COAL MINING AND RECLAMATION PERMIT
APPLICATION TO REVISE A PERMIT (ARP)

Issued To: AMERICAN ENERGY CORP
43521 Mayhugh Hill Rd.
Beallsville, OH 43716

Telephone: (740) 926-9152

ARP Type:
Coal Waste Disposal

Permit Number: D-1159
Application Number: R-1159-4

Effective: 04/24/2002
Expires: 01/25/2003

The issuance of this ARP means only that the application to conduct a coal mining operation meets the requirements of Chapter 1513 of the Revised Code, and as such DOES NOT RELIEVE the operator of any obligation to meet other federal, state or local requirements.

This ARP is issued in accordance with and subject to the provisions, conditions, and limitations of Chapter 1513 of the Revised Code and Chapters 1501:13-1, 1501:13-3 through 1501:13-14 of the Administrative Code.

The approved water monitoring plan for this ARP is:

Quality: S-23, 01-3C, 01-4C, 01-5C, 01-6C, 01-3B, 01-4B, 01-5B, 01-6B, 01-3A, 01-4A, 01-5A, D-8A

Quantity: S-23, 01-3C, 01-4C, 01-5C, 01-6C, 01-3B, 01-4B, 01-5B, 01-6B, 01-3A, 01-4A, 01-5A, D-8A

Note: Any previous condition(s) imposed on this permit, or subsequent adjacent areas, also apply to this ARP unless noted otherwise.

Signature: Michael C Sparks by RP **Date:** 04/24/2002
Chief, Mineral Resources Management

OPERATOR

F100 Rev: 07/01/2001

2/96

_____ New Submittal
__X__ Revised Submittal R-1159-4

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINES AND RECLAMATION

RECEIVED 23 2002

APPLICATION TO REVISE A COAL MINING PERMIT

Note: Refer to the Division's "General Guideline for Processing ARPs" and "Requirements for Specific Types of Common ARPs" for guidance on submitting and processing ARPs.

1. Applicant's Name American Energy Corporation

   Address 43521 Mayhugh Hill Road, Twp. Rd. 88

   City Beallsville State Ohio Zip 43716

   Telephone Number 740 - 926 - 9152

2. Permit Number D-1159

3. Section of mining and reclamation plan to be revised:

   Part 2, Page 13, Item C(1),
   Part 2, Page 14, Item E(1),
   Part 2, Page 15, Item F(1&2),
   Part 3, Page 19 Item A(7)(a) - Attachment 28

4. Describe in detail the proposed revision and submit any necessary drawings, plans, maps, etc.:

   THIS REVISION IS BEING SUBMITTED TO REVISE THE RESPONSE TO THE ABOVE REFERENCED ITEM TO "YES", AND SUBMIT THE NECESSARY INFORMATION TO COMPLY WITH ATTACHMENT 28 AND PARAGRAPH (H), 1501:13-4-05.

   SEE ATTACHED ADDENDA.

5. Describe in detail the reason for requesting the revision:

   THIS REVISION IS BEING SUBMITTED TO ALLOW FOR DISPOSAL OF COAL REFUSE WITHIN THE WASHINGTON #12 COAL MINING PIT.

6. Will this revision constitute a significant alternation from the mining and reclamation operation contemplated in the original permit? __X__ Yes, _____ No.
   (**Note:** refer to paragraph (E) (2) of 1501:13-04-06 of the Ohio Administrative Code to determine if a revision is deemed significant.)

   OPERATOR

   If "yes," complete the following items 7 through 9.

7. In the space below give the name and address of the newspaper in which the public notice is to be published.

   The Times Leader
   Legal Notice Department
   200 South 4th Street
   Martins Ferry, OH 43935

8. In the space below give the text of the public notice that is to be published. (Include the information required by paragraph (A)(1) of 1501:13-05-01 of the Ohio Administrative Code.)

   See Addendum to A.R.P., Item 8.

9. In the space below give the name and address of the public office where this application is to be filed for public viewing.

   Belmont County Courthouse
   Recorder's Office
   Main Street
   St.Clairsville, Ohio 43950

I, the undersigned, a responsible official of the applicant, do hereby verify the information contained in this revision request is true and correct to the best of my information and belief.

Robert D. Moore — 11-21-01
Print Name — Date

Signature — President
Title

Sworn before me and subscribed in my presence this 21st day of November, 2001

NOTARIAL SEAL STATE OF OHIO

BARBARA L. RUSH
NOTARY PUBLIC, STATE OF OHIO
MY COMMISSION EXPIRES 9-01-04

Barbara L. Rush
Notary Public

FOR DIVISION USE ONLY

This request is hereby APPROVED.

Michael L. Sponsler — 4-24-02
Chief, Division of Mines and Reclamation — Date

PROOF OF PUBLICATION

The State of Ohio
County of Belmont, ss:

FEB 20 2002

The undersigned, being sworn, says that he or she is an employee of Eastern Ohio Newspapers, Inc., A Corporation, publisher of the Times Leader a newspaper published in Martins Ferry, Belmont County, Ohio, each day of the week except Saturday and of general circulation in said city and county; that it is a newspaper meeting the requirements of sections 7.12 and 5721.01 Ohio Revised Code as amended effective September 24, 1957; that affiant has custody of the records and files of said newspaper; and that the advertisement of which the annexed is a true copy, was published in said newspaper on each of the days in the month and year stated, as follows:

Jan 21, 28, Feb 4, 11, 18 2002

Audrey Blanco

Subscribed by Affiant and sworn to before me, this 18th day of Feb., A.D. 2002.

Rebecca L Anderson
Notary Public

NOTARIAL SEAL STATE OF OHIO

REBECCA L. ANDERSON
Notary Public, State of Ohio
My Commission Expires Nov. 25, 2006

Public Notice

American Energy Corporation, 43521 Mayhugh Hill Road, Beallsville, Ohio 43716, has submitted an application to revise a coal mining permit #R-1159-4 to the Ohio Department of Natural Resources, Division of Mineral Resources Management. The permit area is located in Belmont County, Wayne Township, Sections 3 & 4, on the property of American Energy Corporation. The portion of the permit area to be affected by this revision encompasses 54.8 acres and is located on the Hunter 7 1/2 minute U.S.G.S. quadrangle map, approximately 3.4 miles north of the Village of Beallsville, Ohio. The application proposes to dispose of coal refuse within the Washington #12 coal mining pit.

The application is on file for public viewing at the Recorder's Office, Belmont County Courthouse, Main Street, St. Clairsville, Ohio 43950 and shall remain so for at least 30 days following the last date of publication of this notice. Written comments or requests for an informal conference may be filed with the Division of Mineral Resources Management, 1855 Fountain Square Court, Bldg. H-3, Columbus, Ohio 43224, within 30 days after the last date of publication of this notice.

TL - ADV. - 5 MON. - JAN. 21, 28, FEB. 4, 11, 18.

Printer's Fee $ 250.25

Notary's Fee $_____

The Times Leader
Martins Ferry, Ohio

Addendum to A.R.P., Item 8.
American Energy Corporation

Public Notice

American Energy Corporation, 43521 Mayhugh Hill Road, Beallsville, Ohio 43716, has submitted an application to revise a coal mining permit #R-1159-4 to the Ohio Department of Natural Resources, Division of Mineral Resources Management. The permit area is located in Belmont County, Wayne Township, Sections 3 & 4, on the property of American Energy Corporation. The portion of the permit area to be affected by this revision encompasses 54.8 acres and is located on the Hunter7 ½ minute U.S.G.S. quadrangle map, approximately 3.4 miles north of the Village of Beallsville, Ohio. The application proposes to dispose of coal refuse within the Washington #12 coal mining pit.

The application is on file for public viewing at the Recorder's Office, Belmont County Courthouse, Main Street, St.Clairsville, Ohio 43950 and shall remain so for at least 30 days following the last date of publication of this notice. Written comments or requests for an informal conference may be filed with the Division of Mineral Resources Management, 1855 Fountain Square Court, Bldg. H-3, Columbus, Ohio 43224, within thirty days after the last date of publication of this notice.

Post-it® Fax Note 7671	Date 4/4/03	# of pages ▷ 2
To John Puterbaugh	From Melanie Hanna	
Co./Dept.	Co. AEC	
Phone #	Phone #	
Fax # 740-432-7711	Fax #	

Re: D-1159-5

ADDENDUM TO A.R.P., D-1159

American Energy Corporation is pr[illegible] D-1159 as a coal refuse disposal site. See attached map and cross sections for location and detail. After coal removal is completed, a portion of the pit and coal bench areas will be left open for coal refuse disposal, which will be generated by American Energy Corp.'s Century Mine (D-0425) located near Alledonia, Ohio. The pit and coal bench areas will be open from the time of coal removal for a period not exceeding six (6) months. During this time, any water that collects in the pit will be promptly pumped to a sediment pond for treatment, if necessary. Due to the volume of waste generated from the D-0425 deep mine, the approved reclamation time table will be met.

A 1 foot to 30' foot thick layer of insitu claystone exists below the #12 coal seam. See Test Hole #1 from original permit D-1159 for 30 foot thick #12 underclay. The refuse will be disposed of in two foot lifts using rubbed tired vehicles and/or sheeps foot roller to meet compaction requirements of 90% of maximum dry density directly atop this insitu claystone material. In conjunction with the layering of coal refuse, a minimum of 2 feet of non-toxic compacted spoil material will be placed in layers against the final highwall, followed by 2 feet of low permeability compacted clay material, as the lifts are completed. Underdrains will be installed if springs, wet weather seeps or other areas producing water are encountered during mining. In these areas, 2 feet of shot rock will be placed against the highwall with the 2 foot clay compacted against the shot rock. (See details on cross section Sheet 2 of 2) The underdrains will be installed so as to direct drainage to naturally occurring swales and existing stream valleys. The pit floor will always slope toward ground surface to assure that water will not impound against the highwall. After the refuse lifts are completed, ***1.5*** feet of non-toxic, low permeability material will be placed over the refuse and an additional 2 feet of cover will be applied over the low permeability material prior to placing 6 inches of topsoil on the area. This will result in a minimum 4 foot of cover over the coal refuse area. Refuse will be encapsulated, including sides, where the #12 coal is mined or unmined. The placement of the cover material completely over the disposal site will minimize surface water, ground water, and oxygen contact with the coal refuse thereby eliminating the formation of acid or toxic leachate. This approach will result in a negligible impact on the environment.

The low permeability material will be identified in the field by a registered professional engineer. The low permeability material that will be used to cap the refuse will be stockpiled above the final highwall for placement after final grade for the top of the refuse is reached. sufficient low permeable material exists on the area to cap the refuse. The 1.5 foot cap for the 52.7 acre area will require 128,000 cubic yards of low permeability material. This material has an intermittent areal extent encompassing the entire refuse disposal area, contained in the variable clay strata lying directly above, 5 to 10 feet above, and 33 to 40 feet, respectively, above the #12 coal as indicated in drill logs for monitoring wells CG01-5A, CG01-3A, CG01-4A, and CG01-6B. The available cap material is listed below:

ADDENDUM TO A.R.P., ITEM 4., AMERICAN ENERGY CORPORATION

2.7 Ac. x 8' (average thickness) x 43,560 / 27 =		34,848 cubic yards
1.9 Ac. x 10' (average thickness) x 43,560 / 27 =		30,653 cubic yards
11.5 Ac. x 14.8' (average thickness) x 43,560 / 27 =		274,589 cubic yards
0.6 Ac. x 7' (average thickness) x 43,560 / 27 =		6,776 cubic yards
	Total	346,866 cubic yards

See Attachment 28 for physical and chemical analysis of the liner/cover material.

Since the proposed refuse disposal area will be reclaimed to approximate original contour, surface water drainage structures, other than those previously existing and proposed in D-1159 and Pond 008 series in permit D-0425, will not be necessary. Existing valleys and drainage ways will safely carry the discharge from the refuse disposal area to Ponds 001, 009, 010, and 008.

The coal refuse material will be hauled to the site by trucks and placement will begin south east of test hole #1, and will continue easterly. Disposal will then start on the east side of the proposed #12 mining pit and coal bench located west of Permit D-0425, and will continue in a west, southwest direction. The open pits and coal bench will have the capacity to store approximately 2,514,970 cubic yards of refuse which amounts to approximately 2,937,457 tons. Spoil and clay generated during mining will be stockpiled above the proposed final highwall and utilized for cover material on the pending D-0425-2 refuse disposal area. Excess overburden storage areas will be seeded and mulched to protect them from wind and water erosion. Overburden storage duration may not exceed six months due to the volume of waste generated from the D-0425 deep mine. See cross sections A-A' through G-G' for redistributed thicknesses of excess overburden.

As described above, the highwall will be lined before placement of refuse material. The placement of the refuse material will consist of layering the refuse in two foot lifts and compacting with rubber tired vehicles and/or sheepsfoot roller. These lifts will be repeated vertically until the final proposed grade (approximate original contour) has been achieved. The refuse will be covered with a 1.5 foot layer of non-toxic, low permeability material. Above the 1.5 foot low permeability material, a 2 foot thick cover material will be placed, followed by six (6) inches of moderately dry growth medium soil and topsoil. Topsoiling and seeding will be completed in the next appropriate planting season following placement of the cover material.

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/22 & 23/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-3A	0	4	Br. clay
	4	24	Br. shale firm @ 6' w/clay bds.
	24	32	Gr. & red clay shale
	32	39	Limestone
	39	48	Gr. clay shale
	48	67	Gr. silty shale/1'limestone @ 63
	67	76	Br. sandstone w/shale bds.
	76	82½	Med. gr. shale
	82½	87	Coal WASHINGTON (No. 12)
	87	93	Clay shale
	93	140	Gr. silty shale w/siltstone bds.
	140	147	Limestone
	147	154	Gr. silty shale
	154	163	Gr. sandstone
	163	178	Gr. silty shale w/limestone bds
	178	188	Dr. gr. silty shale
	188	191½	Coal WAYNESBURG (No. 11)
	191½	199	Dr. clay shale
	199	207	Limestone
	207	223	Gr. silty shale
	223	233	Gr. sandstone
	233	239	Red gr. shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-3A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | **Project: Hydrogeologic Investigation**

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/22 & 23/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-3A	239	253	Gr. silty shale w/limestone bds
	253	263	Limestone w/shale bds.
	263	276	Gr. silty shale w/limestone bds.
	276	280	Dr. gr. shale
	280	281	Limestone

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-3A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001

Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/22/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-3B	0	4	Br. clay
	4	24	Br. shale firm @ 6' w/clay bds.
	24	32	Gr. & red clay shale
	32	39	Limestone
	39	48	Gr. clay shale
	48	67	Gr. silty shale w/1' limestone
	67	76	Br. sandstone w/shale bds.
	76	82½	Med. gr. shale
	82½	86½	Coal WASHINGTON (No. 12)
	86½	88	Clay shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-3B
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001

Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/26/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
GC-01-3C	0	4	Br. clay
	4	6	Br. shale
	6	7	Br. sandstone
	7	21	Br. shale w/clay bands
	21	25	Gr. shale clay

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-3C
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/27,28,29/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-4A	0	1	Topsoil
	1	13	Br. clay
	13	20	Br. gr. sandstone
	20	26	Gr. shale
	26	27	Limestone
	27	30	Gr. silty shale
	30	40	Clay shale
	40	45	Gr. silty shale w/limestone bds.
	45	50	Trace of coal - clay
	50	52	Dr. shale
	52	56	Coal WASHINGTON (No. 12)
	56	61	Clay
	61	76	Clay shale
	76	79	Limestone
	79	87	Gr. shale
	87	95	Gr. sandstone to siltstone
	95	106	Gr. red silty shale to dr. gr.
	106	107	3" trace of coal @ 106' - clay
	107	108	Coal 12" WAYNESBURG "A"
	108	118	Gr. shale w/limestone bds.
	118	140	Gr. silty shale
	140	163	Gr. sandstone

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-4A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/27,28,29/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-4A	163	170	Gr. sandstone
	170	174	Gr. sandstone
	174	181	Gr. shale 6" coal @ 180½' (Waynesburg No. 11)
	181	182	Clay
	182	207	Limestone w/shale bds.
	207	233	Gr. silty shale w/limestone bds.
	233	242	Limestone w/shale bds.
	242	252	Shale w/limestone bds.
	252	256	Gr. sandstone
	256	259	Gr. shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-4A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/27/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-4B	0	1	Topsoil
	1	13	Br. clay
	13	20	Br. gr. sandstone
	20	26	Gr. shale/water @ 20'
	26	27	Limestone
	27	30	Gr. silty shale
	30	40	Clay shale
	40	45	Gr. silty shale w/limestone bds.
	45	50	Trace of coal - clay
	50	52	Dr. shale
	52	56	Coal WASHINGTON (No. 12)
	56	57	Clay

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-4B
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/27 & 29/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-4C	0	1	Topsoil
	1	13	Br. clay
	13	20	Br. gr. sandstone
	20	24	Gr. shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-4C
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

Diamond Drill Hole: CG-01-5A

Driller: Randy McKay, McKay & Gould Drilling, Inc.

Coordinates: N 695,518.10 E 2,412,309.91 (1927 State Plane)
Elevation: 1158.98 Feet MSL
Start: 12 March 2001
Finish: 20 March 2001
Engineer: W. J. Siplivy

Location: Ridge west of refuse area #2
Township: Wayne
Section: 3
County: Belmont
State: Ohio

Thickness	Depth	Description	Construction Use	Bottom Elevation	Acres	Volume (cubic yds.)
22.00	22.00	Non-coring, soil and weathered rock	General fill	1136.98		
1.70	23.70	Claystone, olive-gray, Fe-stained	Clay liner	1135.28		
3.30	27.00	Claystone, gray (1.7' lost)	Clay liner	1131.98		
1.30	28.30	Limestone, Middle Washington, tan-light gray	Riprap or road base	1130.68		
1.00	29.30	Shale, gray, calcareous	General fill	1129.68		
3.70	33.00	Limestone, Middle Washington, tan-light gray	Riprap or road base	1125.98		
3.10	36.10	Claystone, gray	Clay liner	1122.88		
0.50	36.60	Claystone, red	Clay liner	1122.38		
1.10	37.70	Claystone, greenish-gray	Clay liner	1121.28		
1.80	39.50	Claystone, greenish-gray w/limestone nods.	General fill	1119.48		
1.00	40.50	Shale, greenish-gray, sandy w/ls nods.	General fill	1118.48		
3.00	43.50	Sandstone, Lower Marietta, l. gray, calcareous	Riprap or road base	1115.48		
2.40	45.90	Shale, gray w/sandstone partings, x-bedded	General fill	1113.08		
4.60	50.50	Shale, gray	General fill	1108.48		
0.10	50.60	Limestone, tan-light gray	General fill	1108.38		
1.60	52.20	Claystone, gray w/occasional limestone nods.	General fill	1106.78		
2.70	54.90	Shale, gray w/sandstone partings, x-bedded	General fill	1104.08		
0.80	55.70	Shale, gray, silty	General fill	1103.28		
0.60	56.30	Claystone, gray	Clay liner	1102.68		
0.30	56.60	Claystone, gray & red	Clay liner	1102.38		
1.40	58.00	Claystone, gray	Clay liner	1100.98		
0.80	58.80	Shale, gray, silty	Clay liner	1100.18		
4.00	62.80	Claystone, gray w/occasional limestone nods.	General fill	1096.18		
5.90	68.70	Shale, gray w/sandstone partings	General fill	1090.28		
0.90	69.60	Shale, gray	General fill	1089.38		
5.90	75.50	Claystone, gray	Clay liner	1083.48		
0.55	76.05	Shale, black, carbonaceous w/pyrite	Dispose as refuse	1082.93		
3.70	**79.75**	**Washington (No. 12) Coalbed**	None	1079.23		
12.55	92.30	Claystone, gray (6.05' lost)	Clay liner	1066.68		
3.40	95.70	Claystone, gray w/abundant limestone nods.	General fill	1063.28		
3.80	99.50	Claystone, gray, silty	General fill	1059.48		
0.50	100.00	Shale, gray	General fill	1058.98		
5.40	105.40	Sandstone, Mannington, l. gray, calcareous	Riprap or road base	1053.58		
14.20	119.60	Claystone, gray, silty	General fill	1039.38		
3.95	123.55	Claystone, red	Clay liner	1035.43		
4.95	128.50	Claystone, gray (2.45')	Clay liner	1030.48		
0.75	129.25	Shale, black, carbonaceous	Dispose as refuse	1029.73		
0.25	**129.50**	**Coal**	None	1029.48		
1.65	131.15	Shale, dark gray	General fill	1027.83		
0.85	**132.00**	**WAYNESBURG "A" COALBED, w/shale**	None	1026.98		
0.50	132.50	Shale, black, carbonaceous	Dispose as refuse	1026.48		
7.20	139.70	Shale, gray	General fill	1019.28		
5.20	144.90	Claystone, gray w/limestone nodules	General fill	1014.08		
11.70	156.60	Shale, gray w/occasional limestone nodules	General fill	1002.38		
4.90	161.50	Claystone, gray w/limestone nodules	General fill	997.48		
2.75	164.25	Shale, gray	General fill	994.73		
7.35	171.60	Claystone, gray w/occasional limestone nods.	General fill	987.38		
0.45	172.05	Sandstone, Waynesburg, light gray	Riprap or road base	986.93		
5.45	177.50	Shale, gray w/abundant sandstone partings	General fill or road base	981.48		
1.60	179.10	Shale, dark gray w/sandstone partings	General fill or road base	979.88		
1.45	180.55	Shale, dark gray-black	Dispose as refuse	978.43		
0.10	180.65	Shale, black, carbonaceous	Dispose as refuse	978.33		
3.62	**184.27**	**WAYNESBURG (No. 11) COALBED**	None	974.71		
1.33	185.60	Claystone, gray	Clay liner	973.38		
7.55	193.15	Shale, gray	General fill	965.83		
0.10	**193.25**	**Coal, broken**	None	965.73		
0.30	193.55	Claystone, gray		965.43		

AEC 10256

Diamond Drill Hole: CG-01-5A (Continued)

Thickness	Depth	Description	
0.25	193.80	Limestone, tan-light gray	965.18
0.35	194.15	Claystone, gray	964.83
0.15	194.30	Shale, gray w/carbonaceous streaks	964.68
1.70	196.00	Shale, gray, calcareous	962.98
2.70	198.70	Limestone, tan, very hard	960.28
3.30	202.00	Shale, gray, calcareous	956.98
0.55	202.55	Limestone, tan, very hard	956.43
2.90	205.45	Claystone, gray w/limestone nodules	953.53
0.80	206.25	Limestone, tan, very hard	952.73
1.70	207.95	Claystone, greenish-gray w/limestone nodules	951.03
2.45	210.40	Limestone, Waynesburg, tan, nodular	948.58
6.60	217.00	Claystone, greenish-gray	941.98
1.65	218.65	Limestone, tan-light gray	940.33
1.00	219.65	Claystone, greenish-gray	939.33
0.15	219.80	Shale, gray w/carbonaceous streaks	939.18
0.25	220.05	Claystone, greenish-gray w/limestone nodules	938.93
0.85	220.90	Shale, gray w/carbonaceous streaks (Uniontown No. 10 coal horizon)	938.08
3.40	224.30	Claystone, greenish-gray	934.68
4.60	228.90	Shale, greenish-gray w/sandstone streaks	930.08
1.60	230.50	Shale, greenish-gray	928.48
0.70	231.20	Shale, gray, calcareous	927.78
1.25	232.45	Shale, olive-gray	926.53
0.90	233.35	Limestone, tan-light gray	925.63
2.85	236.20	Shale, gray, calcareous	922.78
1.15	237.35	Shale, greenish-gray	921.63
7.15	244.50	Shale, gray	914.48
0.65	245.15	Shale, greenish-gray	913.83
0.80	245.95	Limestone, tan-light gray	913.03
1.05	247.00	Claystone, gray	911.98
7.55	254.55	Shale, gray, calcareous, Fe-stained upper 4'	904.43
2.65	257.20	Limestone, Arnoldsburg, tan-light gray	901.78
1.70	258.90	Claystone, greenish-gray	900.08
2.50	261.40	Shale, gray, calcareous	897.58
1.60	263.00	Claystone, greenish-gray w/occasional limestone nods.	895.98
5.00	268.00	Sandstone, Morningview, light gray, Fe-stained	890.98
4.45	272.45	Shale, gray	886.53
2.40	274.85	Shale, gray, calcareous	884.13
2.60	277.45	Limestone, Benwood, tan-light gray	881.53
0.60	278.05	Shale, gray	880.93
2.25	280.30	Limestone, Benwood, tan-light gray, shaly	878.68
2.70	283.00	Claystone, green	875.98

End of Log

Respectfully submitted,

William J. Siplivy

William J. Siplivy, P.E., C.P.G.

