	191	05/04/2005	12	12	Meas	4.6	9.6	81.20	<.3	13	8.5	882.5	<3	
7411	191	03/08/2006				4.8	9.2	57.20	<.3	10.14	5.863	641.7	<3	
7401	191	06/15/2006				4.8	9.2	55.80	<.3	8.88	5.79	788.8	<3	
7401	191	08/15/2006				5.3	8.6	9.20	<.3	7.6	1.04	660.8	<3	
7401	191	10/11/2006				6.6	14.8	-1.20	<.3	7.32	<.5	607.7	<3	
7401	191	12/18/2006				5.0	9.2	55.40	<.3	7.02	2.27	792.3	<3	
7401	191	03/14/2007				4.7	10.2	34.80	<.3	4.74	6.14	402.8	8.0	
7401	191	05/09/2007				4.4	8.2	135.40	<.3	10.6	15.1	811.4	4.0	
7401	191	08/08/2007				4.6	8.6	99.20	<.3	13.5	9.5	989.9	4.0	
7401	191	10/09/2007				4.4	7.8	126.80	.823	12.6	14	968.1	8.0	
7401	189	12/12/2007												
7401	191	06/11/2008				4.3	7.0	112.40	.468	13.664	18.118	853.8	12	
7401	191	09/10/2008				4.2	7.0	150.20	.484	15.611	22.67	928.8	30	

10/21/2008

Module 8.1A By Project

Project ID: PA1174

Monitoring Point: HNSED1/SAP2

Coll ID	Seq	Date Collected	Initial Flow	Final Flow	Determ Method	pH units	ALK MG/L	HOT A MG/L	FE MG/L	MN MG/L	AL MG/L	SO4 MG/L	T M
7486	422	01/06/2003				7.1	59.6	0.00	.802	2.92	1.71	316.0	10
7411	186	04/15/2003				5.1	5.8	83.00	.315	17	5.38	1068.8	12
4341	001	04/23/2003				7.0	108.2	0.00	1.236	14.4	1.708	1073.5	34
7411	186	05/29/2003				7.0	93.2	0.00	.938	16.4	.606	973.0	14
7411	186	07/01/2003				7.4	148.8	0.00	1.07	15.8	.302	1013.9	10
7411	186	08/06/2003				6.5	81.8	0.00	.509	16.1	.972	945.4	10
7411	186	10/07/2003				6.2	34.0	6.80	.262	13.6	.933	922.7	<2
7411	186	11/06/2003				6.3	48.6	0.20	.642	12.5	1.39	911.5	16
7411	186	12/16/2003				4.5	11.0	118.40	.367	13.5	19	817.1	32
7411	186	03/11/2004				4.2	8.8	304.00	.654	16.5	50.5	1045.0	<2
7411	186	04/15/2004				4.2	9.0	332.20	.541	15.1	48.6	1003.7	32
7411	186	05/27/2004				4.3	10.2	211.20	.988	12.8	28	908.8	8
7411	186	07/29/2004				4.5	12.6	199.20	15.2	14.8	19.4	870.6	944
7411	186	08/31/2004				4.4	9.2	139.40	.334	8.79	14.7	760.0	16.
7411	186	10/27/2004				4.2	10.4	244.00	.433	14.2	36.6	958.2	56.
7411	186	12/08/2004				4.4	11.6	153.80	.365	10.7	23.7	677.7	<3
7411	186	02/15/2005				4.3	10.2	223.80	.492	9.59	28.7	620.9	6.0
7411	186	03/31/2005				4.2	9.2	265.00	.39	12.2	40.5	1056.1	<3
7411	186	05/04/2005				4.2	9.0	248.00	.442	14.5	35.5	999.2	4.0
7411	186	03/08/2006				4.4	10.0	263.40	.483	13.6	39.6	830.6	6.0
7401	186	06/15/2006				4.5	8.4	101.40	.504	11.9	12.8	883.0	8.0
7401	186	08/15/2006				4.3	7.2	189.20	.501	12.8	27.9	866.6	24.
7401	186	10/11/2006				4.3	7.8	244.40	<.3	12.2	39.7	821.9	16.
7401	186	12/18/2006				4.3	9.2	316.40	.3	9.7	34.5	933.7	6.0
7401	186	03/14/2007				4.4	12.4	156.80	.321	7.97	24.3	650.2	<3
7401	186	05/09/2007				4.2	9.0	298.80	.389	13.7	39.9	985.3	4.0
7401	186	08/08/2007				4.1	5.4	223.60	.861	14.9	29.3	1143.6	<3
7401	186	10/09/2007				4.1	4.8	181.80	.444	14.1	20.3	1026.3	8.0
7401	186	12/12/2007				4.7	8.6	38.00	.779	2.32	7.15	155.9	26.
7401	186	06/11/2008				4.1	5.4	271.80	.891	15.204	45.994	909.3	12
7401	186	09/10/2008				4.1	4.6	211.00	.922	15.041	34.372	971.2	24

10/21/2008

Module 8.1A By Project

Project ID: PA1174

Monitoring Point: HNSAP2/SED2

Coll ID	Seq	Date Collected	Initial Flow	Final Flow	Determ Method	pH units	ALK MG/L	HOT A MG/L	FE MG/L	MN MG/L	AL MG/L	SO4 MG/L	TSS MG/L
7486	423	01/06/2003	18	18	Meas	7.2	107.6	0.00	1.42	3.06	.981	505.7	20
7411	187	04/15/2003	20	20	Meas	7.0	80.0	0.00	1.23	14.5	<.2	1004.3	30
7411	187	08/06/2003	30	30		6.9	120.0	0.00	.145	8.15	<.2	745.2	10
7411	187	10/07/2003				6.6	75.0	0.00	.09	6.35	<.2	843.2	4
7411	187	11/06/2003	5.5	5.5	Meas	7.1	122.0	0.00	.141	6.67	<.2	820.2	<2
7411	187	12/16/2003	15	15		6.6	74.6	0.00	.999	13.1	<.2	811.5	12
7411	187	03/11/2004				6.5	72.6	-26.80	1.45	13.3	3.4	815.0	14
7411	187	04/15/2004				4.5	10.6	131.80	.847	15	21.3	1067.1	138
7411	187	05/27/2004	25	25		6.9	98.0	-58.40	2.56	10.1	.512	787.7	4
7411	187	07/29/2004	8	8	Meas	6.8	91.0	-58.80	6	15	.61	1061.0	28.0
7411	187	08/31/2004				6.9	80.0	-50.00	1.34	8.47	<.5	707.5	4.0
7411	187	10/27/2004				6.4	79.8	-21.40	<.3	14.2	.91	1093.5	104
7411	187	12/08/2004				6.6	52.0	-8.20	<.3	9.36	4.13	661.7	18.0
7411	187	02/15/2005				4.4	11.0	171.40	<.3	11.5	23.6	737.2	10.0
7411	187	03/31/2005				4.5	9.6	116.80	.406	5.91	15.2	544.9	42.0
7411	187	05/04/2005				6.4	74.4	-25.80	.644	13.8	7.24	966.7	26.0
7411	187	03/08/2006				7.0	80.4	-40.60	<.3	8.71	<.5	726.0	6.0
7401	187	06/15/2006				8.0	96.4	-72.40	.411	2.66	<.5	828.9	14.0
7401	187	08/15/2006				6.6	108.0	-90.60	2.82	11.4	<.5	763.7	6.0
7401	187	10/11/2006				7.1	105.8	-84.00	.964	10.2	1.54	693.5	<3
7401	187	12/18/2006				5.7	22.2	36.20	<.3	5.79	<.5	629.4	34.0
7401	187	03/14/2007				4.7	12.2	62.00	<.3	6.88	13.9	511.5	10.0
7401	187	05/09/2007				5.0	12.2	72.20	<.3	10.9	14.6	919.6	48.0
7401	187	08/08/2007				7.8	55.2	-31.60	<.3	5.38	<.5	1266.2	<3
7401	187	10/09/2007				4.2	5.8	206.40	.37	16.6	23.9	1059.1	<3
7401	187	06/11/2008				6.1	42.2	7.00	4.978	15.302	19.092	885.8	138
7401	187	09/10/2008				4.1	4.6	241.80	<.3	16.499	37.78	1020.8	8