AMERICAN INSTITUTE OF PROFESSIONAL GEOLOGISTS
CERTIFICATE NUMBER
4599
AIPG
WILLIAM J. SIPLIVY
CERTIFIED PROFESSIONAL GEOLOGIST

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County Belmont Date 3/12,13,14,15,16,19,20/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-5A	0	2	Br. clay
	2	7	Br. sandstone w/mud seams
	7	22	Gr. br. shale w/mud seams
	22	27	Core - Retrieved 3'3" of 5'
	27	42	Core - Retrieved 14'5" of 15'
	22	27	Gr. clay shale/22-24' water
	27	38	Gr. dr. gr. & 1' red @ 36' of
			clay shale
	38	40	Siltstone w/limestone
	40	42	Gr. siltstone
	42	58½	Core - Retrieved 16'4"
	58½	65	Core - Retrieved 6'8"
	65	86	Core - Retrieved 13'
	42	51	Gr. silty shale w/sandstone bds.
	51	52	Clay shale
	52	56	Silty shale
	56	57	Clay shale
	57	59	Silty shale
	59	66	Clay shale w/silty bds.

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-5A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/12,13,14,15,16,19,20/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-5A	66	69	Silty shale
	69	75	Dr. silty shale w/clay bds.
	75	79	Coal WASHINGTON (No. 12)
	79	86	Lost
	86	99½	Core
	86	92	Dr. gr. silty shale
	92	96	Gr. shale w/imbedded limestone
	96	99½	Gr. silty shale
	99½	109	Core
	109	126	Core
	126	142	Core
	142	159½	Core
	99½	108	Gr. siltstone
	108	110	Clay shale
	110	121	Gr. silty shale
	121	126	Red gr. clay shale - lost 2'
	126	131	Gr. & dr. gr. silty shale
	131	132	Coal 9" WAYNESBURG "A"
	132	142	Clay shale
	142	159½	Clay shale w/limestone bds.

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-5A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/12,13,14,15,16,19,20/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-5A	159½	163	Gr. silty shale
	163	168¼	Clay shale - lost 1'
	168¼	171	Clay shale
	171	178	Gr. silty shale
	178	180½	Dr. gr. silty shale
	180½	184	Coal 42" Waynesburg (No. 11)
	184	185½	Clay shale
	185½	188	Dr. gr. shale
	188	189	Dr. gr. shale drilled 6"
	189	193½	Dr. gr. shale w/trace of coal
	193½	208½	Limestone
	208½	218½	Limestone
	218½	229¼	Green gr. silty shale
	229¼	247	Core
	247	263	Core
	263	283	Core
	229¼	232½	Gr. silty shale
	232½	236½	Limestone
	236½	245	Gr. silty shale
	245	246	Limestone
	246	247	Clay shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-5A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/12,13,14,15,16,19,20/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-5A	247	250	Gr. silty shale
	250	257	Limestone
	257	263	Gr. silty shale
	263	268	Gr. sandy limestone
	268	271	Dr. gr. silty shale
	271	280	Limestone
	280	283	Gr. silty shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-5A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/20/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-5B	0	1	Br. clay
	1	7	Br. sandstone
	7	27	Gr. br. shale clay
	27	33	Limestone
	33	38	Dr. gr. shale
	38	40	Gr. silty shale
	40	44	Gr. silty limestone
	44	58	Gr. silty shale
	58	64	Gr. silty shale w/limestone bds.
	64	77½	Br. gr. shale
	77½	81	Coal WASHINGTON (No. 12)
	81	82	Clay shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-5B
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/20/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-5C	0	3	Br. clay
	3	8	Br. sandstone
	8	12	Br. clay
	12	24	Red & br. shale
	24	25	Gr. clay shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-5C
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/30/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-6B	0	8	Br. silty shale
	8	19	Br. shale w/clay bands
	19	23	Gr. clay shale
	23	30	Limestone w/shale bands
	30	42	Gr. shale
	42	44	Gr. sandstone
	44	57	Gr. silty shale w/clay bds.
	57	64	Gr. fine sandstone
	64	72	Gr. clay shale
	72	74	Dr. shale
	74	78	Coal WASHINGTON (No. 12)
	78	79	Clay

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-6B
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/30/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-6C	0	8	Br. silty shale
	8	19	Br. shale w/clay bands
	19	23	Gr. clay shale
	23	30	Limestone w/shale bands
	30	42	Gr. shale
	42	44	Gr. sandstone

	AMERICAN ENERGY CORPORATION CENTURY MINE
William J. Siplivy, PE., Inc. 50 Munroe Falls Avenue Munroe Falls, Ohio 44262	***ROCK CORE LOG*** ***CG-01-6C*** ***COARSE COAL REFUSE FACILITY***
Checked by: WJS Date: 12 April 2001	Project: Hydrogeologic Investigation

ADDENDUM TO ATTACHMENT 14B, A.R.P., PERMIT ~~D-0425~~ D-1159
AMERICAN ENERGY CORPORATION

The first continuous zone of saturation underlying the proposed refuse disposal area occurs in Zone C. Zone C is approximately ninety (90) feet in vertical distance, at its closest point, below the bottom of the proposed refuse disposal area. Zone C has a vertical extent of approximately *132* feet max., and a lateral extent equal to the extent of the 'Cassville' Shale, with the Waynesburg #11 Coal seam as a bedding plane.

Temporal fluctuations are entirely dependent upon rainfall as the recharge of groundwater is confined to the immediate ridgetop areas. Groundwater flow directions will not be affected by the proposed refuse disposal operation. Due to the existing rock structure and topography, recharge of groundwater is confined to the immediate ridgetop areas. Discharge areas within the boundaries of the refuse disposal area can be seen in spring discharge elevations between 1143 and 1140 (Zone A), spring discharge and well static water level between the elevations of 1097 and 1060 (Zone B), and spring discharge and well static water level between the elevations of 1009 and 950 (Zone C).

Zone A discharge ranges from a high of 1.5 gpm during "high flow" conditions to less than 1 gpm during "low flow" conditions.

Zone B discharge ranges from a high of 9.1 gpm during "high flow" conditions to 0 gpm during "low flow" conditions. Fluctuations in water levels in Zone B are illustrated by well DW-7A. The static water level in this well has ranged from a high of 6 feet (elevation 1076) to a low of 9 feet (elevation 1073).

Zone C discharge, based on flows from undeveloped springs, does not exceed <1 gpm. Static water levels at W-7 have ranged from a high of 22 feet (elevation 1040) to a low of 64 feet (elevation 998).

Zones A and B will be isolated from the refuse by 2 feet of non-toxic material will be placed against the open highwall, followed by 2 feet of compacted low permeability material. In areas where water seepage occurs from the highwall, shot rock will be placed against the highwall, followed by the 2 feet of compacted clay material. A 6" drain pipe will be installed approximately 2 feet below the pit floor to direct all drainage from the highwall area. See cross sections A-A' through G-G' and details. Zone C will be isolated by its 90 feet in vertical distance between it and the bottom of the refuse area. Zone D (identified in the original permit) is 238 feet below the proposed refuse disposal area. Zones C and D will not be affected by the proposed refuse disposal.

The uppermost aquifer system, and all zones of saturation above the uppermost aquifer system were determined by existing undeveloped spring elevations, and static water levels in existing wells utilizing a Fisher M-Scope static water level meter. The Generalized Section of Ohio, Division of Geological Survey, Table 1, as well as site specific information noted above, were utilized to define vertical extent of the separate zones of saturation.

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 14B
(WELL/SPRING INVENTORY)

Applicant's Name AMERICAN ENERGY CORPORATION (R-1159-4)

Aquifer/Zone Identification	Aquifer/Zone Lithology	Aquifer/Zone Thickness Well/Spring	Aquifer/Zone Elev. (msl)	Aquifer/Zone Horizontal Extent	Aquifer/Zone Known Uses	Approx. Rate of Discharge/Usage of Aquifer/Zone (gpm or cfs)
A	SANDSTONE, SHALE	117'	1239' TO 1122'	UPPER RIDGE OUTCROP TO OUTCROP	S-23, S-24	NONE, <1 TO 1.5 GPM
B	SANDSTONE, SHALE, #12 COAL	50'	1110 TO 1060	MID-RIDGE OUTCROP TO OUTCROP	DW-7A, DS-10, S-1, 2, 3, 5, 20, 25, 26, 27	DOMESTIC, AGRICULTURAL, NONE, 0 TO 9.1GPM
C	SHALE, #11 COAL	132'	1009 TO 877	LOWER-RIDGE OUTCROP TO OUTCROP	W-7	DOMESTIC

9/88

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 14A
(HYDROLOGIC MEASUREMENTS AND ANALYSES)

APPLICANT AMERICAN ENERGY CORPORATION (REFUSE DISPOSAL)

1	Identification No. of Sampling Station from Hydrology Map	S-23	S-23	S-23			
2	Identification Number	01-07-503	01-10-722	02-02-849			
3	High (H)/Low (L) Intermediate (I) Designation (if applicable)	I	L	H			
4	Surface Elevation for Sampling Station (msl)	1125	1125	1125			
5	Depth of Well Below Land Surface (feet)	--	--	--			
6	Static Water Level of Well Below Land Surface (feet)	--	--	--			
7	Flow for Spring and Stream (gpm or cfs)	.34 GPM	.05 GPM	1.8 GPM			
8	Date Above Measurements Made	7-11-01	10-19-01	02-27-02			
9	Aquifer/Zone Identification For Well/Spring	A	A	A			
10	pH (Standard Units)	8.09	8.12	8.18			
11	Total Acidity (mg/l CaCO3)	6.20	13.40	3.20			
12	Total Alkalinity (mg/l CaCO3)	207.80	240.40	147.60			
13	Specific Conductivity (umhos/cm at 25° C)	667.00	756	485			
14	Total Dissolved Solids (mg/l)	---	---	---			
15	Total Manganese (mg/l)	<0.02	<0.02	0.04			
16	Total Sulfates (mg/l)	94.00	122.00	82.0			
17	Total Iron (mg/l)	0.04	0.33	1.20			
18	Total Suspended Solids (mg/l)	3	4	34.0			
19	Total Hardness (mg/l as CaCO3)	320.00	370.00	220.00			
20	Nitrates	---	---	---			
21	Date Sampled for Analysis	7-11-01	10-19-01	02-27-02			
22	Date Last Precipitation Event Occurred	7-8-01	10-16-01	02-27-02			

Laboratory Name INDUSTRIAL LAB ANALYSIS, INC.
Address 2240 WILLIAMSBURG DRIVE City GLEN DALE
State WEST VIRGINIA Zip 26038

NOTE: If information required by items 5, 6, and 9 is unobtainable, submit as an addendum to Attachment 14A a statement giving the reasons why the information is unobtainable.
NOTE: For each sample provide data for either item 13 or 14.

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 14A
(HYDROLOGIC MEASUREMENTS AND ANALYSES)

APPLICANT AMERICAN ENERGY CORPORATION (REFUSE DISPOSAL)

1	Identification No. of Sampling Station from Hydrology Map	D-8	D-8	D-8			
2	Identification Number	01-07-505	01-10-682	02-02-829			
3	High (H)/Low (L) Intermediate (I) Designation (if applicable)	I	L	H			
4	Surface Elevation for Sampling Station (msl)	925	925	925			
5	Depth of Well Below Land Surface (feet)	--	--	--			
6	Static Water Level of Well Below Land Surface (feet)	--	--	--			
7	Flow for Spring and Stream (gpm or cfs)	.01 CFS	.002 CFS	.02 CFS			
8	Date Above Measurements Made	7-7-01	10-19-01	2-27-02			
9	Aquifer/Zone Identification For Well/Spring	--	--	--			
10	pH (Standard Units)	7.93	7.70	8.10			
11	Total Acidity (mg/l CaCO3)	4.20	7.00	4.60			
12	Total Alkalinity (mg/l CaCO3)	102.00	67.80	102.00			
13	Specific Conductivity (umhos/cm at 25° C)	847.00	1192.00	959			
14	Total Dissolved Solids (mg/l)	---	---	---			
15	Total Manganese (mg/l)	0.07	0.22	0.32			
16	Total Sulfates (mg/l)	283.00	429.00	332.0			
17	Total Iron (mg/l)	0.10	0.53	0.33			
18	Total Suspended Solids (mg/l)	3	15	<2			
19	Total Hardness (mg/l as CaCO3)	326.00	300.00	360.0			
20	Nitrates	---	---	---			
21	Date Sampled for Analysis	7-7-01	10-19-01	02-27-02			
22	Date Last Precipitation Event Occurred	7-5-01	10-16-01	02-27-02			

Laboratory Name INDUSTRIAL LAB ANALYSIS, INC.
Address 2240 WILLIAMSBURG DRIVE City GLEN DALE
State WEST VIRGINIA Zip 26038

NOTE: If information required by items 5, 6, and 9 is unobtainable, submit as an addendum to Attachment 14A a statement giving the reasons why the information is unobtainable.
NOTE: For each sample provide data for either item 13 or 14.

ADDENDUM TO PART 2, ATTACHMENTS 14D
American Energy Corporation

SAMPLE SITE	STATE PLANE COORDINATES X	Y
D-8A	2,413,624	695,395

(304) 547-9094
FAX: (304) 547-6097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

01-May-01

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-01	Date & Time Sampled:	03-30-01 0825
Analysis Number:	104012	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.5	S.U.	03-30-01 0825	QES (DR)	150.1	[2]	
pH, Lab	7.45	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	960	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	1.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	470	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	320	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.11	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	100	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0012	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	0.11	mg/l.	04-05-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	<0.0010	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	190	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-01
Analysis Number: 104012

01-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	24	mg/l.	04-09-01 1300	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.05	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	250	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0060	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	<0.01	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	1500	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

27-Apr-01

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-02	Date & Time Sampled:	03-30-01 0800
Analysis Number:	104013	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.9	S.U.	03-30-01 0800	QES (DR)	150.1	[2]	
pH, Lab	7.99	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	550	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	<1.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	200	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	160	mg/l.	04-03-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.09	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	26	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0024	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	0.16	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0013	mg/l.	04-07-01 1630	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	96	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-02
Analysis Number: 104013

27-Apr-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	47	mg/l.	04-09-01 1300	WB	4500 ClB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.07	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	160	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0056	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	<0.01	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	900	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

01-May-01

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-3A	Date & Time Sampled:	03-30-01 0930
Analysis Number:	104014	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.9	S.U.	03-30-01 0930	QES (DR)	150.1	[2]	
pH, Lab	7.98	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	270	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	<1.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	57	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	210	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.12	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	14	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0031	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	0.19	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0019	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	80	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-3A
Analysis Number: 104014

01-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	1.6	mg/l.	04-09-01 1300	WB	4500 ClB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-26-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.04	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	53	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	<0.0001	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	<0.01	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	460	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

27-Apr-01

By: Andrew R Wade II
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-3B	Date & Time Sampled:	03-30-01 0940
Analysis Number:	104016	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.5	S.U.	03-30-01 0940	QES (DR)	150.1	[2]	
pH, Lab	7.96	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	340	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	4.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	57	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	250	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.07	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	19	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0038	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	0.30	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0017	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	110	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-3B
Analysis Number: 104015

27-Apr-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	1.5	mg/l.	04-09-01 1300	WB	4500 ClB	[1]	0.50 mg/l.
Total Chromium	0.03	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.10	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	51	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0070	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.01	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	610	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 6
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

01-May-01

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-3C	Date & Time Sampled:	03-30-01 0950
Analysis Number:	104016	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.4	S.U.	03-30-01 0950	QES (DR)	150.1	[2]	
pH, Lab	7.34	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	170	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	4.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	33	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	120	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total iron	0.19	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	6.8	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0012	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	0.10	mg/l	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	<0.001	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	67	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-3C
Analysis Number: 104016

01-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	<0.5	mg/l.	04-09-01 1300	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-18-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.04	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	9.7	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0046	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.02	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	280	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

[redacted]

LABORATORY ANALYSES
MAY 01 2001

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

02-May-01
Page 1 of 2

By: [signature]
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-4A	Date & Time Sampled:	03-30-01 1020
Analysis Number:	104017	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL.
pH, Field	9.9	S.U.	03-30-01 1020	QES (DR)	150.1	[2]	
pH, Lab	9.66	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	1400	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	120	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	220	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	300	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	23	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	7.1	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0022	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	22	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0019	mg/l.	04-07-01 1630	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-06-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	28	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

IRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

02-May-01

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-4A
Analysis Number: 104017

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	7.3	mg/l.	05-01-01 1400	WB	4500 ClB	[1]	0.50 mg/l.
Total Chromium	0.06	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.31	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	330	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0007	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.08	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	830	µmhos	04-05-01 1415	RW	120.1	[2]	1.5 µmhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

INV

MAY 3 1 2001
LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

02-May-01
Page 1 of 2

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-4B	Date & Time Sampled:	03-30-01 1030
Analysis Number:	104018	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	8.5	S.U.	03-30-01 1030	QES (DR)	150.1	[2]	
pH, Lab	8.52	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	600	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	22	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	240	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	160	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	1.9	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	4.9	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0044	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	4.6	mg/l.	04-06-01 1800	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0025	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	24	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-4B
Analysis Number: 104018

02-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	4.4	mg/l.	05-01-01 1400	WB	4500 ClB	[1]	0.50 mg/l.
Total Chromium	0.03	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.02	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	280	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0012	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.02	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	850	µmhos	04-05-01 1415	RW	120.1	[2]	1.5 µmhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.

P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD#2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

MAY 31 2001
LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

02-May-01
Page 1 of 2

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-4C	Date & Time Sampled:	03-30-01 1040
Analysis Number:	104019	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.7	S.U.	03-30-01 1040	QES (DR)	150.1	[2]	
pH, Lab	7.16	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	170	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	44	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	46	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	120	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	1.0	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	8.5	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0014	mg/l.	04-07-01 1300	AC	31148	[1]	0.001 mg/l.
Total Aluminum	1.2	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	<0.001	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	45	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
1) Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

IRA-LJET INC.
P.O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-4C
Analysis Number: 104019

02-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	1.5	mg/l.	05-01-01 1400	WB	4500 ClB	[1]	0.50 mg/l.
Total Chromium	0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.07	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	20	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0003	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.03	mg/l.	04-11-01 1500	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	270	µmhos	04-05-01 1415	RW	120.1	[2]	1.5 µmhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

27-Apr-01

By: Andrew B. Watson II
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-5A	Date & Time Sampled:	03-30-01 0800
Analysis Number:	104009	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	9.3	S.U.	03-30-01 0800	QES (DR)	150.1	[2]	
pH, Lab	8.85	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	1600	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	200	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	180	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	270	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	19	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	8.3	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0021	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	250	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0024	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	30	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

FROM : WISIPLIVY,PE INC. FAX NO. : 330-686-8911 Mar. 08 2002 10:18AM P9

(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-5A
Analysis Number: 104009

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	6.0	mg/l.	04-09-01 1300	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	0.11	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.24	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	390	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0001	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.10	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	610	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

FROM : WISIPLIUY,PE INC. FAX NO. : 330-686-8911 Mar. 08 2002 10:19AM P10

TRA-DET INC.
P.O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

27-Apr-01

By: [signature]
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-5B	Date & Time Sampled:	03-30-01 0805
Analysis Number:	104010	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.6	S.U.	03-30-01 0805	QES (DR)	150.1	[2]	
pH, Lab	7.73	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	770	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	<1.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	230	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	360	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.59	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	6.2	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0030	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	1.0	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0040	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	37	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

FROM : WISIPLIVY,PE INC FAX NO. : 330-686-8911 Mar. 08 2002 10:29AM P2

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-5B
Analysis Number: 104010

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	13	mg/l.	04-09-01 1300	WB	4500 ClB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.16	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	380	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0001	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.05	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	1200	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

FROM : WISIPLUY,PE INC. FAX NO. : 330-686-8911 Mar. 08 2002 10:30AM P3

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

27-Apr-01

By: Andrew R. Wade II
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-5C	Date & Time Sampled:	03-30-01 0815
Analysis Number:	104011	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.4	S.U.	03-30-01 0815	QES (DR)	150.1	[2]	
pH, Lab	7.28	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	120	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	<1.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	24	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	77	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	<0.05	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	8.8	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0017	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	<0.1	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0013	mg/l.	04-07-01 1630	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	39	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

FROM : WISIPLIUY,PE INC. FAX NO. : 330-686-8911 Mar. 08 2002 10:30AM P4

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-5C
Analysis Number: 104011

27-Apr-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	<0.5	mg/l.	04-09-01 1300	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	<0.02	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	720	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0010	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	<0.01	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	140	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

FROM : WISIPLIUY,PE INC. FAX NO. : 330-686-8911 Mar. 08 2002 10:31AM P5

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9809

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

15-May-01
Page 1 of 2

By: Andrew R. Wolfe
TraDet, Inc.

Company:	Century Mine	Sampled By:	QES (DR)
Source:	CG-01-6A	Date & Time Sampled:	03-30-01 1145
Analysis Number:	104087	Date & Time Received:	04-05-01 0900

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	8.1	S.U.	03-30-01 1145	QES (DR)	150.1	[2]	
pH, Lab	8.23	S.U.	05-01-01 1600	WB	150.1	[2]	
Total Dissolved Solids	790	mg/l.	04-24-01 0930	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	<1.0	mg/l.	04-24-01 0930	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	370	mg/l.	05-01-01 0945	BL	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	170	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.39	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	10.4	mg/l.	04-11-01 1815	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0021	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	0.66	mg/l.	04-26-01 1620	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0017	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	67	mg/l.	04-26-01 1600	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Century Mine
Source: CG-01-6A
Analysis Number: 104087

15-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	13	mg/l.	05-01-01 1400	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-25-01 1515	RW	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-30-01 1600	AC	239.1	[2]	0.05 mg/l.
Total Manganese	0.02	mg/l.	04-17-01 1430	RW	243.1	[2]	0.02 mg/l.
Total Sodium	240	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0007	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.08	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	1100	µmhos/cm	04-05-01 1415	RW	120.1	[2]	1.5 µmhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

02-May-01
Page 1 of 2

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-6B	Date & Time Sampled:	03-30-01 1310
Analysis Number:	104020	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	8.3	S.U.	03-30-01 1310	QES (DR)	150.1	[2]	
pH, Lab	8.10	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	460	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	8.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	100	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	260	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.56	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	11	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0031	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	1.1	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0011	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	42	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

IRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-8087

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9509

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-6B
Analysis Number: 104020

02-May-01
Page 2 of 2

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	10	mg/l.	05-01-01 1400	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.03	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	170	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0002	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.02	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	740	µmhos	04-05-01 1415	RW	120.1	[2]	1.5 µmhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 14C
(WELL/SPRING INVENTORY)

Applicant's Name AMERICAN ENERGY CORPORATION (R-1159-4)

Well/Spring Identification Number	Name of Owner of Well/Spring	Surface Elevation of Well/Spring	Depth of Well in Feet Below Land Surface	Static Water Level of Well in Feet Below Land Surface	Lithology of Supplying Aquifer/ Waterbearing Zone	Known Uses of Well/Spring (if spring give discharge rate)
CG-01-3A	American Energy Corporation	1161.21	284.62'	209.85'	C	Domestic (Outside Adj. Area)
CG-01-3B	American Energy Corporation	1161.31	88.89'	83.13'	B	Domestic, Agricultural, None, 0 to 9.1 gpm
CG-01-3C	American Energy Corporation	1160.66	26.01	18.46'	A	None, 0 to 1.5 gpm
CG-01-4A	American Energy Corporation	1152.95	258.39'	143.94'	C	Domestic, (Outside Adj. Area)
CG-01-4B	American Energy Corporation	1152.30	57.82'	55.54'	B	Domestic, Agricultural, None, 0 to 9.1 gpm
CG-01-4C	American Energy Corporation	1151.96	25.00'	4.35'	A	None, 0 to 1.5 gpm
CG-01-5A	American Energy Corporation	1158.98	265.41'	201.03'	C	Domestic, (Outside Adj. Area)
CG-01-5B	American Energy Corporation	1158.57	83.77'	75.47'	B	Domestic, Agricultural, None, 0 to 9.1 gpm
CG-01-5C	American Energy Corporation	1158.98	24.28'	5.36'	A	None, 0 to 1.5 gpm
CG-01-6B	American Energy Corporation	1165.52	81.72'	74.64'	B	Domestic (Outside Adj. Area)
CG-01-6C	American Energy Corporation	1165.64	43.96'	29.54'	A	Domestic, Agricultural, None, 0 to 9.1 gpm

AEC 10297

The consequences of the proposed refuse disposal on the contents of total suspended and dissolved solids, total iron, total manganese, acidity, and pH will be minimal. The proposed disposal area is designed to reduce infiltration by utilizing materials of acceptably low permeability to completely surround the waste. Compaction of the refuse further reduces permeability, which minimizes seepage of effluent into the refuse. Adverse impact to the hydrologic balance will be minimal.

Water from the mining area is controlled by a series of drainage ditches and sediment ponds to minimize quality and quantity changes in the vicinity of the site. The drainage control plan also minimizes the possibility of stream flow alteration for off-site areas. All sediment control structures will be cleaned out when 60% design capacity is reached. Any standing water will be pumped to another existing structure. Wide track dozers will then move sediment to a point where it is accessible for a Gradall machine to collect and load it into trucks which will transport it to an approved refuse disposal site.

The refuse proposed to be disposed of is composed mainly of roof and floor material. Naturally occurring on-site materials will be used to underlie, line the highwall, and cover the refuse material. The highwall liner (2 feet out from the highwall) and cap cover material consists of clay/claystone as shown in the drill logs for monitoring wells CG01-5A, CG01-3A, CG01-4A, and CG01-6B. See attached logs.

Undeveloped springs S-23 and S-24 are developed in Zone A. Dug well DW-7A, developed spring DS-10, and undeveloped springs S-1, S-2, S-3, S-5, S-20, S-25, S-26, and S-27 are developed in Zone B. Drilled well W-7, and undeveloped springs S-10 and S-22 are developed in Zone C. None of the undeveloped springs, or developed spring DS-10 are in use. W-7 and DW-7A are domestic (W-7) and agricultural (DW-7A) supplies located 1200 feet and 1000 feet, respectively, east of the proposed refuse disposal area. See Addendum to Attachment 14B for a more detailed discussion of Zones A, B, and C.

SZ-1 (identified in the original D-1159 permit) is located on the opposite, or east side of Piney Creek from the proposed refuse disposal area. It is generated from a pre-law disposal site as shown on past maps of this area. The reclaimed refuse disposal area located immediately southeast of the proposed site does not produce any seeps of this nature, nor does the Pond 008 series monitoring in permit D-0425, which collects all runoff from the reclaimed disposal area, reflect impacted drainage.

Within the proposed refuse disposal area, aquifer Zones A & B will be temporarily disturbed by coal removal, and by highwall lining operations, but this will have no affect on existing developed ground water sources. Legitimately-used developed supplies are protected by their distance from the proposed disposal area. The southeast dip of the strata will also help to protect these zones from impact. Measures to prevent water from Zones A & B from entering the refuse disposal area are shown on cross section A - A' through G - G' (lining of the highwall, and capping with 1.5 feet of non-toxic, low permeability material).

Impact to Zones A & B will be negligible. Zone A will be intercepted during coal removal, however, its recharge zone will not be disturbed, and it occurs within the elevation of refuse disposal.

Zone B may show some diminution, but should recover following mining, refuse disposal, and reclamation. Drainage from Zones A and B will not come in contact with the refuse proposed to be disposed of. Zone C occurs at least 90 feet below the proposed bottom of refuse disposal, which will quite effectively provide the recommended minimum five foot isolation distance between the uppermost aquifer system underlying the site and the bottom of the refuse. Impacts to Zones C and D are not anticipated due to their respective locations, 90 feet and 238 feet below the proposed refuse disposal.

American Energy Corporation does not anticipate the water table reestablishing within the refuse disposal area. Please note that the existing reclaimed site does not exhibit any seepage, nor does nearby surface water sampling exhibit any adverse impacts. As with the analyses submitted for monitoring wells at this site, quarterly monitoring analyses of monitoring wells at nearby permit D-0360, Perkins Run area also showed fluctuations in mercury levels that were below, within, and above the published drinking water standard levels prior to issuance of that permit. Quarterly monitoring data of the monitoring wells for this site is currently being assembled, and will be submitted by Bill Siplivy under separate cover for D-0425-2 project area.

Zone A will be monitored quarterly at S-23, as well as monitoring wells CG01-3C, CG01-4C, CG01-5C, and CG01-6C. Zone B will be monitored quarterly at monitoring wells CG01-3B, CG01-4B, CG01-5B, and CG01–6B. Zone C will be monitored at wells CG01-3A, CG01-4A, and CG01-5A. (See attached monitoring well installation logs, submitted as addenda to Attachment 28, Page 3, Item 15) Surface water will be monitored at site D-8A, as well as discharge from sediment ponds 001, 009, and 010. A current sample of site D-8A does not exist at this time. Therefore, sampling at site D-8 has been submitted with this ARP to demonstrate current downstream quality and quantity.

See Attachment 28 for chemical analysis of refuse material and sealant material.

Total sediment yield from the area disturbed by refuse disposal will not differ from the sediment yield from the area disturbed by coal removal. Sediment yield will increase during mining due to newly exposed surface.

The surface will be less permeable after construction of the clay cap seal which will lead to increases in peak flow in the immediate vicinity of the site. These changes will be minimal since the associated watershed is small. Chances of flooding and stream flow alteration for the small tributaries draining the site will not change significantly. The drainage control plan will also minimize the possibility of flooding and stream flow alteration. Stream flow will be maintained by discharge from the sediment ponds.

The proposed activity should have no impact on ground and surface water availability. Mining activities have been ongoing in this area for many years, with no quantity problems noted or reported. No refuse will be disposed of within 100 feet of a stream channel, or, within the buffer zone of a stream. The plan is to isolate the refuse material from contact with water. Placing the material on the pit floor above the insitu clay floor will be above the reestablished water. The highwall and cap liners, and drainage pipes to collect water from the highwall, will isolate waste from contact with ground water.

The western portion of the proposed refuse disposal area does not overlie existing or future planned areas of underground mining. The eastern portion of the proposed refuse disposal area does overlie an existing abandoned portion of the #8 seam underground mine. The coalbed elevation here is approximately 724 feet. The interval between the mine and the coal refuse foundation is at least 360 feet. The mine was active in this location about 30 years ago. Based on field observations today, there is no indication of surface subsidence to either the abandoned refuse pile or surrounding area. This is due to mine extraction rate, stratigraphy and interval between the mine and refuse foundation. The mine was a room and pillar operation. The mine map shows the maximum extraction rate was about 50% in the production sections (butt panels), and 40% in the main development entries. The stratigraphy contains numerous rigid beds of sandstone and limestone. These beds are capable of bridging overburden loads over large areas supported by solid coal and large barrier pillars. Due to these factors, subsidence is not expected in the future over the old #8 mine workings. Should subsidence occur within the old works, the distance between the mine and the disposal area (360' min.) Will protect the disposal area from damage.

ADDENDUM TO ATTACHMENT 28, PAGE 3, ITEM 17.,
AMERICAN ENERGY CORPORATION

Legitimately-used ground water supplies DW-7A and W-7 will not experience contamination, diminution, or interruption as a result of the proposed refuse disposal. Their distance from the proposed refuse disposal area, as well as dip of the strata will protect these sources. Monitoring of sediment ponds, and treatment if necessary, will protect surface water in the vicinity of the proposed disposal. See approved permit D-1159 and D-1159-1 responses Part 2, Items F(1) and F(2).

Rights of present ground water users will be respected and protected by measures as described in the sealing plan. Based on the measures to be undertaken to minimize the impact of the refuse disposal area on surface and ground water, Bennoc, Inc. does not anticipate that the rights of present users will be affected. However, if users rights are infringed upon, an alternate source will be provided. If the quality and quantity of water available for domestic use is diminished, alternate water sources within the underlying aquifer could be tapped by drilling and casing to a greater depth, depending on the quality and quantity required.

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT

ATTACHMENT 28
(COAL WASTE DISPOSAL PLAN)

Applicant's Name AMERICAN ENERGY CORPORATION

1. The coal mine waste to be disposed of on the coal mining operation is from a: (check appropriate response)

   _____ Wash plant facility
   __X__ Tipple facility
   _____ Other (e.g. large pre-existing gob pile)

2. Submit an Attachment 12 for the material to include at a minimum: pH, percent of total or pyritic sulfur, neutralization potential, potential acidity, and calcium carbonate deficiency. **See Attachment 12**

3. State the size fractions and percentages of the size fractions of the waste material. **See Attachment 12.**

4. Submit as an addendum a stability analysis to address how placement of the waste material will not cause instability within the backfilled area. Include all necessary calculations and analyses. **See Attached Stability Analysis.**

5. State the estimated amount of refuse material in tons to be disposed of on the proposed permit area: **2,937,457**

6. State the percent moisture and density of the refuse material, if the coal waste is from a wash plant.

   N/A

7. Describe how infiltration of water into the disposal area will be minimized.

In areas proposed to be utilized for refuse disposal, the highwall face will be reclaimed by placing a 2 foot thickness of non-toxic spoil, in 2 foot compacted lifts, against the highwall, followed by 2 feet of compacted clay material. The entire pit floor and coal bench is underlain by a 20 foot+- thick insitu low permeability claystone material. The refuse will be placed directly on this material. The entire disposal area surface will be covered with 1.5 feet of non-toxic low permeability material and sloped to drain. Above the 1.5 foot cover material, an additional 2 foot cover and six inches of a moderately dry growth medium soil and topsoil will be placed. By developing the reclamation cover in this manner, water infiltration and leachate formation will be minimized by the use of low permeability materials. Based on the small amount of anticipated infiltration after reclamation, the proposed disposal area should have a minimal impact on the area ground water conditions.

04/94

OHIO DEPARTMENT [illegible] URAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 12
(DRILLING REPORT - SURFACE MINE)

This data obtained from public information for permit D-0360 as a representative #8 coal seam refuse analysis. Permit D-0360 is less 3 miles northeast of Permit D-1159.

Applicant's Name _ American Energy Corporation

(Check one: __X__ core drilled _____ rotary air, _____ other (describe)_____)

Test Hole # _

State Plane Coordinates X _____

Y _____

Lithologic Unit (1)	* Thickness Feet	pH	CaCo3 Deficiency (1000 Tons)	Neutralization Potential (1000 Tons)	Potential Acidity	Total Sulfur %	Physical Properties (2)			
Topsoil										
Subsoil							Compactible	Erodible	Color	Grain Size
Roof Rock	266.20-276.20	9.38	-314	355	40.6	1.30				
Floor Rock	358.70-368.70	9.23	-167	269	102	3.26				
Roof Rock	339.10-349.10	9.26	-179	241	61.9	1.96				
Floor Rock	284.30-294.30	9.37	21.0	44.9	65.9	2.11				
Roof Rock	236.30-246.30	9.34	-160	204	44.1	1.41				
Floor Rock	353.00-363.00	9.39	-75.8	167	91.2	2.92				
Roof Rock	332.40-342.40	9.34	-173	210	36.6	1.17				
Floor Rock	308.70-318.70	9.38	-282	319	37.1	1.19				
Floor Rock	251.30-261.30	8.96	-44.8	107	62.2	1.99				
Floor Rock	328.60-338.60	9.03	-54.0	178	124	3.96				
Floor Rock	328.10-338.10	9.18	-140	199	59.0	1.89				
Roof Rock	311.40-321.40	9.37	-256	296	40.0	1.28				
Floor Rock	299-309	9.27	-119	214	95.0	3.04				
Roof Rock	281.10-291.10	9.48	-247	286	38.7	1.24				

_____ Total Thickness _____ Surface elevation of test hole

Coal Seam Information

NAME	NUMBER	TOTAL SULFUR %	PYRITE/MARCASITE SULFUR %

(1) If subsurface water was encountered, identify the stratum in which it was encountered by an asterisk (*).
(2) Describe any observable physical properties of such stratum (e.g. color, grain size, compactiblity, erodiblity, etc.)

* The thickness column refers to depth ranges. Roof rock consists of the immediate ten feet above the roof coal. Floor rock is the immediate ten feet below the Pittsburgh No. 8 coalbed.

AEC 10303

04/94

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 12
(DRILLING-REPORT - SURFACE MINE)

Applicant's Name American Energy Corporation

(Check one: ___ core drilled ___ rotary air, X other (describe) Grab)

Test Hole # REFUSE MATERIAL SIZE FRACTIONS

State Plane Coordinates X _____

Y _____

Lithologic Unit (1)	Thickness	pH	CaCo Deficiency (1000 tons)	Neutralization Potential (1000 tons)	Potential Acidity	Total or Pyritic Sulfur %	Physical Properties (2)			
Topsoil										
Subsoil							Compactible	Erodible	Color	Grain Size
SIZE FRACTION	DISTRIBUTION									
Plus 2 inch SQ	40.31%									
2 x 1 inch SQ	26.77%									
1 x 1/2 inch SQ	23.17%									
½ in. SQ x 8 mesh	7.64%									
Minus 8 mesh	2.11%									
Cumulative	100%									

(Dry Basis)

_____ Total Thickness _____ Surface Elevation of test hole

Coal Seam Information

NAME	NUMBER	TOTAL SULFUR %	PYRITE/MARCASITE SULFUR %

(1) If subsurface water was encountered, identify the stratum in which it was encountered by an asterick (*)
(2) Describe any observable physical properties of each stratum (e.g. color, grain size, compactibility, erodibility, etc.)

AEC 10304

American Energy Corporation
Century Mine

Stability Analysis of Coal Refuse as Highwall Backfill

The stability of the coal refuse backfill has been calculated using the Rotational Equilibrium Analysis of Multilayered Embankments (REAME) computer program developed by Dr. Yang H. Huang, Sc.D. of the University of Kentucky. The REAME program is a personal computer adaptation based on a variety of slope stability analysis procedures. The simplified Bishop method of slope evaluation was used in this analysis.

The strata underlying the #12 coal seam was determined to be gray claystone. The material that will be used as a liner material under and around the coal refuse will be a mixture of brown and gray clay. Conservative strength values for the soils were taken from page 36 of *Stability Analysis of Earth Slopes* by Dr. Yang H. Huang, Sc.D. The following coefficients were used for the claystone: cohesion = 1400 psf, phi angle = 32° and a unit weight of 109 pcf. The clay liner material was assumed to be weaker with a cohesion of 500 psf, a phi angle of 30° and a unit weight of 107 pcf.

The values used for the coal refuse were taken from a previous stability analysis performed by D'Appolonia for prelaw refuse that was placed at the Allison Mine. See the original permit D-0425 D'Appolonia drawing No. 81-250-E4, Sheet No. 4 of 21, Figure No. 11. Their values were based on experience, field and laboratory test data and previous test results for similar materials. The values used are as follows: cohesion = 0 psf, phi angle = 30° and unit weight = 113 psf.

A phreatic surface was included in the REAME run even though the installed or natural seal will prevent water from reaching the top of the coal underclay. The phreatic surface was assumed to run along the top of the #12 coal seam and then down along the top of the claystone. The parameters above were utilized to check the stability of the highwall backfill under a "worst case" condition. A minimum safety factor of 1.82 was determined by the REAME program. Please refer to the attached output sheets and drawings for more information.

Donald M. Brafford, P.E.
4-11-02

STATE OF OHIO
DONALD M.
BRAFFORD
E-29449
REGISTERED
PROFESSIONAL ENGINEER

REAME (ROTATIONAL EQUILIBRIUM ANALYSIS OF MULTILAYERED EMBANKMENTS)
THIS 2000 VERSION (REAME2k) IS LICENSED BY CIVIL ENGINEERING SOFTWARE CENTER TO:
Jack A. Hamilton & Associates, Inc.