10/21/2008

Module 8.1A By Project

Project ID: PA1174

Monitoring Point: HNSAP1/SED1

Coll ID	Seq	Date Collected	Initial Flow	Final Flow	Determ Method	pH units	ALK MG/L	HOT A MG/L	FE MG/L	MN MG/L	AL MG/L	SO4 MG/L	TSS MG/L
7486	421	01/06/2003				7.2	69.2	0.00	.464	2.98	.979	370.6	20
7411	185	04/15/2003				5.1	9.6	102.80	1.38	17.5	22.4	1105.5	92
7411	185	05/29/2003				6.5	130.2	0.00	2.3	17.1	68.4	1022.0	66
7411	185	07/01/2003				6.6	210.6	0.00	10.5	17.3	.444	1243.0	16
7411	185	08/06/2003				6.1	79.6	0.00	3.22	17.2	13.2	994.6	72
7411	185	10/07/2003				6.1	31.8	13.40	.544	14.1	3.184	944.9	34
7411	185	11/06/2003				6.3	48.4	2.60	.349	12	.665	960.3	2
7411	185	12/16/2003				4.5	11.8	118.20	.754	13.8	25.1	847.3	46
7411	185	03/11/2004				4.2	9.0	293.80	.656	15.9	48	1058.9	22
7411	185	04/15/2004				4.2	10.0	306.00	1.03	14.7	48.1	1002.6	96
7411	185	05/27/2004				4.3	10.6	237.60	3.12	12.8	31.5	826.5	256
7411	185	07/29/2004				4.6	10.4	94.40	1.08	14.6	9.98	781.1	12.0
7411	185	08/31/2004				4.4	9.4	137.40	.456	8.8	15.4	774.8	18.0
7411	185	10/27/2004				4.3	11.4	235.80	1.23	14.3	37.9	980.7	22.0
7411	185	12/08/2004				4.6	10.2	101.60	.419	6.48	13	447.5	10.0
7411	185	02/15/2005				6.2	23.0	22.80	2.44	.471	6.43	94.7	32.0
7411	185	03/31/2005				4.3	11.2	213.20	.506	10.9	27.7	1009.6	98.0
7411	185	05/04/2005				4.4	11.0	185.20	3.94	12.3	24.1	900.6	610.0
7411	185	03/08/2006				4.4	11.0	230.60	.544	9.39	26.4	735.8	18.0
7401	185	06/15/2006				4.6	9.6	118.00	1.06	11.7	16.2	873.3	22.0
7401	185	08/15/2006				4.3	7.8	189.00	3.11	13.6	35.3	857.3	8.0
7401	185	10/11/2006				4.4	9.4	273.60	.921	12.9	44	880.2	10.0
7401	185	12/18/2006				4.5	10.6	196.20	<.3	9.02	26.2	711.6	44.0
7401	185	03/14/2007				6.8	19.4	-3.80	.42	.176	1	28.7	16.0
7401	185	05/09/2007				3.4	0.0	413.80	1.39	14.6	55.5	1030.7	10.0
7401	185	08/08/2007				4.4	9.0	234.80	1.11	14.6	30.6	1008.8	26.0
7401	185	10/09/2007				4.2	6.2	184.20	.827	14.2	20.8	1040.4	36.0
7401	185	09/10/2008				3.5	0.0	413.20	1.343	15.916	60.483	1111.7	8