INPUT FILE NAME -C:\Reamedat\625SCRHW.DAT

TITLE -Century Mine - Highwall Backfill Stability

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1

NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 0

TWO-DIMENSIONAL ANALYSIS (THREED = 0)

CASE NO. 1 SEISMIC COEFFICIENT (SEIC) =0.000

NO. OF BOUNDARY LINES (NBL) = 4

NO. OF POINTS ON BOUNDARY LINE 1 = 3
1 X COORD.=-500 Y COORD.= 1065
2 X COORD.= 0 Y COORD.= 1065
3 X COORD.= 500 Y COORD.= 1065

NO. OF POINTS ON BOUNDARY LINE 2 = 4
1 X COORD.= 71 Y COORD.= 1085
2 X COORD.= 260 Y COORD.= 1085
3 X COORD.= 262 Y COORD.= 1089
4 X COORD.= 276 Y COORD.= 1150

NO. OF POINTS ON BOUNDARY LINE 3 = 5
1 X COORD.= 71 Y COORD.= 1085
2 X COORD.= 97 Y COORD.= 1089
3 X COORD.= 240 Y COORD.= 1089
4 X COORD.= 253 Y COORD.= 1138
5 X COORD.= 276 Y COORD.= 1150

NO. OF POINTS ON BOUNDARY LINE 4 = 9
1 X COORD.=-500 Y COORD.= 1075
2 X COORD.= 0 Y COORD.= 1075
3 X COORD.= 55 Y COORD.= 1080
4 X COORD.= 71 Y COORD.= 1085
5 X COORD.= 276 Y COORD.= 1150
6 X COORD.= 286 Y COORD.= 1155
7 X COORD.= 383 Y COORD.= 1170
8 X COORD.= 425 Y COORD.= 1175
9 X COORD.= 500 Y COORD.= 1180

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000	0.000				
2	0.000	2.000	4.357			
3	0.154	0.000	3.769	0.522		
4	0.000	0.091	0.313	0.317	0.500	0.155
	0.119	0.067				

MIN. DEPTH OF TALLEST SLICE (DMIN) = 1
NO. OF RADIUS CONTROL ZONES (NRCZ) = 1

AEC 10306

RADIUS DECREMENT (RDEC) FOR ZONE 1 = 0
NO. OF CIRCLES (NCIR) FOR ZONE 1 = 5
ID NO. FOR FIRST CIRCLE (INFC) FOR ZONE 1 = 1
NO. OF BOTTOM LINES (NOL) FOR ZONE 1 = 1

LINE NO. (LINO)	BEG. NO. (NBP)	END NO. (NEP)
1	1	3

UNIT WEIGHT OF WATER (GW) = 62.4

SOIL NO.	COHESION	FRIC. ANGLE	UNIT WEIGHT
1	1400	32	109
2	500	30	107
3	0	30	113

USE PHREATIC SURFACE
USE GRID
NO. OF SLICES (NSLI) = 10
NO. OF ADD. CIRCLES (NAC) = 3
ANALYSIS BY SIMPLIFIED BISHOP METHOD (MTHD=2)
NUMBER OF FORCES (NFO)= 0
SOFT SOIL NUMBER (SSN)= 0

NO. OF POINTS ON WATER TABLE (NPWT) = 7

1	X COORD.=-500	Y COORD.= 1075
2	X COORD.= 0	Y COORD.= 1075
3	X COORD.= 55	Y COORD.= 1080
4	X COORD.= 71	Y COORD.= 1085
5	X COORD.= 260	Y COORD.= 1085
6	X COORD.= 262	Y COORD.= 1089
7	X COORD.= 500	Y COORD.= 1089

NO. OF SOILS WITH DIFFERENT WATER TABLE (NSDW) = 0
NO. OF SOILS WITH DIFFERENT PORE PRESSURE RATIO (NSDP) = 0

INPUT COORD. OF GRID POINTS 1, 2,AND 3

POINT 1 X COORD. = 40 Y COORD. = 1395
POINT 2 X COORD. = 40 Y COORD. = 1145
POINT 3 X COORD. = 240 Y COORD. = 1145

X INCREMENT (XINC) = 5 Y INCREMENT (YINC) = 5
NO. OF DIVISIONS BETWEEN POINTS 1 AND 2 (ND12) = 5
NO. OF DIVISIONS BETWEEN POINTS 2 AND 3 (ND23) = 4
ONLY A SUMMARY TABLE IS PRINTED (NPRT = 0)
SLICES WILL BE SUBDIVIDED

AUTOMATIC SEARCH WILL FOLLOW AFTER GRID

FACTORS OF SAFETY BASED ON GRID

IN THE FOLLOWING TABLE, WARNING INDICATES HOW MANY TIMES THE MAXIMUM RADIUS IS LIMITED BY THE END POINTS OF GROUND LINES:

AEC 10307

CENTER X COORDINATE	CENTER Y COORDINATE	NO. OF CIRCLE TOTAL	CRITIC.	RADIUS	LOWEST F.S.	WARNING
40	1395	8	8	306.128	1.827	0
40	1345	8	8	258.349	1.828	0
40	1295	8	8	210.571	1.829	0
40	1245	5	1	180.000	5.539	0
40	1195	5	1	130.000	6.721	0
40	1145	5	1	80.000	9.263	0
90	1395	8	8	291.771	1.832	0
90	1345	8	8	243.993	1.833	0
90	1295	8	8	196.214	1.835	0
90	1245	8	8	148.436	1.839	0
90	1195	8	8	100.657	1.846	0
90	1145	8	8	52.879	1.865	0
140	1395	11	6	305.091	2.883	0
140	1345	8	8	229.636	1.839	0
140	1295	8	8	181.857	1.843	0
140	1245	8	8	134.079	1.850	0
140	1195	8	8	86.301	1.864	0
140	1145	8	8	38.522	1.914	0
190	1395	11	8	304.971	3.495	0
190	1345	11	3	252.749	3.367	0
190	1295	11	7	197.106	3.208	0
190	1245	8	8	119.722	1.864	0
190	1195	8	8	71.944	1.890	0
190	1145	8	8	24.165	2.030	0
240	1395	11	7	304.311	4.215	0
240	1345	11	7	254.647	4.143	0
240	1295	11	7	205.209	4.092	0
240	1245	11	3	148.428	4.104	0
240	1195	11	9	80.455	4.134	0
240	1145	8	8	9.809	2.591	0

GRID IS EXPANDED AS FOLLOWS SO MINIMUM FACTOR OF SAFETY FALLS WITHIN THE GRID

40	1445	8	8	353.906	1.827	0
90	1445	8	8	339.549	1.831	0
140	1445	11	6	354.039	3.065	0
190	1445	11	8	353.917	3.623	0
240	1445	11	2	355.723	4.306	1
40	1495	8	8	401.684	1.827	0
90	1495	11	8	405.295	2.707	0
140	1495	11	3	405.988	3.208	0
190	1495	11	8	403.153	3.760	0
240	1495	5	1	408.442	4.438	1
40	1545	8	8	449.463	1.827	0
90	1545	11	8	454.009	2.922	0
140	1545	11	3	454.573	3.362	0
190	1545	11	7	455.708	3.840	1
240	1545	5	1	448.135	4.619	1
40	1595	8	8	497.241	1.826	0
90	1595	11	7	505.203	3.080	0
140	1595	11	3	503.436	3.503	0
190	1595	11	2	504.471	3.979	1
240	1595	5	1	489.719	4.940	1
40	1645	11	4	557.907	2.811	0
90	1645	11	10	553.873	3.258	0

AEC 10308

140	1645	11	8	555.951	3.589	0
190	1645	5	1	558.861	4.198	1
240	1645	5	1	532.752	5.337	1
-10	1645	8	8	559.377	1.824	0
-10	1595	8	8	511.598	1.824	0
-10	1545	7	7	464.671	1.827	0
-10	1495	7	7	416.776	1.827	0
-10	1445	7	7	368.880	1.826	0
-10	1395	5	1	330.000	10.738	0
-10	1345	5	1	280.000	15.339	0
-10	1295	5	1	230.000	24.919	0
-10	1245	5	1	180.000	46.028	0
-10	1195	5	1	130.000	58.940	0
-10	1145	5	1	80.000	73.559	0
-60	1645	6	6	574.500	1.824	0
-60	1595	3	1	530.000	28.205	0
-60	1545	3	1	480.000	65.812	0
-60	1495	2	1	430.000	190.667	0
-60	1445	2	1	380.000	249.659	0
-60	1395	2	1	330.000	367.780	0
-60	1345	4	1	280.000	693.819	0
-60	1295	1	1	230.000	2723.353	0
-60	1245	1	1	180.000	1000.000	0
-60	1195	1	1	130.000	1000.000	0
-60	1145	1	1	80.000	1000.000	0

LOWEST FACTOR OF SAFETY AT EACH GRID POINT IS TABULATED BELOW

COORDINATE	-60.000	-10.000	40.000	90.000	140.000	190.000	240.000
1645.000	1.824	1.824	2.811	3.258	3.589	4.198	5.337
1595.000	28.205	1.824	1.826	3.080	3.503	3.979	4.940
1545.000	65.812	1.827	1.827	2.922	3.362	3.840	4.619
1495.000	190.667	1.827	1.827	2.707	3.208	3.760	4.438
1445.000	249.659	1.826	1.827	1.831	3.065	3.623	4.306
1395.000	367.780	10.738	1.827	1.832	2.883	3.495	4.215
1345.000	693.819	15.339	1.828	1.833	1.839	3.367	4.143
1295.000	2723.353	24.919	1.829	1.835	1.843	3.208	4.092
1245.000	1000.000	46.028	5.539	1.839	1.850	1.864	4.104
1195.000	1000.000	58.940	6.721	1.846	1.864	1.890	4.134
1145.000	1000.000	73.559	9.263	1.865	1.914	2.030	2.591

MINIMUM FACTORS OF SAFETY OCCUR AT THE FOLLOWING 3 CENTERS:

FACTOR OF SAFETY = 1.824 AT (-60.000,1645.000)
FACTOR OF SAFETY = 1.824 AT (-10.000,1595.000)
FACTOR OF SAFETY = 1.826 AT (-10.000,1445.000)

AUTOMATIC SEARCHES WILL BE MADE ONLY ON THE CENTER WITH THE SMALLEST F.S. MORE SEARCHES FROM OTHER CENTERS MAY BE NEEDED TO ENSURE THAT MINIMUM F.S. IS OBTAINED.

AT POINT (-10 1595) RADIUS 511.598 THE MINIMUM FACTOR OF SAFETY IS 1.824

FACTORS OF SAFETY BASED ON SEARCH

AEC 10309

IN THE FOLLOWING TABLE, WARNING INDICATES HOW MANY TIMES THE MAXIMUM RADIUS IS LIMITED BY THE END POINTS OF GROUND LINES:

CENTER X COORDINATE	CENTER Y COORDINATE	NO. OF CIRCLE TOTAL	CRITIC.	RADIUS	LOWEST F.S.	WARNING
-10	1595	8	8	511.598	1.824	0
-5	1595	8	8	510.162	1.824	0
-15	1595	7	7	513.927	1.826	0
-10	1600	8	8	516.376	1.824	0
-10	1590	7	7	507.777	1.827	0
-8.75	1595	8	8	511.239	1.824	0
-11.25	1595	7	7	512.907	1.827	0
-10	1596.25	8	8	512.793	1.824	0
-10	1593.75	8	8	510.404	1.824	0
-10	1592.5	8	8	509.209	1.824	0
-8.75	1593.75	8	8	510.045	1.824	0
-11.25	1593.75	7	7	511.709	1.827	0

AT POINT (-10 1593.75) RADIUS 510.404

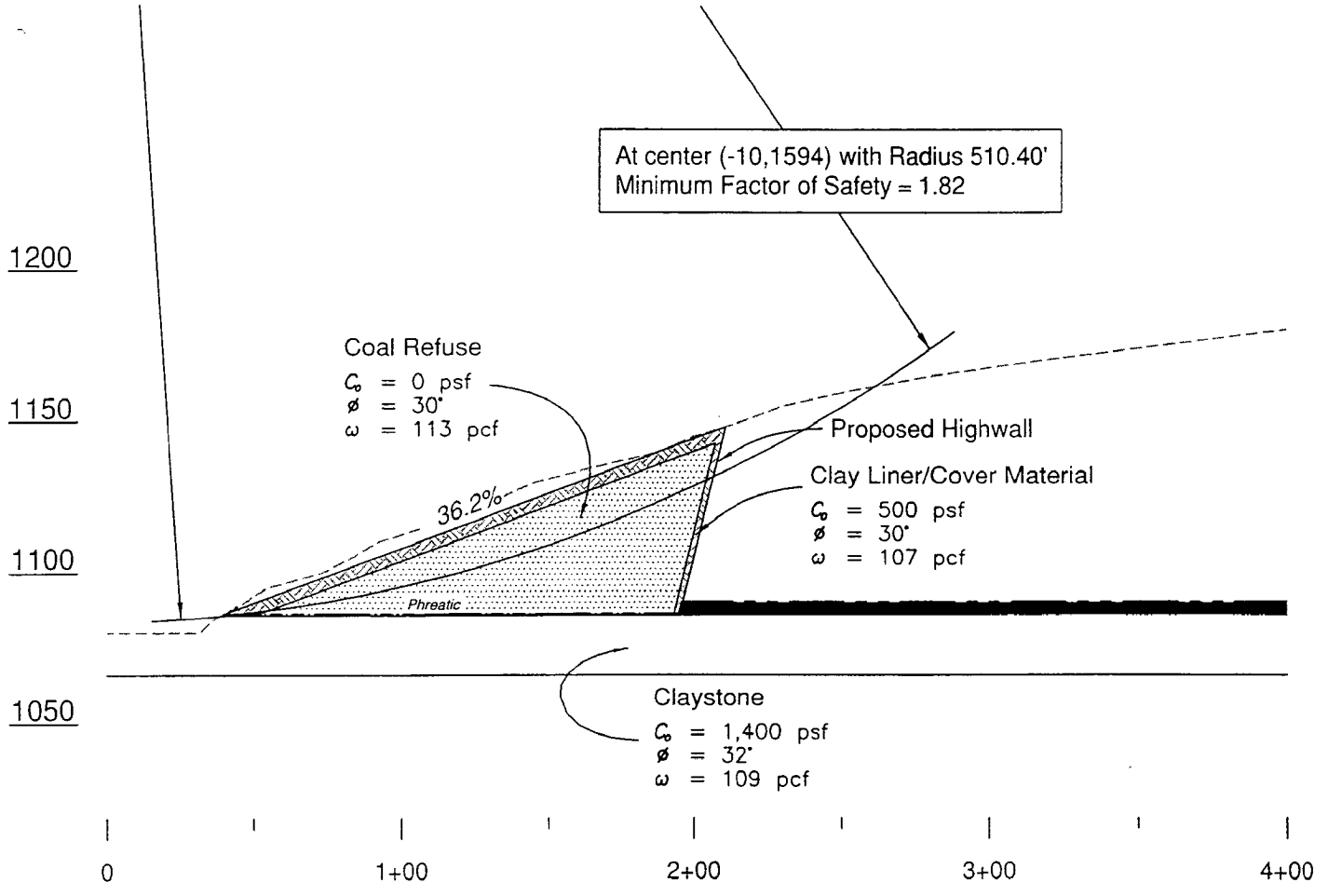
THE MINIMUM FACTOR OF SAFETY IS 1.824

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	SLICE HEIGHT	WATER HEIGHT	BOTTOM SINE	TOTAL WEIGHT	EFFECT. WEIGHT	RESIST. MOMENT	DRIVING MOMENT
1	3	5.983	0.189	0.000	.249	.128E+03	.128E+03	.365E+05	.163E+05
2	3	5.983	0.510	0.000	.261	.345E+03	.345E+03	.981E+05	.459E+05
3	3	5.983	0.753	0.000	.272	.509E+03	.509E+03	.144E+06	.707E+05
4	3	5.983	0.917	0.000	.284	.620E+03	.620E+03	.175E+06	.898E+05
5	3	5.983	1.001	0.000	.296	.677E+03	.677E+03	.190E+06	.102E+06
6	3	5.983	1.005	0.000	.308	.679E+03	.679E+03	.190E+06	.107E+06
7	3	5.983	0.927	0.000	.319	.627E+03	.627E+03	.175E+06	.102E+06
8	3	5.983	0.767	0.000	.331	.519E+03	.519E+03	.144E+06	.876E+05
9	3	5.983	0.524	0.000	.343	.354E+03	.354E+03	.981E+05	.620E+05
10	3	5.983	0.196	0.000	.354	.133E+03	.133E+03	.365E+05	.240E+05
							SUM	.129E+07	.707E+06

AT CENTER (-10.000 , 1593.750) WITH RADIUS 510.404 AND SEIS. COEFF. 0.00
FACTOR OF SAFETY BY NORMAL METHOD IS 1.822
FACTOR OF SAFETY BY SIMPLIFIED BISHOP METHOD IS 1.824

AEC 10310



AMERICAN ENERGY CORPORATION

Highwall Backfill Stability Section

Scale: 1" = 60'

I HEREBY CERTIFY THAT THIS SLOPE STABILITY ANALYSIS HAS BEEN PREPARED TO MEET THE APPLICABLE REQUIREMENTS OF RULE 1501: 13-09-09 (A)(3)(b)OF THE ADMINISTATIVE CODE.

Donald M. Brafford 4/11/02

STATE OF OHIO
DONALD M. BRAFFORD
E-29449
REGISTERED
PROFESSIONAL ENGINEER

AEC 10311

8. Specifically describe how the disposal plan will comply with paragraph (J) of rule 1501:13-9-14 of the Administrative Code.
See response to Attachment 28, Page 1, Item 7.

9. Does the disposal plan propose to neutralize wash plant waste with spoil material? _____ Yes, __X__ No. If "yes," submit as an addendum an acid/base account of the refuse and spoil materials.

10. Does the disposal plan propose to seal the disposal area? __X__ Yes, _____ No. If "yes," submit an Attachment 12 for the sealant material which includes pH, percent of total or pyritic sulfur, neutralization potential, potential acidity, calcium carbonate deficiency, and lithology.
See Sealant Material Attachment 12.

11. If a sealant material is to be used, submit a permeability analysis of the material to be used as a sealant. Also, address below how the sealant material will be compacted and the anticipated permeability coefficient to be achieved following compaction.
Cover materials termed "clay/silty clay" on Attachment 12 will be comprised of soils found in Test Pits 1 and 4, and materials identified in the Addendum to ARP, Item 4., 3rd paragraph. Over compaction of the soil will be avoided because some settlement of the refuse is expected. Placement of these soils will be accomplished using either truck haulage or tractor scraper haulage. The soils will be spread by bulldozer with uniformity to be achieved by a light to medium weight sheepsfoot type roller. Sealing will involve lining of the highwall, insitu claystone material beneath, installation of pipe drains if springs, wet weather seeps or other areas producing water are encountered, and capping with the clay/silty clay material described above. See Addendum to A.R.P., Item 4. *Pipe drains will be installed during periods of 'low flow' (<1 gpm) and/or all areas where drainage is currently seen at the surface in the form of springs. If the pipe drains were not installed, and water flowed from the highwall, it would flow vertically down the 2 foot spoil drain and terminate in clay. Pipe drains at all 'wet areas' should effectively direct all water from the highwall safely beneath the refuse floor.* **(The #12 underclay will not be compacted. Chemical analysis of same is attached. The #12 underclay was tested at a neighboring permit. Compaction will only be performed on the highwall liner and cap.**

12. Show the location of the coal mine waste storage and disposal areas and the location of cross sections on the application map. **See A.R.P. Application Map**

13. Describe how the disposal plan will meet requirements of paragraph (J)(3) of rule 1501:13-9-04 of the Administrative Code.
During active refuse disposal, all water impacted by the refuse material will be passed through sediment Ponds 001, 009, or 010 for treatment, if necessary, prior to discharge. When disposal operations are completed, refuse material will be buried under at least 1.5 feet of non-toxic material, and sloped to drain.

04/94

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

Date: October 27, 1998

ATTACHMENT 12
(DRILLING REPORT - SURFACE MINE)

Applicant's Name American Energy Corporation Property: _____

(Check one: __ core drilled, _X_ rotary air, __ other (describe) ___)

Test Hole # #12 Coal Underclay / claystone
State Plane Coordinates X: _____
Y: _____

Lithologic Unit (1)	Thickness	pH	$CaCO_3$ Deficiency (1000 Tons)	Neutralization Potential (1000 Tons)	Potential Acidity	Total Sulfur %	Physical Properties(2)			
Topsoil										
Subsoil							Compactiible	Erodible	Color	Grain Size
Grey Claystone	3' 8"	9.37	-25.00	66.25	41.25	1.32	Moderately	Slightly	Gray	Fine
Grey Claystone	30'	8.90	-36.56	36.88	0.31	0.01	Moderately	Slightly	Gray	Fine

_____ Total thickness _____ Surface elevation of test hole

Coal Seam Information

Name	Number	Total Sulfur %	Pyrite/Marcasite Sulfur %

(1) If subsurface water was encountered, identify the stratum in which it was encountered by an asterick (*)
(2) Describe any observable physical properties of each stratum (e.g. color, grain size, compactibility, erodibility, etc.).

AEC 10313

Moisture-Density Curve No. 2

Project Perkins Run Refuse Disposal

Date 4-20-98

GREEN AND ASSOCIATES

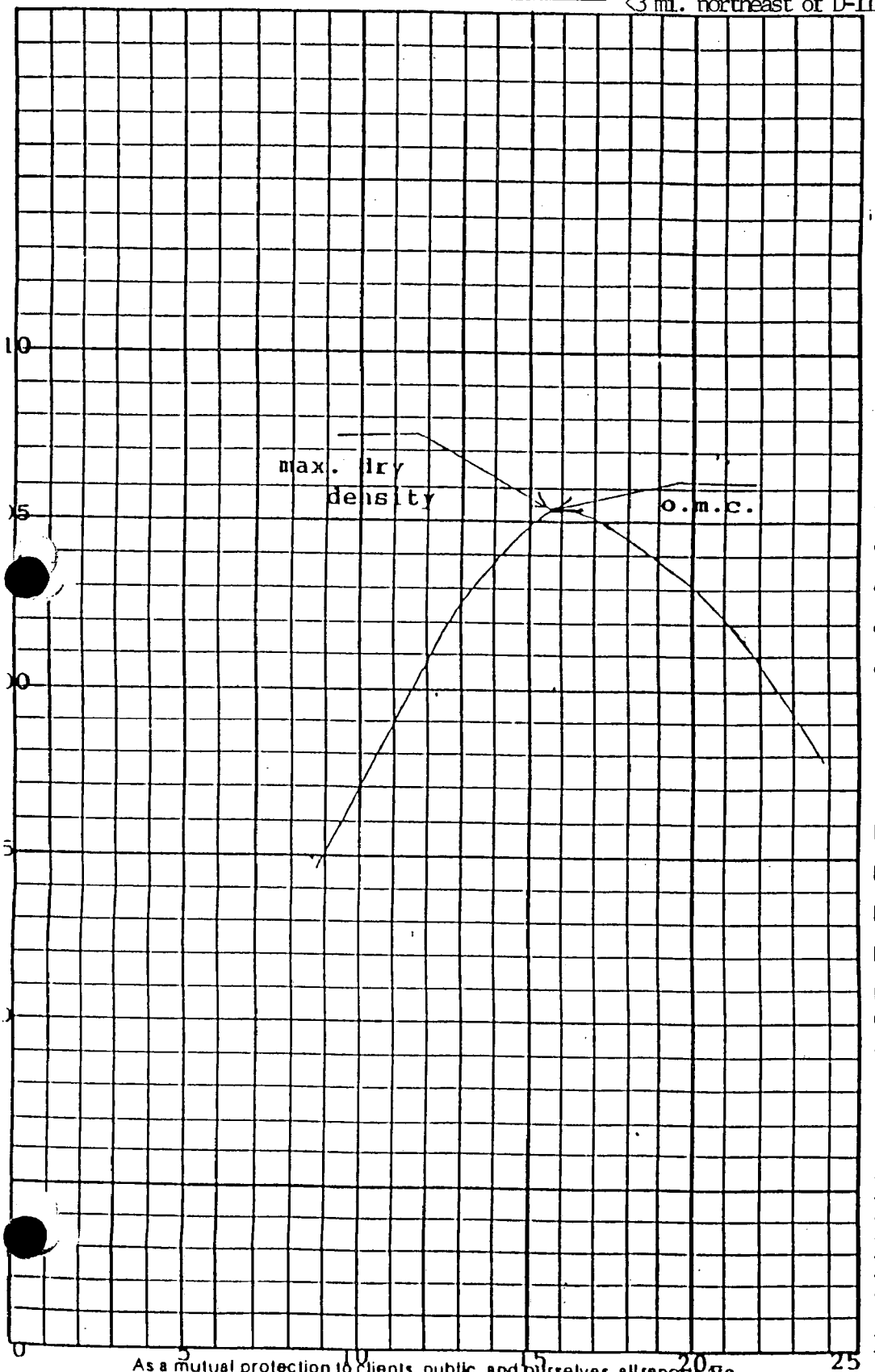
Design • Engineering • Surveying

156 Woodrow Avenue • Suite 3
St. Clairsville, Ohio 43950
Phone (740) 695-9977

Soil Description Very moist, grayish brown sand some clayey silt

Source East Knob Borrow Area **TP-13**

This data obtained from public information for D-0360 as a representative permeability of the #12 coal underclay. D-0360 <3 mi. northeast of D-1159.



Job # 98-131

Sample # 2, S39,100 W70,400

Specific Gravity:

AASHTO Test

ASTM Test D-698

Method A

Hammer Wt. 5½ Lbs.

Hammer Drop 12"

No. Blows/Layer 25

No. Layers 3

Mold Size 4" Dia.

Grain Size Distribution

% Aggregate

% Coarse Sand

% Fine Sand

% Silt

% Clay

Note:
Agg. = Above #10 sieve
C.S. = bet. #10 & #40 sieve
F.S. = bet. #40 & #200 sieve

L.L. 38.7

P.L. 27.2

P.I. 11.5

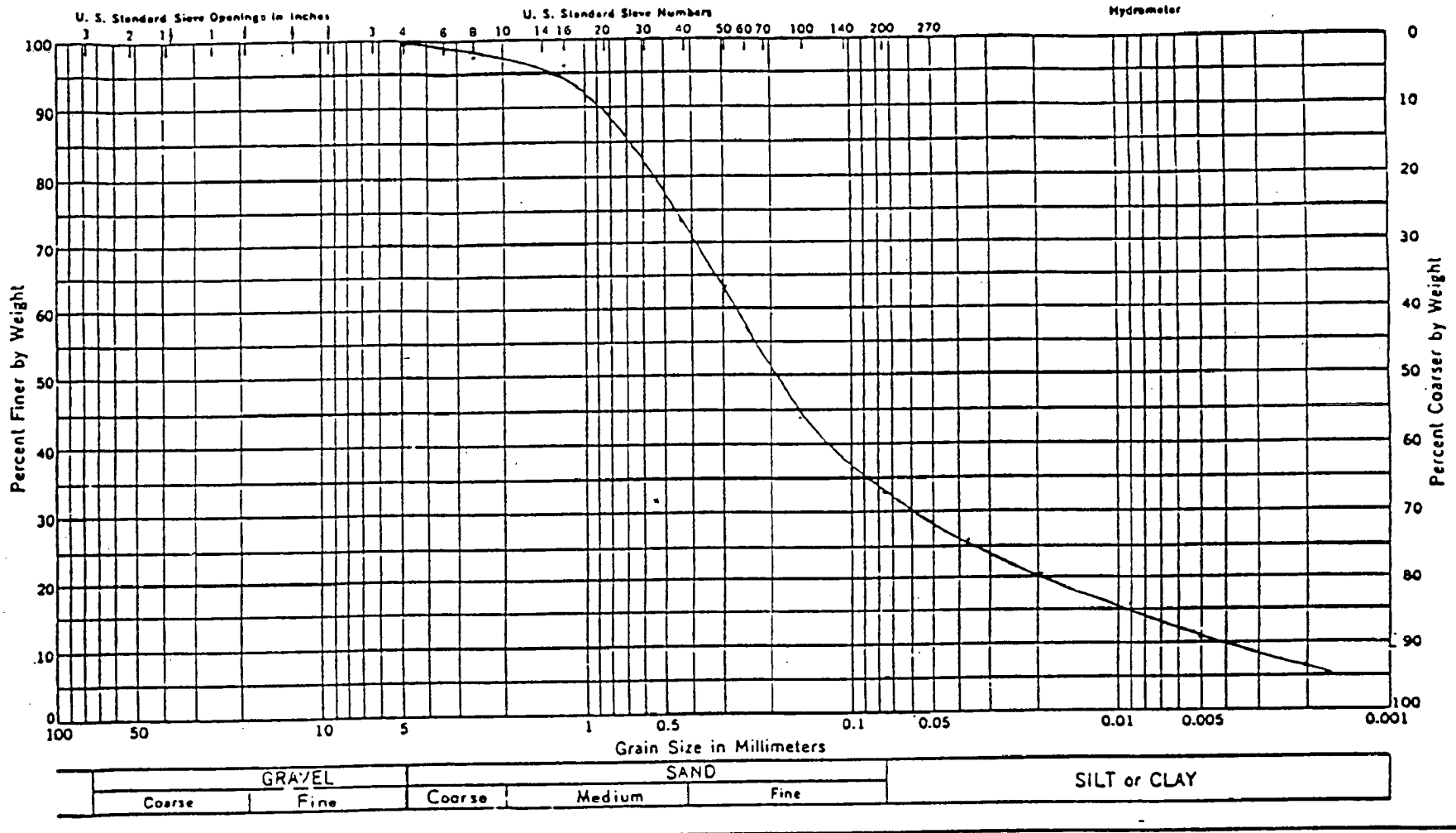
Nat. W_c 21.8%

Max. Dry Density 105.4 p.c.f

Optimum Moisture 15.8%

*Sieve	% Passing

As a mutual protection to clients, public, and ourselves, all reports are submitted as the confidential property of clients, and authorization for



HOLE NO.	SAMPLE NO.	DEPTH	M.C		CLASSIFICATION
			21.8%		Very moist, grayish brown sand
					some clayey silt " SP - ML "
					Coeff.of perm. $k=1.1x10^{-7}$ cm/sec
					@94.7% of ASTM D-698, Max. dry
					density=105.4pcf @15.8% moisture
					Sample #2, East knob borrow area
					S39,100 W70,400
					LL= 38.7, PL=27.2, PI= 11.5

Project: Perkins Run Refuse Disposal

Job No: 98-131

Laboratory Soil Testing

April, 1998

TP-13

This data obtained from public information for D-0360 as a representative permeability of the #12 coal underclay. D-0360 is less than 3 miles northeast of D-1159.

WILLIAM J. SIPLIVY, P.E., C.P.G.

Geotechnical Engineer

8 March 2002

Ms. Ellen Greer
Jack A. Hamilton & Associates, Inc.
Consulting Engineers and Surveyors
342 High Street
Flushing, Ohio 43977

Re: CENTURY MINE COARSE COAL REFUSE DISPOSAL

Dear Ms. Greer:

In response to your interest in the underclay of the Washington No. 12 coalbed, my experience has been it is suitable for use as a low permeability liner and cap material in landfill applications.

This is based on recent lab testing and liner installation for another coal company's coarse coal refuse disposal facility, several miles east of the Century mine, in Belmont County. A permeability of less than E-07 is normally achieved there when the moisture content is 0 to 4 percent wet of optimum, at a minimum compactive effort of 95 percent Standard Proctor.

Please feel free to call if there are further questions.

Sincerely,

William J. Siplivy, P.E., Inc.

William J. Siplivy

William J. Siplivy, P.E., C.P.G.

cc: Ryan Desko – Century mine

4667 Turnberry Trail • Stow, OH 44224 • 330-678-0027 • wjsiplivy@aol.com

TEST PIT LOGS
COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
WAYNE TOWNSHIP, BELMONT COUNTY, OHIO
23 AUGUST 2001

TP-1

Thickness (ft.)	Description
1.2	Silt loam, brown, rooted
0.7	Silty clay loam, brown
5.3	Clay, red (sampled for geotechnical tests)
7.2	Total pit depth (dry)

TP-2

Thickness (ft.)	Description
1.0	Silt loam, brown, rooted (at tree line)
2.8	Silty clay, brown
0.4	Clay w/weathered sandstone, brown
4.2	Total pit depth (dry, pit stopped in sandstone)

TP-3

Thickness (ft.)	Description
4.9	Clay, brown, saturated
4.4	Coal fines (old pond?), saturated
0.8	Clay, gray
10.1	Total pit depth (wet)

TP-4

Thickness (ft.)	Description
0.7	Silt loam, brown, rooted
1.3	Silty clay, brown
0.8	Clay w/limestone boulders
1.0	Clay, brown
4.2	Clay, red (sampled for geotechnical tests)
8.0	Total pit depth (dry)

TP-5

Thickness (ft.)	Description
3.2	Shaly limestone, brownish-gray (stripped)
3.2	Total pit depth (dry)

TP-6

Thickness (ft.)	Description
5.4	Clay, brown (saturated)
3.2	Clay, gray (seepage at top)
0.7	Clay, brown (saturated)
9.3	Total pit depth (wet)

TP-7

Thickness (ft.)	Description
0.8	Silt loam, brown, rooted
0.7	Clay, brown
1.0	Sandstone, brownish-gray
2.5	Total pit depth (dry, pit stopped in sandstone)

TP-8

Thickness (ft.)	Description
0.4	Silt loam, brown, rooted
2.8	Silty clay, brown
0.6	Clay, brown w/weathered sandstone
3.8	Total pit depth (dry, pit stopped in sandstone)

AMERICAN INSTITUTE OF PROFESSIONAL GEOLOGISTS
CERTIFICATE NUMBER
4599
AIPG
WILLIAM J. SIPLIVY
CERTIFIED PROFESSIONAL GEOLOGIST

Respectfully submitted:

William J. Siplivy

William J. Siplivy, P.E., C.P.G.

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

STRATA ANALYSIS
SAMPLES RECEIVED 22 OCTOBER, 2001

SAMPLE NO. INTERVAL DESCRIPTION	TOTAL MOISTURE %	pH S.U.	NEUTRALIZATION POTENTIAL TONS/1000 TONS AS CACO3	TOTAL SULFUR %	PYRITIC SULFUR %	POTENTIAL ACIDITY TONS/1000 TONS AS CACO3 (TOTAL SULFUR)	POTENTIAL ACIDITY TONS/1000 TONS AS CACO3 (PYRITIC SULFUR)	CACO3 DEFICIENCY TONS/1000 TONS AS CACO3 (TOTAL SULFUR)	CACO3 DEFICIENCY TONS/1000 TONS AS CACO3 (PYRITIC SULFUR)
C-110623 TP-4 REDDISH BROWN SILTY CLAY	15.39	4.93	1.84	0.05	0.10	1.56	3.13	-0.28	1.29
C-110624 TP-1 REDDISH BROWN CLAY	19.78	7.00	8.38	0.08	0.24	2.50	7.50	-5.88	-0.88

PRESTON R. MOCZEK 11/19/01

NOTE:
Sulfur analysis is based on high temperature combustion that causes the Sulfur bearing compounds to breakdown, converting the Sulfur to Sulfur Dioxide for subsequent Infrared absorption and detection. With inorganic materials such as soils, the combustion and sulfur release process may not go to completion; resulting in Total Sulfur concentrations being less than the sum of the forms of Sulfur. In such cases it is suggested to place more reliance on the Forms of Sulfur Analysis.

Permeability Test Report

ASTM D 5084 - Method C

Boring: TP-2

Press Tube: No

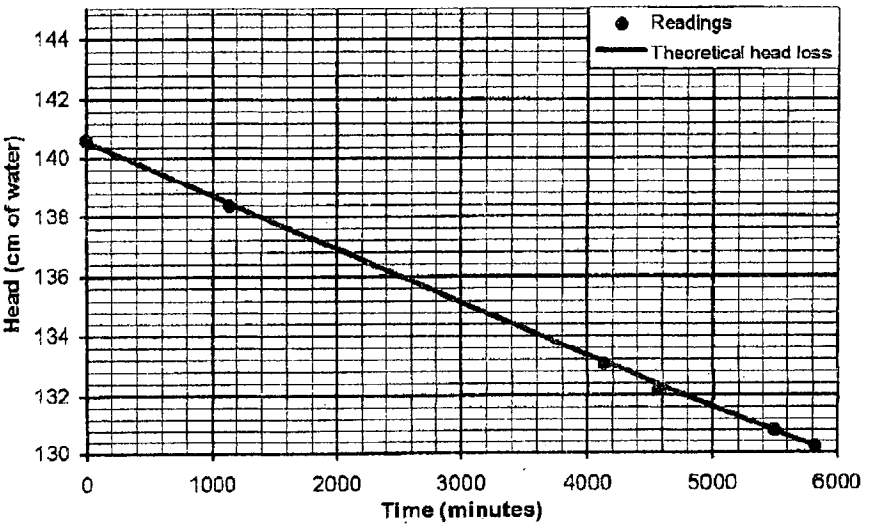
Sample: Bag Sample (Brown)

Depth:

Liquid Limit	40
Plasticity Index	19
Specific Gravity	2.7

Permeant Liquid
De-aired, deionized water

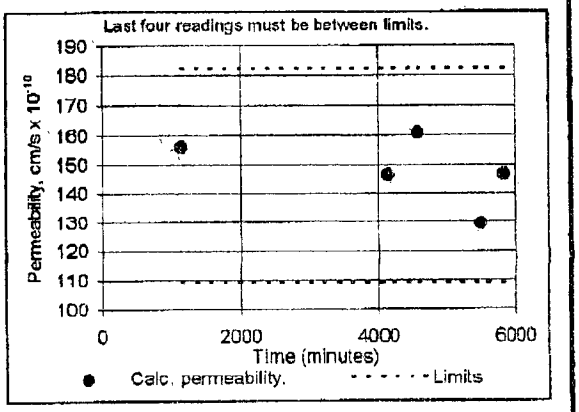
Temp. (°C)
21.0



	Diameter (cm)	Area, A (cm^2)	Length, L (cm)	Moisture (%)	Dry Density (pcf)	Saturation (%)
Initial	7.148	40.12	7.668	25.2	98.3	95.3
Final	7.148	40.12	7.668	26.4	98.3	99.9

Chamber Pressure (psi)	Backpressure (psi)		Consolidation Stress (psi)		Hydraulic Gradient (-)		
	Inflow	Outflow	Max.	Min.	Max.	Min.	Avg.
60.0	58.0	56.0	4.0	2.0	18.3	17.0	17.7

Date	Time	Buret Readings Inflow	Buret Readings Outflow	Flow Ratio	Head, h (cm)	$k_{20°C}$ (cm/sec)
9/28/01	12:36	1.9	16.1	-----	140.6	-----
9/29/01	7:45	2.7	15.3	1.00	138.4	1.6E-08
10/1/01	9:35	4.6	13.4	1.00	133.0	1.5E-08
10/1/01	16:55	4.9	13.1	1.00	132.2	1.6E-08
10/2/01	8:13	5.4	12.6	1.00	130.8	1.3E-08
10/2/01	13:40	5.6	12.4	1.00	130.2	1.5E-08



$$k_{20°C} = R_T \frac{aL}{2At} \ln\left(\frac{h_1}{h_2}\right) = \mathbf{1.5E\text{-}08} \quad \text{cm/sec}$$

a - Area of burets (0.71 cm^2)
t - Elapsed time between readings
R_T - Temperature correction factor = (0.980)

Remarks:
Sample was remolded to 98% of standard moisture density curve maximum dry density @ 2% wet of optimum moisture content.

DLZ

Client: William J. Siplivy, P.E., CPG
Project: Century Mine
Job No: 0121-4543.00

Permeability Test Report

ASTM D 5084 - Method C

Boring: TP-1

Press Tube: No

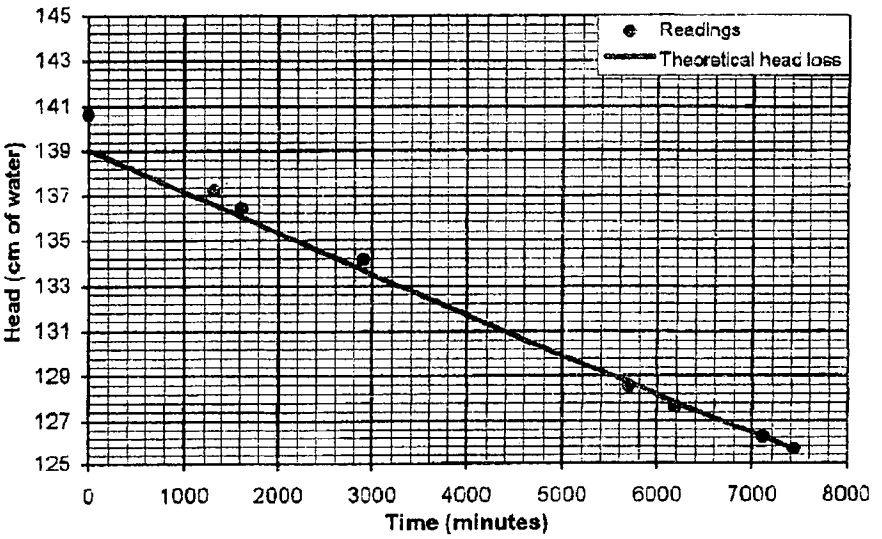
Sample: Bag Sample (Red Clay)

Depth:

Liquid Limit	39
Plasticity Index	17
Specific Gravity	2.7

Permeant Liquid
De-aired, deionized water

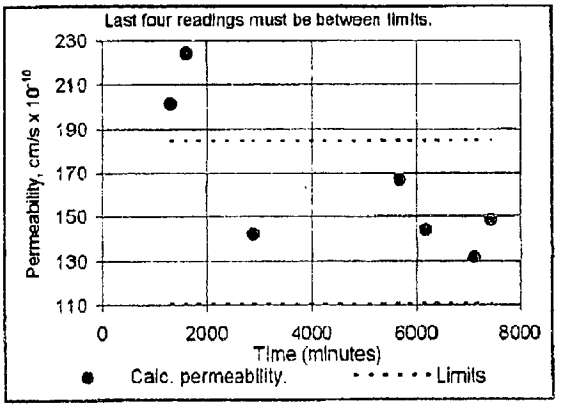
Temp. (°C)
21.0



	Diameter (cm)	Area, A (cm^2)	Length, L (cm)	Moisture (%)	Dry Density (pcf)	Saturation (%)
Initial	7.163	40.30	7.564	24.2	99.3	93.9
Final	7.163	40.30	7.564	25.8	99.3	100.0

Chamber Pressure (psi)	Backpressure (psi)		Consolidation Stress (psi)		Hydraulic Gradient (-)		
	Inflow	Outflow	Max.	Min.	Max.	Min.	Avg.
60.0	58.0	56.0	4.0	2.0	18.6	16.6	17.6

Date	Time	Buret Readings Inflow	Buret Readings Outflow	Flow Ratio	Head, h (cm)	$k_{20°C}$ (cm/sec)
9/27/01	9:40	3.2	18.8	-----	140.6	-----
9/28/01	7:36	4.4	17.6	1.00	137.3	2.0E-08
9/28/01	12:36	4.7	17.3	1.00	136.4	2.2E-08
9/29/01	9:55	5.5	16.5	1.00	134.1	1.4E-08
10/1/01	8:35	7.5	14.5	1.00	128.5	1.7E-08
10/1/01	16:55	7.8	14.2	1.00	127.7	1.4E-08
10/2/01	8:12	8.3	13.7	1.00	126.3	1.3E-08
10/2/01	13:40	8.5	13.5	1.00	125.7	1.5E-08



$$k_{20°C} = R_T \frac{aL}{2At} \ln\left(\frac{h_1}{h_2}\right) = \mathbf{1.5E\text{-}08} \quad \text{cm/sec}$$

a - Area of burets (0.71 cm^2)
t - Elapsed time between readings
R_T - Temperature correction factor = (0.980)

Remarks:
Sample was remolded to 98% of standard moisture density curve maximum dry density @ 2% wet of optimum moisture content.