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Module 8.1A By Project

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Project ID: PA1174

Monitoring Point: HNWET/POND

Coll ID	Seq	Date Collected	Initial Flow	Final Flow	Determ Method	pH	pH units	ALK MG/L	HOT A MG/L	FE MG/L	MN MG/L	AL MG/L	SO4 MG/L	TSS MG/L
7486	425	01/06/2003				6.8		69.0	0.00	2.22	3.95	4.44	482.1	52
7411	190	04/15/2003				7.0		52.4	0.00	.741	12.8	.714	976.7	8
7411	190	05/29/2003				4.5		0.6	151.40	6.7	17.1	26.4	870.8	194
7411	190	07/01/2003				4.5		8.0	95.40	1.73	15.3	8.8	762.4	2
7411	190	08/06/2003				6.8		66.4	0.00	.504	7.94	2.15	699.8	26
7411	190	10/07/2003	3.5	3.5	Meas	4.4		8.4	107.60				830.1	30
7411	190	11/06/2003				4.6		9.6	97.20	.332	8.53	10	827.3	4
7411	190	12/16/2003	6	6		6.3		37.6	12.40	.426	11.7	4.01	802.1	28
7411	190	03/11/2004				6.4		36.4	10.60	.339	11.9	3.41	698.9	22
7411	190	04/15/2004				4.6		9.8	117.60	.579	15.8	14.8	1041.0	18
7411	190	05/27/2004				5.6		14.4	51.40	.51	10.8	5.12	741.6	34
7411	190	07/29/2004				5.2		10.6	46.80	.68	11	4.49	799.4	28.0
7411	190	08/31/2004				6.6		36.8	13.80	1.23	6.84	9.43	720.2	34.0
7411	190	10/27/2004				4.5		11.4	118.60	.48	16.2	12.6	899.3	68.0
7411	190	12/08/2004				5.5		13.4	34.40	<.3	10.4	4.64	669.1	34.0
7411	190	02/15/2005				4.5		10.2	156.80	<.3	10.3	19.9	597.6	6.0
7411	190	03/31/2005				4.5		9.2	104.40	<.3	9.75	10.4	866.4	4.0
7411	190	05/04/2005				4.8		10.2	48.80	<.3	14.2	4.9	963.0	<3
7411	190	03/08/2006				4.6		11.0	109.60	.514	11.68	16.73	730.4	18.0
7401	190	06/15/2006				4.7		11.6	199.40	2.73	14.2	31.7	892.2	218.0
7401	190	08/15/2006				5.0		9.6	37.20	<.3	7.8	7.1	692.4	26.0
7401	190	10/11/2006				6.1		17.2	7.00	<.3	7.33	5.73	687.0	22.0
7401	190	12/18/2006				5.5		12.0	40.80	<.3	6.46	3.9	822.3	12.0
7401	190	03/14/2007				4.6		11.2	71.60	<.3	6.97	12.7	598.1	18.0
7401	190	05/09/2007				4.6		9.0	90.00	<.3	10.8	9.3	893.0	4.0
7401	190	08/08/2007				4.6		8.6	104.20	<.3	13.5	10.2	1006.1	6.0
7401	190	10/09/2007				4.3		9.2	288.20	20.3	15.7	81.8	976.5	514.0
7401	190	09/10/2008				4.1		5.8	275.40	7.858	17.696	53.613	972.0	86

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Module 8.1A By Project

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Project ID: PA1174

Monitoring Point: HNSD2/WET

Coll ID	Seq	Date Collected	Initial Flow	Final Flow	Determ Method	pH	pH units	ALK MG/L	HOT A MG/L	FE MG/L	MN MG/L	AL MG/L	SO4 MG/L	TSS MG/L
7486	424	01/06/2003				7.2		100.2	0.00	1.61	3.28	1.55	489.4	32
7411	188	04/15/2003				7.2		64.8	0.00	.814	12.3	<.2	923.2	12
7411	188	08/06/2003				7.2		104.0	0.00	.227	7.09	<.2	668.2	14
7411	188	10/07/2003	6	6	Meas	6.7		54.8	0.00	.225	3.649	<.2	812.7	14
7411	188	11/06/2003				7.0		55.6	0.00	.115	2.92	<.2	827.1	6
7411	188	12/16/2003				7.0		78.6	0.00	.625	11.3	<.2	757.8	10
7411	188	03/11/2004				6.1		39.2	5.20	.438	12	3.95	764.2	24
7411	188	04/15/2004				4.6		10.2	110.20	.641	15.8	15.3	1055.3	28
7411	188	05/27/2004				7.0		72.0	-25.40	.673	10.7	.682	740.5	14
7411	188	07/29/2004				7.3		64.0	-32.40	.302	9.16	<.5	1068.4	6.0
7411	188	08/31/2004				7.3		65.6	-30.00	.617	6.96	<.5	733.6	4.0
7411	189	08/31/2004	9.5	9.5	Meas	4.3		8.4	200.20	8.05	12.2	28.2	771.2	50.0
7411	188	10/27/2004				6.4		36.8	10.80	<.3	13.8	.777	1093.5	24.0
7411	188	12/08/2004				6.7		47.6	-5.20	<.3	10.4	2.83	671.2	12.0
7411	188	02/15/2005				4.4		11.0	168.20	<.3	10.4	21.5	673.6	16.0
7411	188	03/31/2005				4.6		9.6	88.00	<.3	9.73	10.1	874.7	12.0
7411	188	05/04/2005				6.6		33.8	-1.20	<.3	13.6	3.52	981.6	22.0
7411	188	03/08/2006				7.0		77.0	-39.40	<.3	9.61	.68	728.9	16.0
7401	188	06/15/2006				7.6		100.2	-75.80	.616	2.66	<.5	874.8	16.0
7401	188	08/15/2006				6.8		91.0	-77.40	1.17	6.4	<.5	702.1	30.0
7401	188	10/11/2006				7.5		84.0	-65.60	.622	7.15	1.29	648.3	<3
7401	188	12/18/2006				6.5		48.0	-7.60	<.3	6.71	1.74	894.4	4.0
7401	188	03/14/2007				4.6		12.2	71.20	<.3	7.33	13.4	623.1	10.0
7401	188	05/09/2007				4.7		9.6	77.60	<.3	10.8	6.96	904.0	6.0
7401	188	08/08/2007				7.7		55.0	-27.20	<.3	6.41	1.61	1345.6	4.0
7401	188	10/09/2007				8.0		48.6	-29.20	<.3	.141	<.5	1185.1	8.0
7401	188	12/12/2007				6.9		57.0	-32.00	.673	8.09	1.88	485.0	12.0
7401	188	06/11/2008				4.8		9.8	36.60	1.596	14.915	8.656	865.6	54