DLZ

Client: William J. Siplivy, P.E., CPG
Project: Century Mine
Job No: 0121-4543.00

14. Submit a cross section showing the elevation, final profile, saturated zones (existing and proposed), and reclaimed surface profile of the disposal area.

See Cross Sections A - A' through G - G'.

15. Identify surface and ground water monitoring sites which will specifically determine hydrologic impact which may proximately occur as a result of the disposal plan. If monitoring wells are to be constructed as part of this plan, submit information as to well construction, development, and design.

Surface water site D-8A, and sediment Ponds 001, 009, and 010, and ground water sites *as listed in the Addendum to* Part 2, Page 14, Item E(1) will be monitored quarterly for quality and quantity to determine hydrologic impact as a result of the proposed disposal plan. See monitoring well installation logs, submitted as Addenda to this item.

16. Ensure that Part II, item E of the permit application addresses the probable hydrologic consequences of the disposal area on the hydrologic balance of the area. Specifically address changes in ground water and surface water quality in detail.

See Addendum to Part 2, Page 14, Item E

17. Submit a detailed assessment plan for the disposal area and ensure that Part II, items F(1) and F(2) of the permit application identify surface and ground water supplies which may be adversely affected by the disposal area and acceptable alternative sources.

See Addendum to Part 2, Page 14, Item E, and *Addendum to Attachment 28, Page 3, Item 17.*

18. If the material to be disposed is slurry, then submit data characterizing soil materials to be utilized in construction, if applicable.

N/A, No slurry disposal, coarse refuse only.

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-3A

Collar Elevation (feet, msl): 1163.04
Location: N 694,963.93 E 2,413,390.24
Date Started: 22 March 2001
Date Completed: 23 March 2001
Water Depth: 209.68 feet
Water Elevation: 953.36 feet, msl

Well Materials List

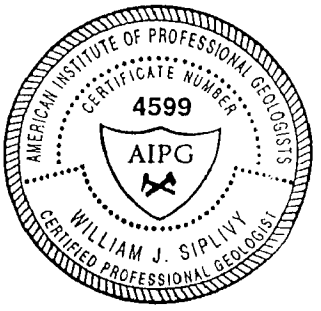
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 47 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 5 bags
11. Installation method: Gravity

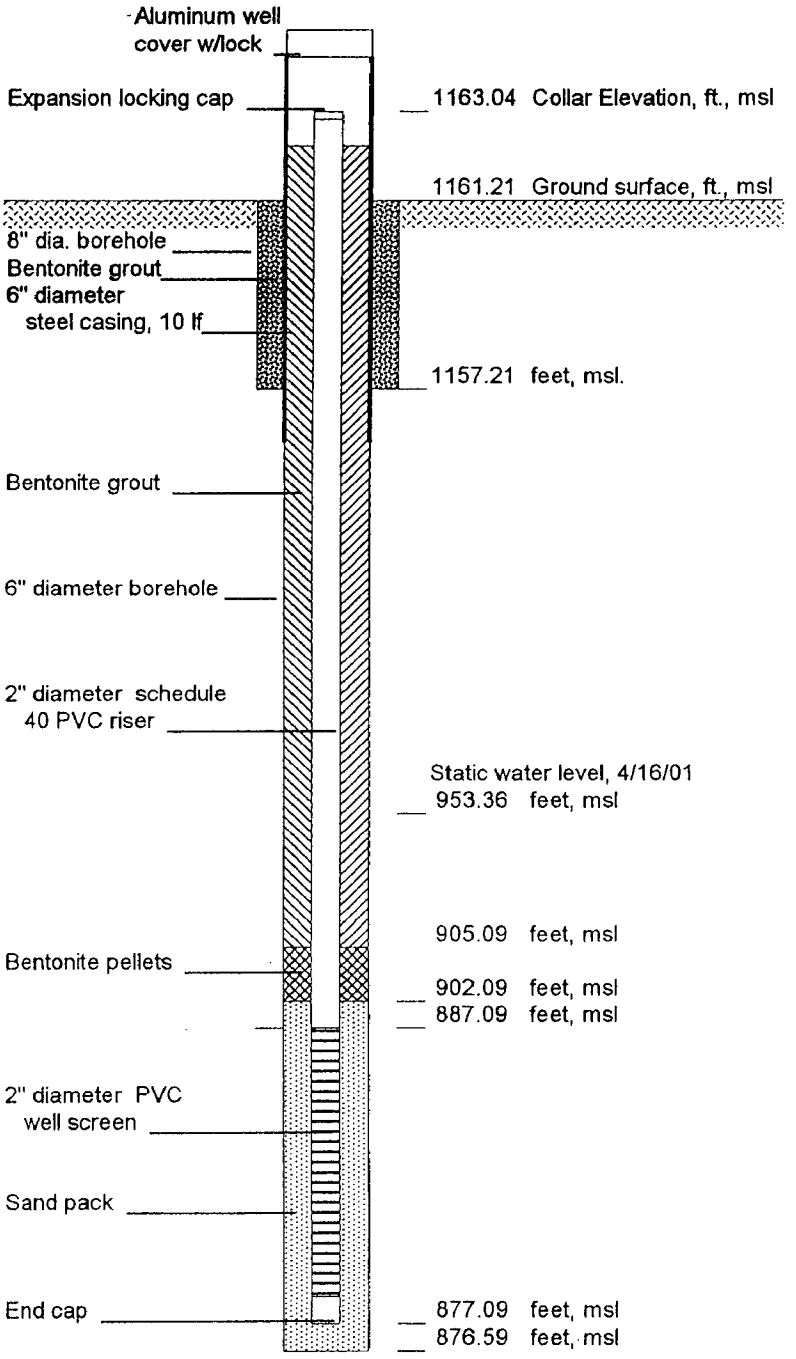
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





RECEIVED
APR 23
DIVISION
RESOURCES

CG-01-3A.WK4

WJS

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-3B

Collar Elevation (feet, msl): 1163.22
Location: N 694,960.31 E 2,413,398.70
Date Started: 23 March 2001
Date Completed: 23 March 2001
Water Depth: 85.04 feet
Water Elevation: 1078.18 feet, msl

Well Materials List

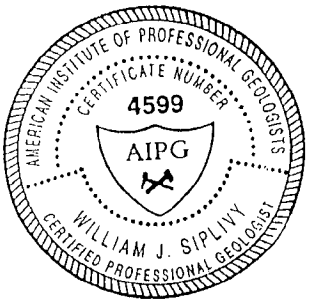
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 15 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

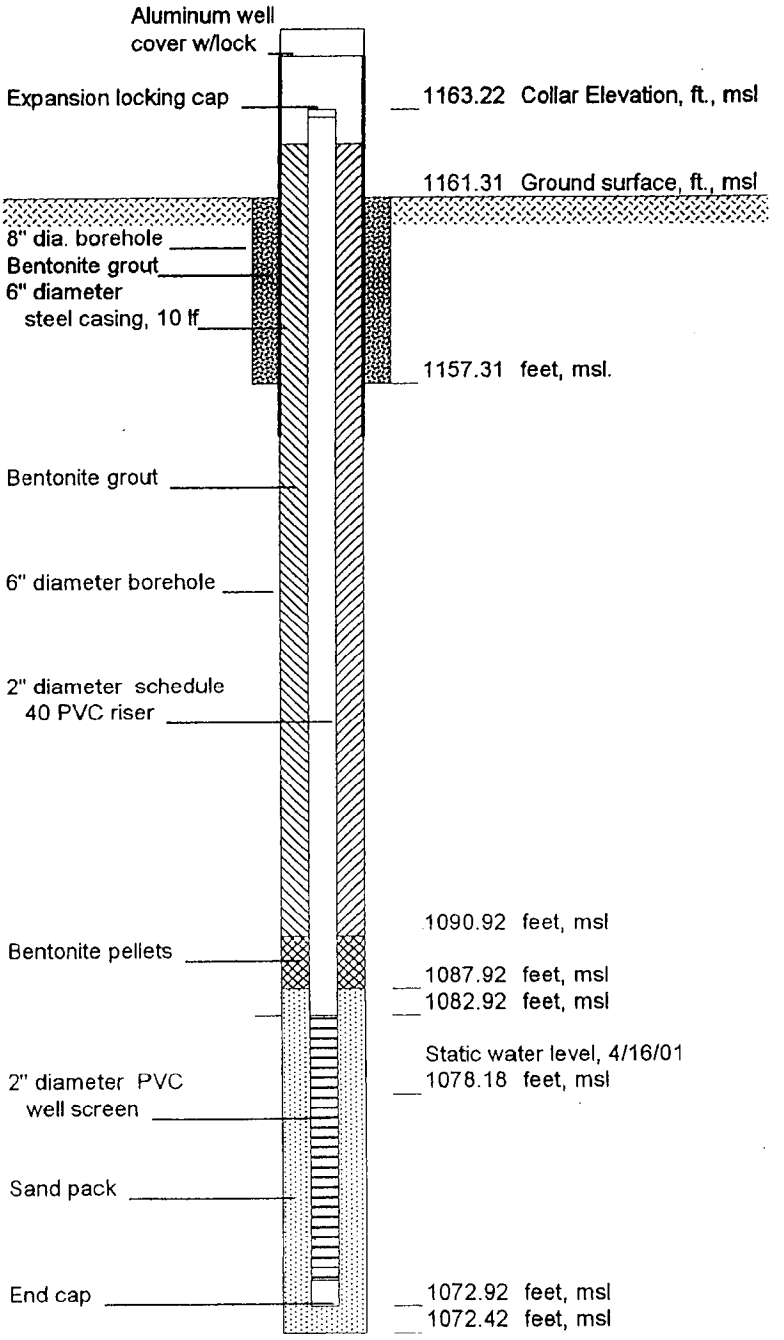
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-3B.WK4

WJS

AEC 10323

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-3C

Collar Elevation (feet, msl): 1162.35
Location: N 694,958.80 E 2,413,381.85
Date Started: 26 March 2001
Date Completed: 26 March 2001
Water Depth: 20.15 feet
Water Elevation: 1142.2 feet, msl

Well Materials List

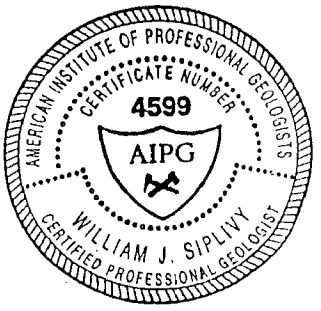
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 2 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

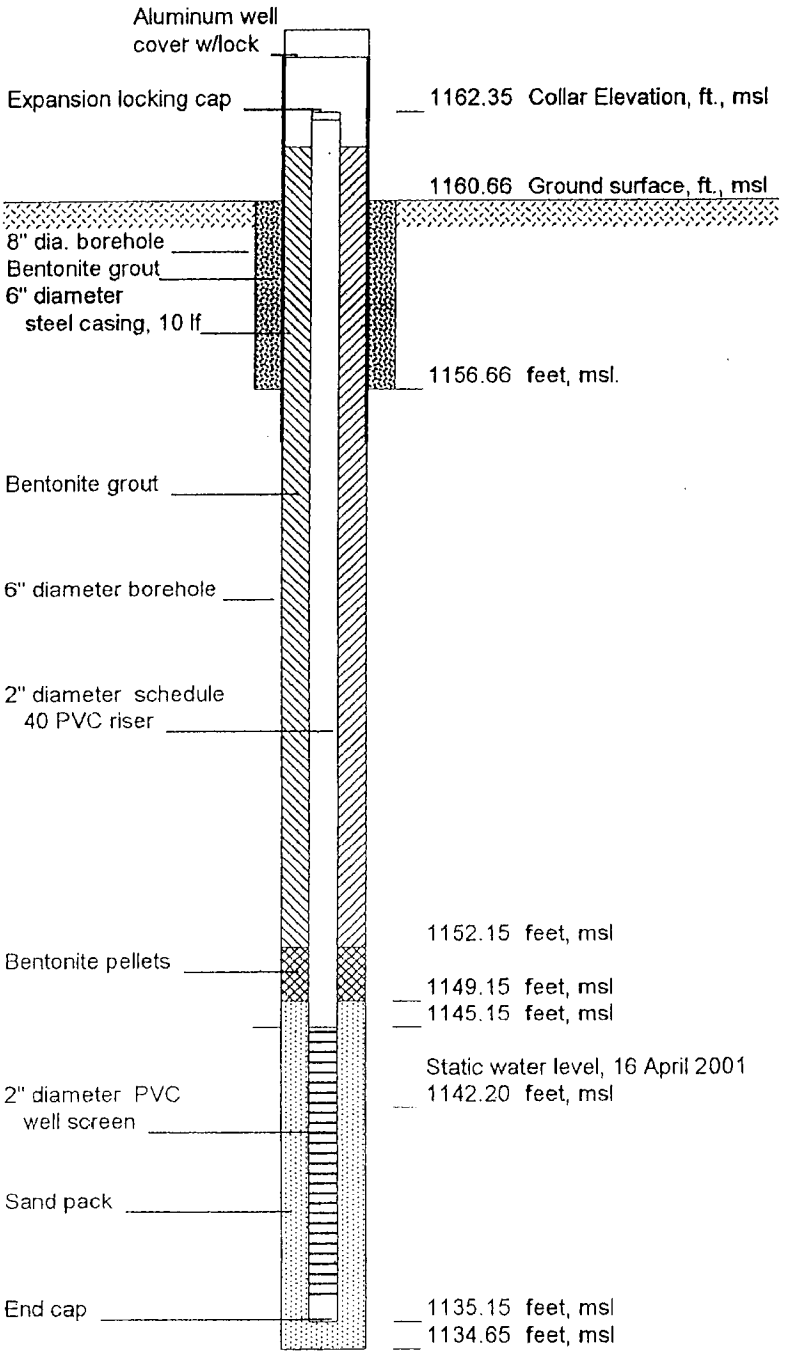
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-3C.WK4

WJS

AEC 10324

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-4A

Collar Elevation (feet, msl): 1154.06
Location: N 696,720.93 E 2,412,001.29
Date Started: 27 March 2001
Date Completed: 29 March 2001
Water Depth: 145.05 feet
Water Elevation: 1009.01 feet, msl

Well Materials List

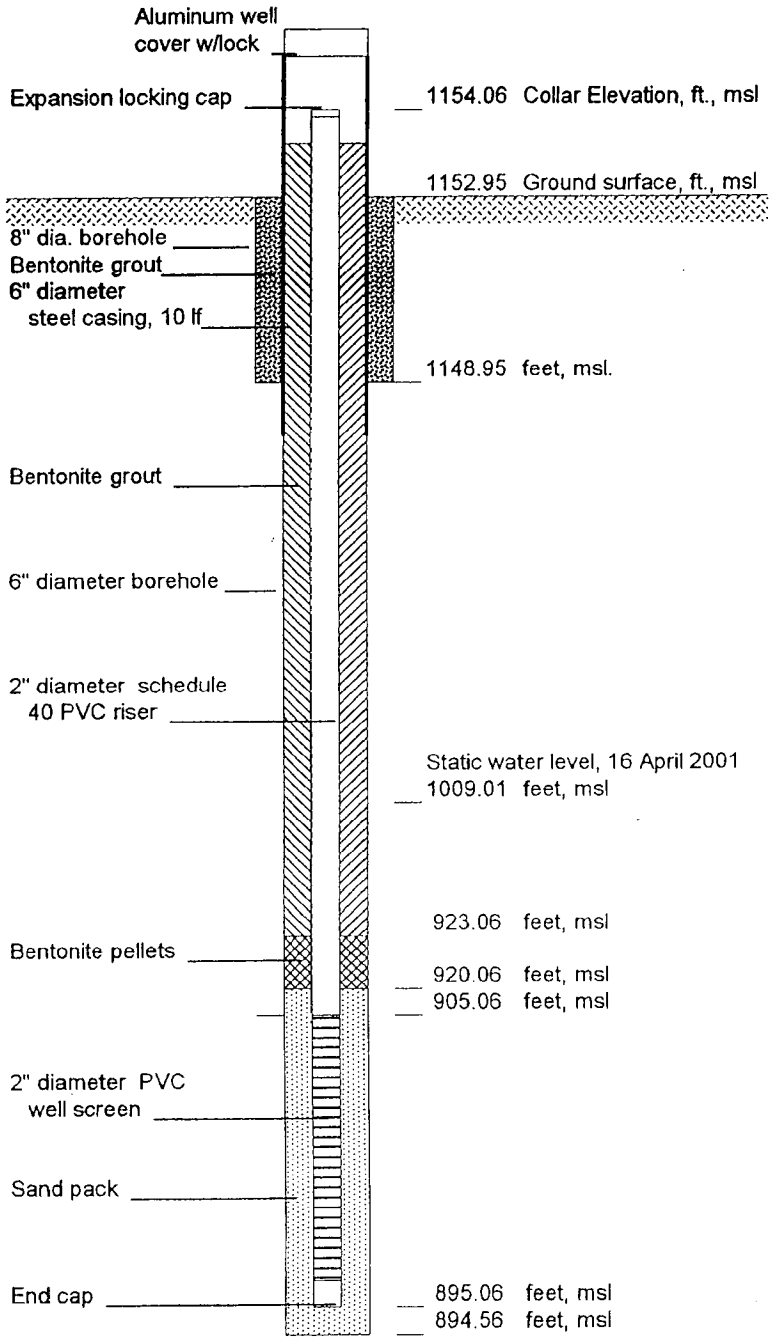
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 50 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG



CG-01-4A.WK4

WJS

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-4B

Collar Elevation (feet, msl): 1153.58
Location: N 696,716.79 E 2,412,008.57
Date Started: 27 March 2001
Date Completed: 27 March 2001
Water Depth: 56.82 feet
Water Elevation: 1096.76 feet, msl

Well Materials List

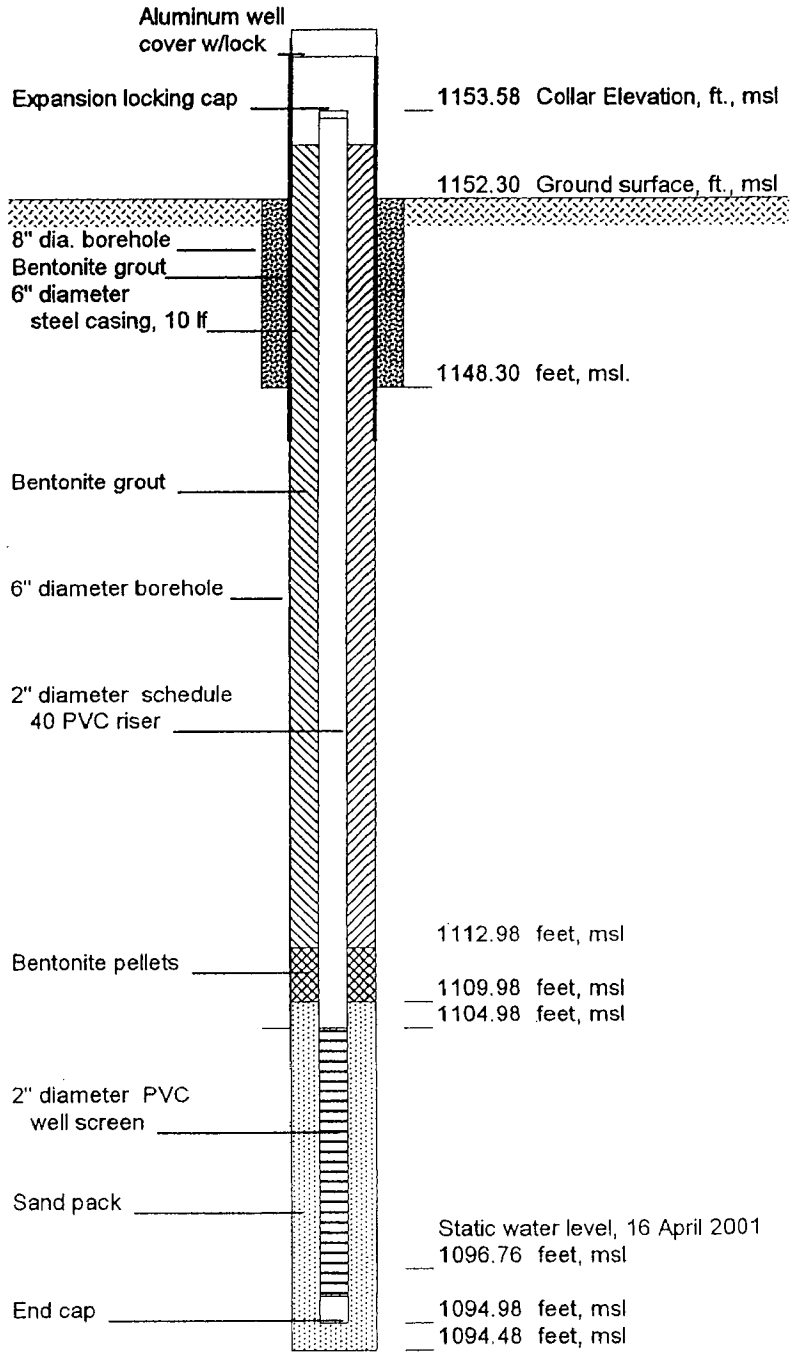
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 9 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG



CG-01-4B.WK4

WJS

AEC 10326

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-4C

Collar Elevation (feet, msl): 1153.26
Location: N 696,713.01 E 2,412,015.57
Date Started: 27 March 2001
Date Completed: 29 March 2001
Water Depth: 5.65 feet
Water Elevation: 1147.61 feet, msl