BAMR Monitoring Point ID: HNPONDOUT (191)

Description: Final Pond discharge. Sampled from outlet of principal spillway pipe from Final Pond into Spillway.

NOTES: Small red italicized entries indicate lowest detectable limit. Sample analysis for this parameter was

SAMPLE		Flow	pH	Field Conductivity	Acidity		Alkalinity		Iron		
					Total	Net	Total	Net	Total	Ferrous	
					Lab "Hot"	Calculated	Lab	Calculated	Fe	Fe ⁺²	% Total
Date	Source	(gpm)	(lab)	(umhos/cm)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	%
01/06/2003	7486-426	45.0	6.7	-	0.000	0.000	46.400	46.400	2.090	0.160	0.0
04/15/2003	7411-191	20.0	6.8	-	0.000	0.000	31.000	31.000	0.553	0.190	0.3
05/29/2003	7411	No Flow - No Sample Taken			-	-	-	-	-	-	
07/01/2003	7411	No Flow - No Sample Taken			-	-	-	-	-	-	
08/06/2003	7411-191	4.0	7.0	-	0.000	0.000	50.000	50.000	0.481	0.110	0.2
09/09/2003	7411-191	-	6.6	-	0.000	0.000	22.400	22.400	0.086	0.080	0.9
10/07/2003	7411-191	3.5	4.8	-	47.200	39.000	8.200	0.000	0.233	0.070	0.3
11/06/2003	7411-191	10.0	4.6	-	85.000	76.000	9.000	0.000	0.143	0.110	0.7
02/15/2005	7411-191	-	4.5	-	132.600	122.600	10.000	0.000	0.300	0.150	0.9
03/31/2005	7411-191	24.0	4.5	-	79.600	71.000	8.600	0.000	0.300	0.130	0.4
03/08/2006	7411-191	-	4.8	-	57.200	57.200	9.200	0.000	0.300	0.130	0.4
06/15/2006	7401191	-	4.8	-	55.800	46.600	9.200	0.000	0.300	0.150	0.9
08/15/2006	7401191	-	5.3	-	9.200	0.600	8.600	0.000	0.300	0.110	0.3
10/11/2006	7401191	-	6.6	-	-1.200	0.000	14.800	16.000	0.300	0.020	0.0
12/18/2006	7401191	-	5.0	-	55.400	46.200	9.200	0.000	0.300	0.040	0.1
03/14/2007	7401191	-	4.7	-	34.800	24.600	10.200	0.000	0.300	0.080	0.2
05/09/2007	7401191	-	4.4	-	135.400	127.200	8.200	0.000	0.300	0.100	0.3
08/08/2007	7401191	-	4.6	-	99.200	90.600	8.600	0.000	0.300	0.000	0.0
10/09/2007	7401191	-	4.4	-	126.800	119.000	7.800	0.000	0.823	0.000	0.0
12/12/2007	7401191	-	5.7	-	10.200	0.000	10.400	0.200	0.300	0.120	0.4
06/11/2008	7401191	-	4.3	-	112.400	105.400	7.000	0.000	0.468	0.290	0.0
09/10/2008	7401191	-	4.2	-	150.200	143.200	7.000	0.000	0.484	0.220	0.4
		-		-		0.000		0.000			#DIV/0!
		-		-		0.000		0.000			#DIV/0!
	Always insert a row here for entering new sample data in order for statistics to calculate correctly.										
Number Of Sample Dates	Count	6.0	20.0	0.00	20.00	22.00	20.00	22.00	20.000	20.000	20.000
	Max	45.0	7.0	0.00	150.20	143.20	50.00	50.00	2.090	0.290	#DIV/0!
	Min	3.5	4.2	0.00	-1.20	0.00	7.00	0.00	0.086	0.000	#DIV/0!
22	Average	17.8	5.2	#DIV/0!	59.49	48.60	14.79	7.55	0.433	0.113	#DIV/0!