Well Materials List

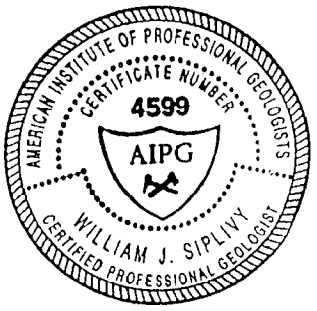
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 4 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

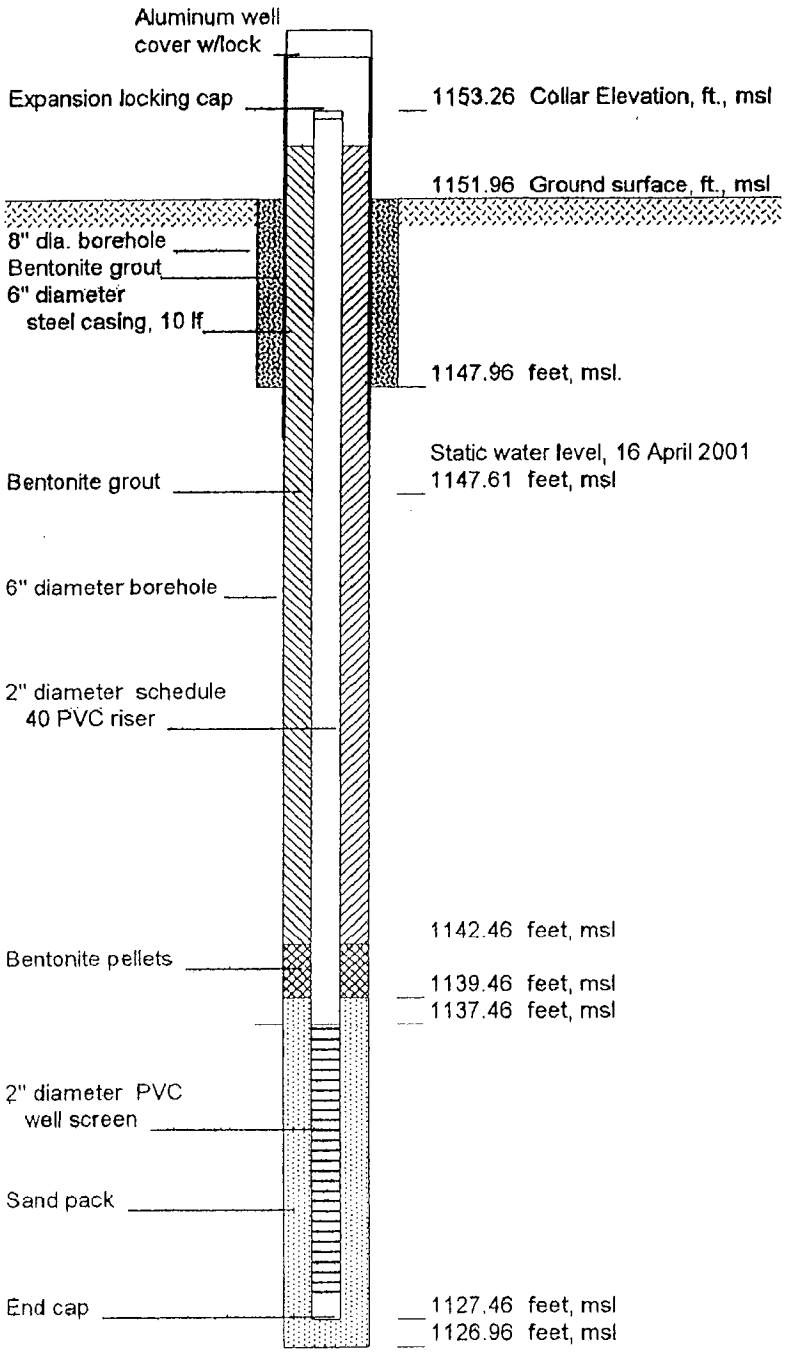
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-4C.WK4

WJS

AEC 10327

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-5A

Collar Elevation (feet, msl): 1161.07
Location: N 695,518.10 E 2,412,309.91
Date Started: 12 March 2001
Date Completed: 20 March 2001
Water Depth: 203.12 feet
Water Elevation: 957.95 feet, msl

Well Materials List

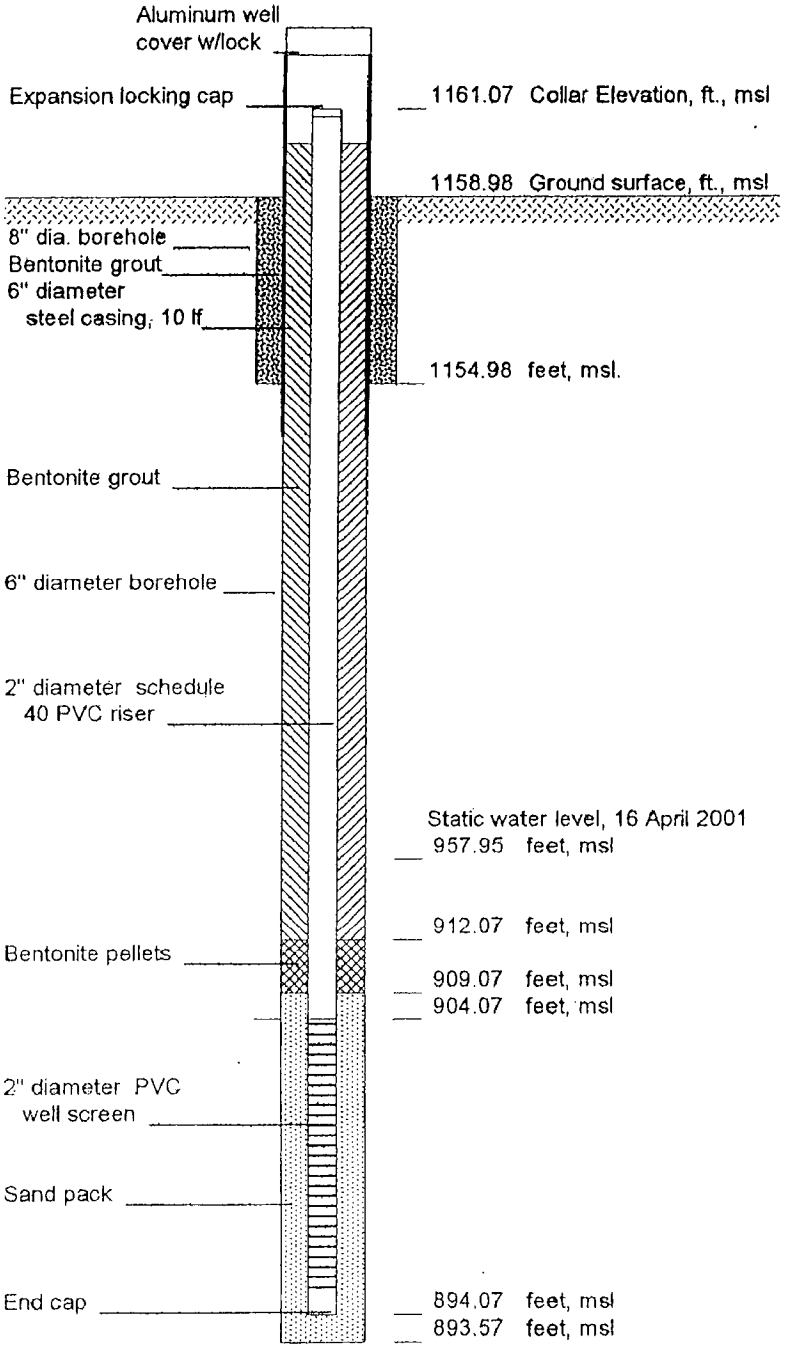
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 56 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 4 bags
11. Installation method: Gravity

Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy w/rain, high 30's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG



CG-01-5A.WK4

WJS

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-5B

Collar Elevation (feet, msl): 1160.16
Location: N 695,537.87 E 2,412,307.73
Date Started: 20 March 2001
Date Completed: 20 March 2001
Water Depth: 77.06 feet
Water Elevation: 1083.1 feet, msl

Well Materials List

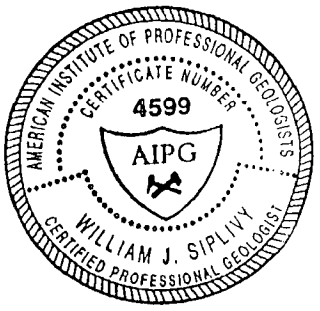
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 14 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

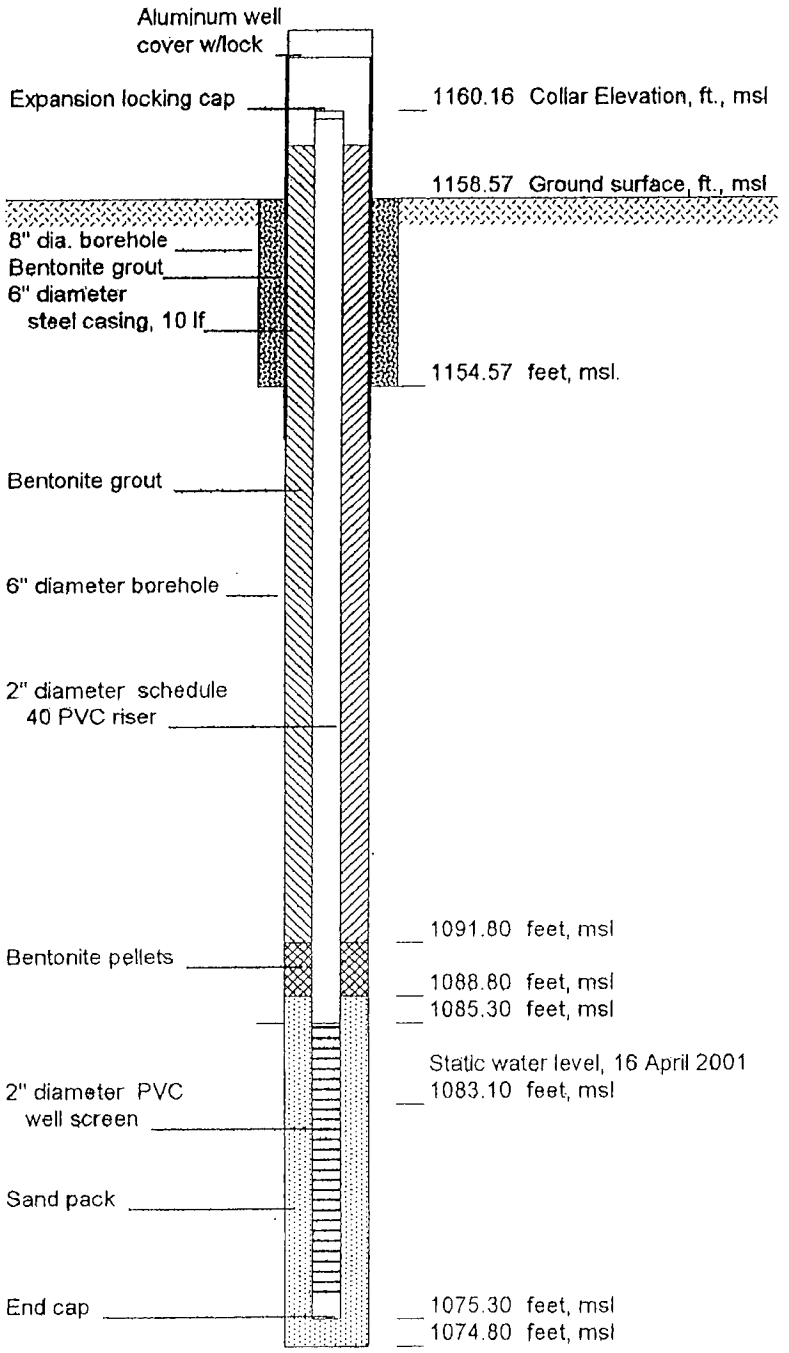
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-5B.WK4

WJS

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-5C

Collar Elevation (feet, msl): 1160.86
Location: N 695,528.14 E 2,412,308.76
Date Started: 20 March 2001
Date Completed: 20 March 2001
Water Depth: 7.24 feet
Water Elevation: 1153.62 feet, msl

Well Materials List

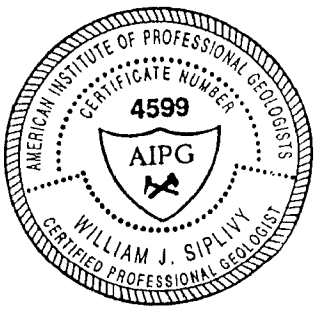
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type; Bentonite
4. Grout quantity: 2 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 5 bags
11. Installation method: Gravity

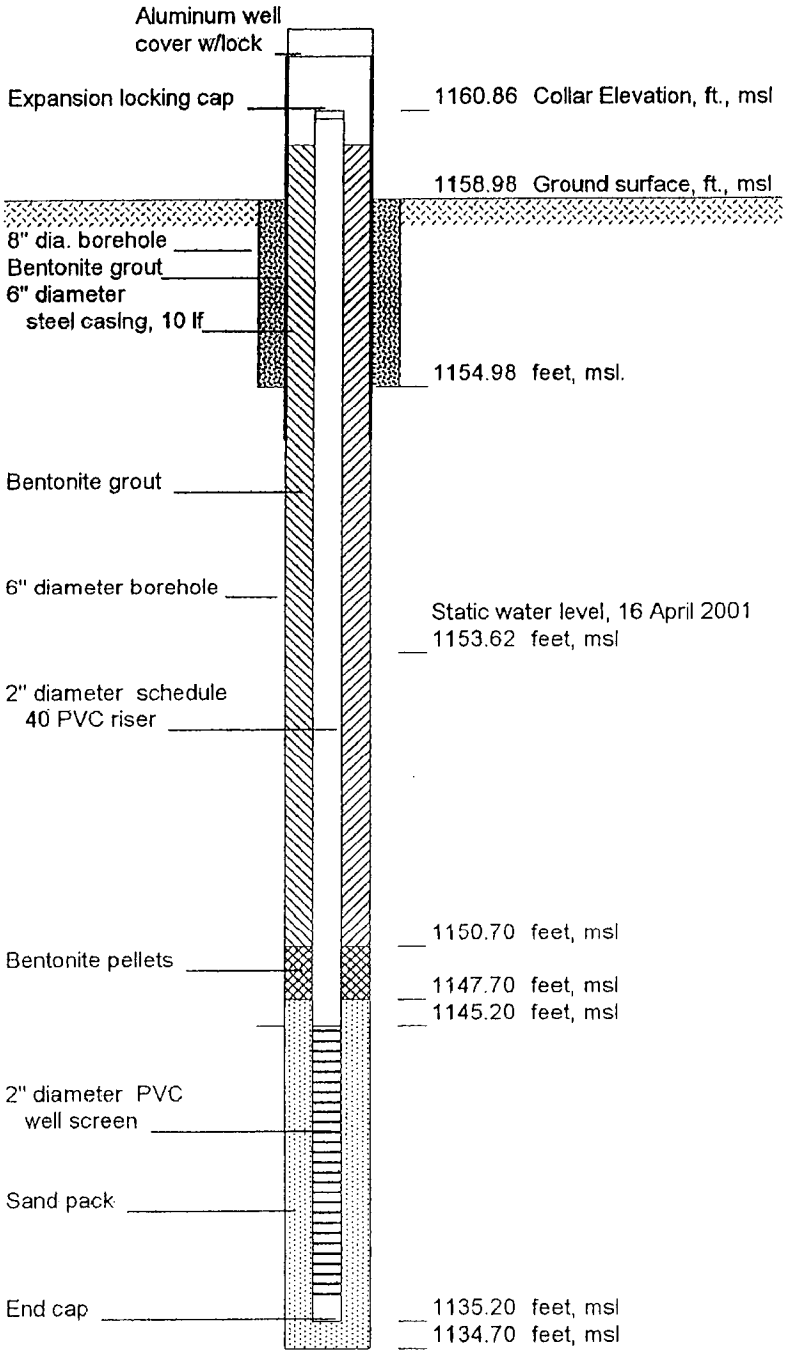
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-5C.WK4

WJS

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 4, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-6B

Collar Elevation (feet, msl): 1166.7
Location: N 696,894.84 E 2,413,834.75
Date Started: 30 March 2001
Date Completed: 30 March 2001
Water Depth: 74.64 feet
Water Elevation 1092.06 feet, msl

Well Materials List

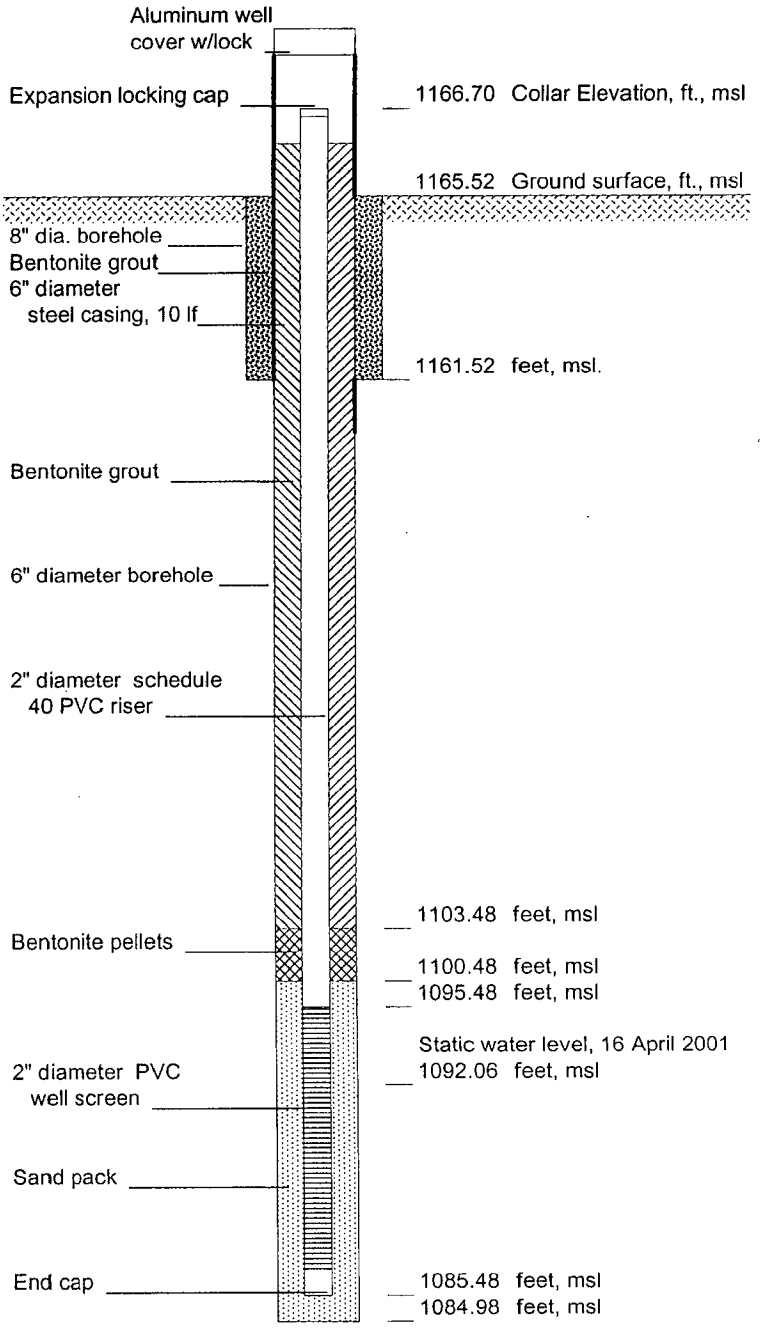
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 12 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Sunny, mid 50's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG



CG-01-6B.WK4

WJS

AEC 10331

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 4, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-6C

Collar Elevation (feet, msl): 1167.01
Location: N 696,895.79 E 2,413,842.77
Date Started: 30 March 2001
Date Completed: 30 March 2001
Water Depth: 30.91 feet
Water Elevation: 1136.1 feet, msl

Well Materials List

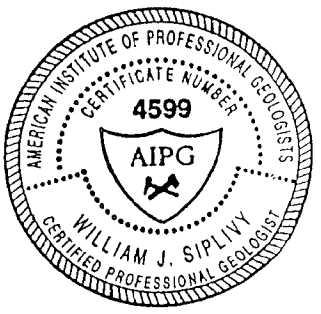
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 6 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

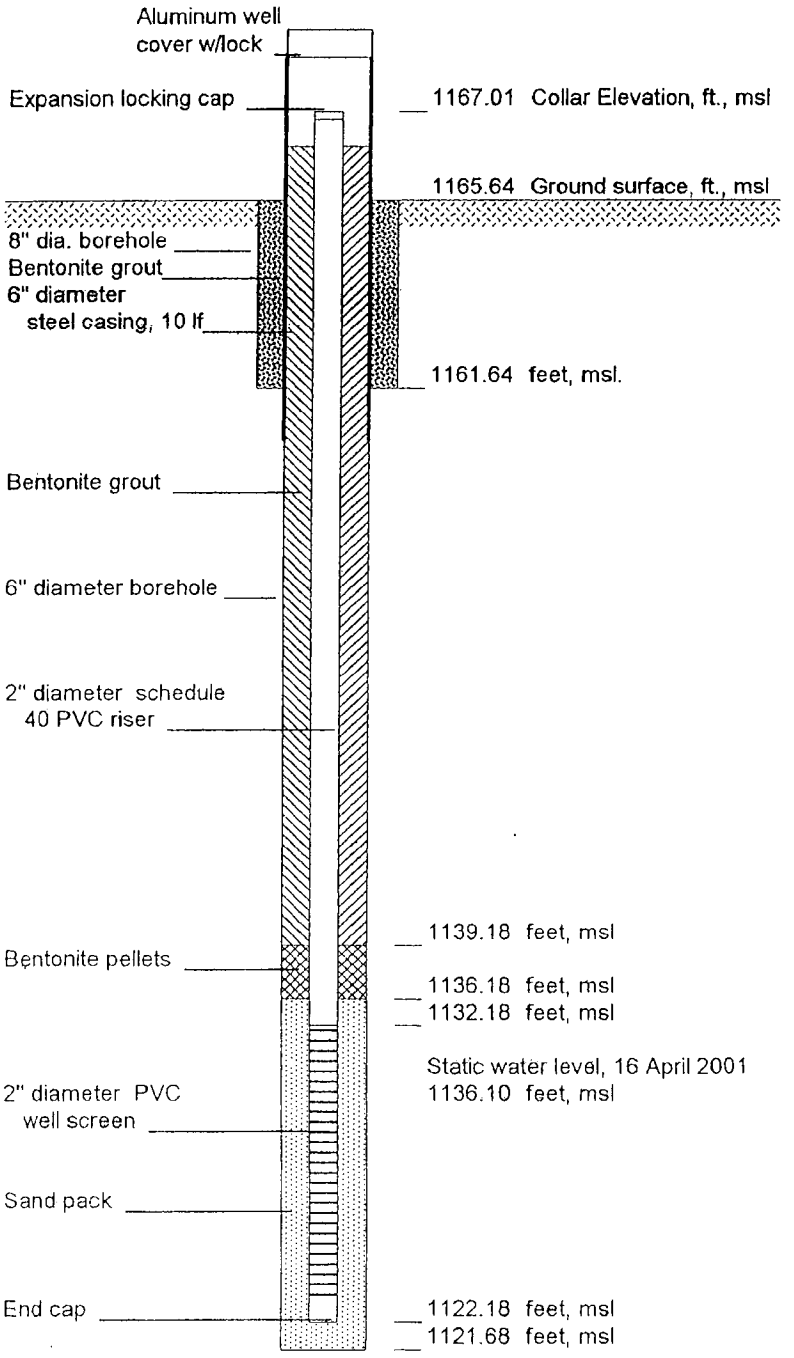
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Sunny, mid 50's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-6C.WK4

WJS

AEC 10332

ADDENDUM TO ATTACHMENT 28, PAGE 3, ITEM 17.,
AMERICAN ENERGY CORPORATION

Legitimately-used ground water supplies DW-7A and W-7 will not experience contamination, diminution, or interruption As a result of the proposed refuse disposal. Their distance from the proposed refuse disposal area, as well as dip of the strata will protect these sources. Monitoring of sediment ponds, and treatment if necessary, will protect surface water in the vicinity of the proposed disposal. See approved permit D-1159 and D-1159-1 responses Part 2, Items F(1) and F(2).