10/21/2008

Module 8.1A By Project

Project ID: PA1174

Monitoring Point: MARKELALD

ALD TO se
Influent

Coll ID	Seq	Date Collected	Initial Flow	Final Flow	Determ Method	pH units	ALK MG/L	HOT A MG/L	FE MG/L	MN MG/L	AL MG/L	SC MG/L
7486	416	01/06/2003				6.3	82.4	39.40	106	21.5	<.2	974.
7485	714	03/14/2003				6.4	119.4	24.00	114	20.3	<.2	916.
7411	181	03/19/2003				5.9	45.6	151.80	83.7	22.4	.942	926.
7411	181	04/15/2003				6.3	112.6	60.80	112	19.5	<.2	1188.
7411	181	05/29/2003				6.4	124.4	66.80	117	20.9	<.2	987.
7411	181	07/01/2003				6.1	59.0	95.00	118	20.2	<.2	1026.
7411	181	08/06/2003				6.4	157.0	64.60	114	20.1	<.2	1041.
4301	232	08/19/2003				6.3	159.8	64.00	110	18.8	<.2	972.
7411	181	10/07/2003				6.2	121.0	62.40	105	19.5	<.2	1011.
4301	266	10/08/2003				6.3	142.0	78.60	105	18.7	<.2	979.
7411	181	11/06/2003				6.2	119.4	69.00	110	19.3	<.2	1010.
7411	181	11/25/2003				6.5	158.0	0.00	96.5	17.8	<.2	1043.
7411	181	12/16/2003				6.5	158.0	0.00	110	19.1	<.2	982.
4301	297	03/10/2004				6.3	64.6	62.80	114	20	<.2	888.
7411	181	03/11/2004				6.3	131.8	62.60	116	19.3	<.2	958.
7411	181	04/15/2004				6.4	113.4	87.60	102	18.3	<.2	966.
7411	181	05/27/2004				6.4	169.8	92.40	95	17.1	<.2	942.
7411	181	07/29/2004				6.0	89.0	54.20	98.4	18.9	<.5	962.
4301	400	08/11/2004				6.4	155.2	58.40	90.4	16.1	<.5	932.
4301	403	08/13/2004				6.3	124.6	74.00	95.3	17.7	<.5	845.
7411	181	08/31/2004				6.1	99.4	65.00	90.9	16.3	<.5	1053.
7411	181	10/27/2004				6.4	158.6	65.20	90.3	16.6	<.5	988.
7411	181	12/08/2004				6.6	172.0	54.80	91.9	17	<.5	820.
7411	181	02/02/2005				6.5	133.6	68.40	88.9	15.9	<.5	999.
7411	181	03/31/2005				6.4	141.4	60.80	90.3	16.4	<.5	1062.
7411	181	05/04/2005				6.4	109.6	64.00	92.7	16.9	<.5	913.
7411	181	07/20/2005				6.2	102.8	56.20	90.9	16.6	<.5	>300
7411	181	09/01/2005				6.5	183.6	71.80	91.3	16.6	<.5	915.
7411	181	03/08/2006				6.5	156.6	-34.60	98.47	17.77	<.5	850.
7401	181	06/15/2006				6.0	66.6	44.20	87.1	15.7	<.5	965.
7401	181	08/15/2006				6.2	72.6	37.40	98.3	17.9	<.5	932.
7401	181	12/18/2006				6.6	186.0	90.60	71.1	12.8	<.5	896.
4301	054	03/27/2007				6.6	179.8	44.40	88.9	16.9	<.5	947.
7401	181	05/09/2007				6.5	141.2	74.60	88	15.2	<.5	884.

10/21/2008

Module 8.1A By Project

Project ID: PA1174

Monitoring Point: MARKELFINAL

Coll ID	Seq	Date Collected	Initial Flow	Final Flow	Determ Method	pH units	ALK MG/L	HOT A MG/L	FE MG/L	MN MG/L	AL MG/L	SO4 MG/L
7486	417	01/06/2003	238	238	Meas	6.2	50.0	115.20	87.1	20.6	<.2	827.8
7485	702	01/09/2003	185.3	185.3	Meas	6.2	55.8	90.20	85.9	19.8	<.2	912.1
7485	715	03/14/2003				6.3	71.4	72.20	73.6	18.5	<.2	943.0
7411	182	03/19/2003				6.4	146.8	41.80	115	20.5	<.2	1055.5
7411	182	04/15/2003				6.0	42.6	151.20	99.3	22.4	2.16	881.5
7411	182	05/29/2003	281	281	Meas	6.2	53.4	120.20	72	20	<.2	877.6
7411	182	07/01/2003				6.3	128.2	65.40	69.3	20.2	<.2	1030.4
4301	219	07/24/2003				6.2	89.8	107.40	69.1	18.4	<.2	880.3
4301	220	07/24/2003				6.2	87.6	112.20	67.6	18	<.2	900.6
7411	182	08/06/2003	154	154		6.2	90.8	82.20	74.1	19.3	<.2	955.1
4301	230	08/19/2003	172	172	Meas	6.1	74.2	88.60	67.7	19.7	<.2	959.3
7411	182	10/07/2003	206	206	Meas	6.0	52.8	99.60	71.2	19.7	<.2	952.3
4301	264	10/08/2003	165	165		6.2	66.2	95.40	65.9	18.7	<.2	971.7
7411	182	11/06/2003	84	84	Meas	6.2	87.4	88.80	77.5	17.9	<.2	969.0
4301	277	11/24/2003	164	164	Meas	6.4	79.2	88.20	74.8	18.1	<.2	835.7
7411	182	11/25/2003	154	154	Meas	6.4	70.6	70.60	70.5	17.1	<.2	943.0
7411	182	12/16/2003	171	171		6.4	109.4	64.60	78.6	18.2	<.2	875.5
4301	299	03/10/2004	164	164	Meas	6.3	71.4	64.60	75.5	18.4	<.2	855.7
7411	182	03/11/2004				6.3	76.6	60.20	72.5	18.3	<.2	894.6
7411	182	04/15/2004	188	188	Meas	6.3	59.6	90.60	66.1	16.9	<.2	863.3
7411	182	05/27/2004	206	206		6.3	101.4	91.40	59.7	15.5	<.2	867.2
7411	182	07/29/2004	171	171	Meas	6.0	68.0	49.20	70.6	17.9	<.5	874.6
4301	407	08/09/2004				6.4	122.0	53.40	65.3	17.7	<.5	1010.1
4301	401	08/11/2004				6.2	59.0	48.20	35.2	15.8	<.5	911.4
4301	405	08/13/2004				6.2	60.2	70.80	40.6	17.4	<.5	925.0
7411	182	08/31/2004	171	171	Meas	6.0	74.2	64.80	62.2	15.2	<.5	983.3
7411	182	10/27/2004				6.4	95.4	74.00	67.1	16.7	<.5	946.6
7411	182	12/08/2004	33	33	Meas	6.5	100.6	48.20	63	15.9	<.5	774.9
7411	182	02/02/2005	84	84	Est	6.5	115.8	80.20	71	15.5	<.5	831.6
7411	182	03/31/2005	94	94	Meas	6.4	83.4	12.20	57	15.2	<.5	1030.2
7411	182	05/04/2005	171	171	Meas	6.4	59.2	59.00	55.8	16.4	<.5	885.2
7411	182	07/20/2005	138	138	Meas	6.2	60.4	48.60	55.2	16.1	<.5	>300.0
7411	182	09/01/2005				6.4	117.0	62.60	62.5	15.7	<.5	874.2
7411	182	03/08/2006				6.4	74.6	59.00	59.1	17.96	<.5	868.6
7401	182	06/15/2006				6.1	49.0	46.00	56.2	15.3	<.5	956.0
7401	182	12/18/2006				6.6	103.4	81.60	51.1	12.1	<.5	872.8
4301	055	03/27/2007				6.5	96.8	38.40	67.1	16.9	<.5	920.5
7401	182	05/09/2007				6.5	64.2	65.00	50.2	15.8	<.5	877.8

APPENDIX H

Water Quality Data Summary

Markel ALD system

PA 1174

Clarion County

Clarion TWP

SIS Monitoring Point Alias ID: (181)

70951

Description: Discharge from ald into sed pond Sampled at 2 ft. rectangular weir.

MARKEL:MARKELALD					Acidity		Alkalinity		Iron		
Sample		Flow (gpm)	pH (lab)	Field	Total	Net	Total	Net	Total	Ferrous	
Date	Source			Conductivity (umhos/cm)	Lab "Hot" (mg/l)	Calculated (mg/l)	Lab (mg/l)	Calculated (mg/l)	Fe (mg/l)	Fe ⁺² (mg/l)	% Total (%)
12/20/2002	7411-042	-	6.4	-	28.00	0.00	133.60	105.60	114.000	98.490	0.8
1/6/2003	7486-416	-	6.3	-	39.40	0.00	82.40	43.00	106.000	104.000	0.9
1/9/2003	Sample Taken	-	-	-	-	-	-	-	-	-	-
3/14/2003	7485-714	-	6.4	1753.00	24.00	0.00	119.40	95.40	114.000	94.600	0.8
3/19/2003	7411-181	-	5.9	1546.00	151.80	106.20	45.60	0.00	83.700	-	-
4/15/2003	7411-181	-	6.3	1764.00	60.80	0.00	112.60	51.80	112.000	-	-
5/29/2003	7411-181	-	6.4	1721.00	66.80	0.00	124.40	57.60	117.000	-	-
7/1/2003	7411-181	-	6.1	-	95.00	36.00	59.00	0.00	118.000	67.000	0.5
7/24/2003		-	-	-	-	0.00	-	0.00	-	-	#DIV
2/2/2005	7411-181	-	6.5	-	68.40	0.00	133.60	65.20	88.900	110.220	1.0
3/31/2005	7411-181	-	6.4	-	60.80	0.00	141.40	80.60	90.300	109.320	1.0
5/4/2005	7411-181	-	6.4	-	64.00	0.00	109.60	45.60	92.700	101.080	1.0
7/20/2005	7411-181	-	6.2	-	56.20	0.00	102.80	46.60	90.900	99.400	1.0
9/1/2005	7411-181	-	6.5	-	71.80	0.00	183.60	111.80	91.300	101.080	1.0
3/8/2006	7411181	-	6.5	-	-34.60	0.00	156.60	191.20	98.470	106.280	1.0
6/15/2006	7401181	-	6.0	-	44.20	0.00	66.60	22.40	87.100	99.210	1.0
8/15/2006	7401181	-	6.2	-	37.40	0.00	72.60	35.20	98.300	97.560	0.9
12/18/2006	7401181	-	6.6	-	90.60	0.00	186.00	95.40	71.100	107.730	1.0
3/27/2007	4301054	-	6.6	-	44.40	0.00	179.80	135.40	88.900	0.000	0.0
5/9/2007	7401181	-	6.5	-	74.60	0.00	141.20	66.60	88.000	104.320	1.0
						0.00		0.00			#DIV
						0.00		0.00			#DIV

Always insert a row here for entering new sample data in order for statistics to calculate correctly.