Rights of present ground water users will be respected and protected by measures as described in the sealing plan. Based on the measures to be undertaken to minimize the impact of the refuse disposal area on surface and ground water, ***American Energy Corporation*** does not anticipate that the rights of present users will be affected. However, if users rights are infringed upon, an alternate source will be provided. If the quality and quantity of water available for domestic use is diminished, alternate water sources within the underlying aquifer could be tapped by drilling and casing to a greater depth, depending on the quality and quantity required.

19. Describe in detail the monitoring plan and analytical procedures to be followed for this disposal plan.

Ground and surface water sites as referenced and listed in item 15. above will be monitored quarterly for quality and quantity. See A.R.P. Application Map for location of these sites. Pond monitoring will be conducted as required by NPDES/Stormwater General Permit OHM000001, Facility No.3GM00018. Analytical procedures as identified by the U.S. EPA, Methods for Chemical Waste Analysis of Water and Waste, will be utilized for all water quality analysis. (Pond 008 is monitored under Permit D-0425)

20. Identify the parameter limits and frequencies to be met as set by the OEPA by the disposal area, if different from the NPDES/NSPS requirements.

NPDES/Stormwater General Permit No. OHM000001, Facility No. 3GM00018 parameter limits and frequency requirements for monitoring at Ponds 001, 009, and 010 will be observed.

21. If required per the modified MOA, submit an OEPA Application for Permit to Install or Plan Approval (Form 4309) as an addendum to this attachment.

N/A

Ohio Department of Natural Resources

BOB TAFT, GOVERNOR | SAMUEL W. SPECK, DIRECTOR

Ohio Department of Mineral Resources Management
Michael L. Sponsler, Chief
1855 Fountain Square Court-Bldg. H-3
Columbus, Ohio 43224-1383
Phone: (614) 265-6633 Fax: (614) 265-7999

Date: 04/24/2002

To: Appropriate Governmental Agencies

From: Michael L. Sponsler, Chief
Division of Mineral Resources Management

Re: Coal Mine Application Number: R-1159-4
Coal Mine Permit Number: D-1159
Mine Name: N/A
Date Issued: 04/24/2002

Applicant: AMERICAN ENERGY CORP
43521 Mayhugh Hill Rd.
Beallsville, OH 43716

Telephone: (740) 926-9152

Permit Location:

COUNTY	TOWNSHIP	SECTION	LOTS	T	R	Quad
BELMONT	WAYNE	3		6	5	HUNTER
BELMONT	WAYNE	4		6	5	HUNTER

The Division of Mineral Resources Management has issued a coal mining and reclamation permit Application to Revise Permit (ARP) to the above named applicant. The permit number and date of issuance is shown above.

The approved water monitoring plan for this permit's application to revise permit (ARP) is:

Quality: S-23, CG013C, CG014C, CG015C, CG016C, CG013B, CG014B, CG015B, CG016B, CG013A, CG014A, CG015A, D-8A

Quantity: S-23, CG013C, CG014C, CG015C, CG016C, CG013B, CG014B, CG015B, CG016B, CG013A, CG014A, CG015A, D-8A

F65 Rev: 07/01/2001

Distribution List:

Office of Surface Mining
Eastland Professional Plaza
4480 Refugee Road, Suite 201
Columbus, OH 43232

Mark Mann
Ohio EPA, Division of Surface Water
Lazarus Government Center
P.O. Box 1049
Columbus, OH 43216-1049

Ric Queen
Ohio EPA, Division of Surface Water
Lazarus Government Center
P.O. Box 1049
Columbus, OH 43216-1049

Scott Sutliff
Ohio EPA, Division of Drinking & Groundwater
Lazarus Government Center
P.O. Box 1049
Columbus, OH 43216-1049

Jack A. Hamilton & Associates, Inc.
P.O. Box 471
342 High Street
Flushing, OH 43977

Al Rogalla, Chief, Regulatory Branch
U.S. Army Corps of Engineers, Pittsburgh District
William S. Moorhead Federal Bldg.
1000 Liberty Avenue
Pittsburgh, PA 15222-4186

Michael D. Gheen, Chief, Regulatory Branch
U.S. Army Corps of Engineers, Huntington District
502 Eighth Street
Huntington, WV 25701-2070

Bruce Goff
Ohio EPA, Southeast District Office
2195 Front Street
Logan, OH 43138

Belmont County Commissioners
Courthouse
Main Street
St. Clairsville, OH 43950

Belmont County Planning Commission
Courthouse
Main Street
St. Clairsville, OH 43950

Wayne Township Trustees
c/o Betty Lucas, Clerk
55709 County Hwy. 92
Beallsville, OH 43716

F65 Rev: 07/01/2001

2/96

_____ New Submittal
___X_ Revised Submittal R-_1159-4_

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINES AND RECLAMATION

APPLICATION TO REVISE A COAL MINING PERMIT

Note: Refer to the Division's "General Guideline for Processing ARPs" and "Requirements for Specific Types of Common ARPs" for guidance on submitting and processing ARPs.

1. Applicant's Name American Energy Corporation

   Address 43521 Mayhugh Hill Road, Twp. Rd. 88

   City Beallsville State Ohio Zip 43716

   Telephone Number 740 - 926 - 9152

2. Permit Number D-1159

3. Section of mining and reclamation plan to be revised:

   Part 2, Page 13, Item C(1),
   Part 2, Page 14, Item E(1),
   Part 2, Page 15, Item F(1&2),
   Part 3, Page 19 Item A(7)(a) - Attachment 28

4. Describe in detail the proposed revision and submit any necessary drawings, plans, maps, etc.:

   THIS REVISION IS BEING SUBMITTED TO REVISE THE RESPONSE TO THE ABOVE REFERENCED ITEM TO "YES", AND SUBMIT THE NECESSARY INFORMATION TO COMPLY WITH ATTACHMENT 28 AND PARAGRAPH (H), 1501:13-4-05.

   SEE ATTACHED ADDENDA.

5. Describe in detail the reason for requesting the revision:

   THIS REVISION IS BEING SUBMITTED TO ALLOW FOR DISPOSAL OF COAL REFUSE WITHIN THE WASHINGTON #12 COAL MINING PIT.

6. Will this revision constitute a significant alternation from the mining and reclamation operation contemplated in the original permit? __X__ Yes, _____ No.
   (**Note:** refer to paragraph (E) (2) of 1501:13-04-06 of the Ohio Administrative Code to determine if a revision is deemed significant.)

   If "yes," complete the following items 7 through 9.

7. In the space below give the name and address of the newspaper in which the public notice is to be published.

   The Times Leader
   Legal Notice Department
   200 South 4th Street
   Martins Ferry, OH 43935

8. In the space below give the text of the public notice that is to be published. (Include the information required by paragraph (A)(1) of 1501:13-05-01 of the Ohio Administrative Code.)

   See Addendum to A.R.P., Item 8.

9. In the space below give the name and address of the public office where this application is to be filed for public viewing.

   Belmont County Courthouse
   Recorder's Office
   Main Street
   St.Clairsville, Ohio 43950

I, the undersigned, a responsible official of the applicant, do hereby verify the information contained in this revision request is true and correct to the best of my information and belief.

Robert D. Moore	11-21-01
Print Name	Date
	President
Signature	Title

Sworn before me and subscribed in my presence this 21st day of November, 2001

NOTARIAL SEAL STATE OF OHIO

BARBARA L. RUSH
NOTARY PUBLIC, STATE OF OHIO
MY COMMISSION EXPIRES 9-01-04

Barbara L. Rush
Notary Public

FOR DIVISION USE ONLY

This request is hereby _____.

Chief, Division of Mines and Reclamation Date

PROOF OF PUBLICATION

The State of Ohio
County of Belmont, ss:

FEB 20 2002

The undersigned, being sworn, says that he or she is an employee of Eastern Ohio Newspapers, Inc., A Corporation, publisher of the Times Leader a newspaper published in Martins Ferry, Belmont County, Ohio, each day of the week except Saturday and of general circulation in said city and county; that it is a newspaper meeting the requirements of sections 7.12 and 5721.01 Ohio Revised Code as amended effective September 24, 1957; that affiant has custody of the records and files of said newspaper; and that the advertisement of which the annexed is a true copy, was published in said newspaper on each of the days in the month and year stated, as follows:

Jan 21, 28, Feb 4, 11, 18 2002

Audrey Blanco

Subscribed by Affiant and sworn to before me, this 18th day of Feb., A.D. 2002.

Rebecca L Anderson
Notary Public

REBECCA L. ANDERSON
Notary Public, State of Ohio
My Commission Expires Nov. 25, 2006

Public Notice

American Energy Corporation, 43521 Mayhugh Hill Road, Beallsville, Ohio 43716, has submitted an application to revise a coal mining permit #R-1159-4 to the Ohio Department of Natural Resources, Division of Mineral Resources Management. The permit area is located in Belmont County, Wayne Township, Sections 3 & 4, on the property of American Energy Corporation. The portion of the permit area to be affected by this revision encompasses 54.8 acres and is located on the Hunter 7 1/2 minute U.S.G.S. quadrangle map, approximately 3.4 miles north of the Village of Beallsville, Ohio. The application proposes to dispose of coal refuse within the Washington #12 coal mining pit.

The application is on file for public viewing at the Recorder's Office, Belmont County Courthouse, Main Street, St. Clairsville, Ohio 43950 and shall remain so for at least 30 days following the last date of publication of this notice. Written comments or requests for an informal conference may be filed with the Division of Mineral Resources Management, 1855 Fountain Square Court, Bldg. H-3, Columbus, Ohio 43224, within 30 days after the last date of publication of this notice.

TL - ADV. - 5 MON. - JAN. 21, 28, FEB. 4, 11, 18.

Printer's Fee $ 250.25

Notary's Fee $_____

The Times Leader
Martins Ferry, Ohio

AEC 10339

Addendum to A.R.P., Item 8.
American Energy Corporation

Public Notice

American Energy Corporation, 43521 Mayhugh Hill Road, Beallsville, Ohio 43716, has submitted an application to revise a coal mining permit #R-1159-4 to the Ohio Department of Natural Resources, Division of Mineral Resources Management. The permit area is located in Belmont County, Wayne Township, Sections 3 & 4, on the property of American Energy Corporation. The portion of the permit area to be affected by this revision encompasses 54.8 acres and is located on the Hunter7 ½ minute U.S.G.S. quadrangle map, approximately 3.4 miles north of the Village of Beallsville, Ohio. The application proposes to dispose of coal refuse within the Washington #12 coal mining pit.

The application is on file for public viewing at the Recorder's Office, Belmont County Courthouse, Main Street, St.Clairsville, Ohio 43950 and shall remain so for at least 30 days following the last date of publication of this notice. Written comments or requests for an informal conference may be filed with the Division of Mineral Resources Management, 1855 Fountain Square Court, Bldg. H-3, Columbus, Ohio 43224, within thirty days after the last date of publication of this notice.

ADDENDUM TO A.R.P., ITEM 4., AMERICAN ENERGY CORPORATION

American Energy Corporation is proposing to utilize a portion of Permit D-1159 as a coal refuse disposal site. See attached map and cross sections for location and detail. After coal removal is completed, a portion of the pit and coal bench areas will be left open for coal refuse disposal, which will be generated by American Energy Corp.'s Century Mine (D-0425) located near Alledonia, Ohio. The pit and coal bench areas will be open from the time of coal removal for a period not exceeding six (6) months. During this time, any water that collects in the pit will be promptly pumped to a sediment pond for treatment, if necessary. Due to the volume of waste generated from the D-0425 deep mine, the approved reclamation time table will be met.

A 1 foot to 30' foot thick layer of insitu claystone exists below the #12 coal seam. See Test Hole #1 from original permit D-1159 for 30 foot thick #12 underclay. The refuse will be disposed of in two foot lifts using rubbed tired vehicles and/or sheeps foot roller to meet compaction requirements of 90% of maximum dry density directly atop this insitu claystone material. In conjunction with the layering of coal refuse, a minimum of 2 feet of non-toxic compacted spoil material will be placed in layers against the final highwall, followed by 2 feet of low permeability compacted clay material, as the lifts are completed. Underdrains will be installed if springs, wet weather seeps or other areas producing water are encountered during mining. In these areas, 2 feet of shot rock will be placed against the highwall with the 2 foot clay compacted against the shot rock. (See details on cross section Sheet 2 of 2) The underdrains will be installed so as to direct drainage to naturally occurring swales and existing stream valleys. The pit floor will always slope toward ground surface to assure that water will not impound against the highwall. After the refuse lifts are completed, ***1.5*** feet of non-toxic, low permeability material will be placed over the refuse and an additional 2 feet of cover will be applied over the low permeability material prior to placing 6 inches of topsoil on the area. This will result in a minimum 4 foot of cover over the coal refuse area. Refuse will be encapsulated, including sides, where the #12 coal is mined or unmined. The placement of the cover material completely over the disposal site will minimize surface water, ground water, and oxygen contact with the coal refuse thereby eliminating the formation of acid or toxic leachate. This approach will result in a negligible impact on the environment.

The low permeability material will be identified in the field by a registered professional engineer. The low permeability material that will be used to cap the refuse will be stockpiled above the final highwall for placement after final grade for the top of the refuse is reached. sufficient low permeable material exists on the area to cap the refuse. The 1.5 foot cap for the 52.7 acre area will require 128,000 cubic yards of low permeability material. This material has an intermittent areal extent encompassing the entire refuse disposal area, contained in the variable clay strata lying directly above, 5 to 10 feet above, and 33 to 40 feet, respectively, above the #12 coal as indicated in drill logs for monitoring wells CG01-5A, CG01-3A, CG01-4A, and CG01-6B. The available cap material is listed below:

ADDENDUM TO A.R.P., ITEM 4., AMERICAN ENERGY CORPORATION

2.7 Ac. x 8' (average thickness) x 43,560 / 27 =		34,848 cubic yards
1.9 Ac. x 10' (average thickness) x 43,560 / 27 =		30,653 cubic yards
11.5 Ac. x 14.8' (average thickness) x 43,560 / 27 =		274,589 cubic yards
0.6 Ac. x 7' (average thickness) x 43,560 / 27 =		6,776 cubic yards
	Total	346,866 cubic yards

See Attachment 28 for physical and chemical analysis of the liner/cover material.

Since the proposed refuse disposal area will be reclaimed to approximate original contour, surface water drainage structures, other than those previously existing and proposed in D-1159 and Pond 008 series in permit D-0425, will not be necessary. Existing valleys and drainage ways will safely carry the discharge from the refuse disposal area to Ponds 001, 009, 010, and 008.

The coal refuse material will be hauled to the site by trucks and placement will begin south east of test hole #1, and will continue easterly. Disposal will then start on the east side of the proposed #12 mining pit and coal bench located west of Permit D-0425, and will continue in a west, southwest direction. The open pits and coal bench will have the capacity to store approximately 2,514,970 cubic yards of refuse which amounts to approximately 2,937,457 tons. Spoil and clay generated during mining will be stockpiled above the proposed final highwall and utilized for cover material on the pending D-0425-2 refuse disposal area. Excess overburden storage areas will be seeded and mulched to protect them from wind and water erosion. Overburden storage duration may not exceed six months due to the volume of waste generated from the D-0425 deep mine. See cross sections A-A' through G-G' for redistributed thicknesses of excess overburden.

As described above, the highwall will be lined before placement of refuse material. The placement of the refuse material will consist of layering the refuse in two foot lifts and compacting with rubber tired vehicles and/or sheepsfoot roller. These lifts will be repeated vertically until the final proposed grade (approximate original contour) has been achieved. The refuse will be covered with a 1.5 foot layer of non-toxic, low permeability material. Above the 1.5 foot low permeability material, a 2 foot thick cover material will be placed, followed by six (6) inches of moderately dry growth medium soil and topsoil. Topsoiling and seeding will be completed in the next appropriate planting season following placement of the cover material.

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/22 & 23/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-3A	0	4	Br. clay
	4	24	Br. shale firm @ 6' w/clay bds.
	24	32	Gr. & red clay shale
	32	39	Limestone
	39	48	Gr. clay shale
	48	67	Gr. silty shale/1'limestone @ 63
	67	76	Br. sandstone w/shale bds.
	76	82½	Med. gr. shale
	82½	87	Coal WASHINGTON (No. 12)
	87	93	Clay shale
	93	140	Gr. silty shale w/siltstone bds.
	140	147	Limestone
	147	154	Gr. silty shale
	154	163	Gr. sandstone
	163	178	Gr. silty shale w/limestone bds
	178	188	Dr. gr. silty shale
	188	191½	Coal WAYNESBURG (No. 11)
	191½	199	Dr. clay shale
	199	207	Limestone
	207	223	Gr. silty shale
	223	233	Gr. sandstone
	233	239	Red gr. shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-3A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001

Project: Hydrogeologic Investiga

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/22 & 23/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-3A	239	253	Gr. silty shale w/limestone bds
	253	263	Limestone w/shale bds.
	263	276	Gr. silty shale w/limestone bds.
	276	280	Dr. gr. shale
	280	281	Limestone

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-3A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001

Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/22/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-3B	0	4	Br. clay
	4	24	Br. shale firm @ 6' w/clay bds.
	24	32	Gr. & red clay shale
	32	39	Limestone
	39	48	Gr. clay shale
	48	67	Gr. silty shale w/1' limestone
	67	76	Br. sandstone w/shale bds.
	76	82½	Med. gr. shale
	82½	86½	Coal WASHINGTON (No. 12)
	86½	88	Clay shale

	AMERICAN ENERGY CORPORATION CENTURY MINE
William J. Siplivy, PE., Inc. 50 Munroe Falls Avenue Munroe Falls, Ohio 44262	***ROCK CORE LOG*** ***CG-01-3B*** ***COARSE COAL REFUSE FACILITY***
Checked by: WJS Date: 12 April 2001	**Project: Hydrogeologic Investigation**

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/26/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
GC-01-3C	0	4	Br. clay
	4	6	Br. shale
	6	7	Br. sandstone
	7	21	Br. shale w/clay bands
	21	25	Gr. shale clay

	AMERICAN ENERGY CORPORATION CENTURY MINE
William J. Siplivy, PE., Inc. 50 Munroe Falls Avenue Munroe Falls, Ohio 44262	***ROCK CORE LOG*** ***CG-01-3C*** ***COARSE COAL REFUSE FACILITY***
Checked by: WJS Date: 12 April 2001	Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/27,28,29/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-4A	0	1	Topsoil
	1	13	Br. clay
	13	20	Br. gr. sandstone
	20	26	Gr. shale
	26	27	Limestone
	27	30	Gr. silty shale
	30	40	Clay shale
	40	45	Gr. silty shale w/limestone bds.
	45	50	Trace of coal - clay
	50	52	Dr. shale
	52	56	Coal WASHINGTON (No. 12)
	56	61	Clay
	61	76	Clay shale
	76	79	Limestone
	79	87	Gr. shale
	87	95	Gr. sandstone to siltstone
	95	106	Gr. red silty shale to dr. gr.
	106	107	3" trace of coal @ 106' - clay
	107	108	Coal 12" WAYNESBURG "A"
	108	118	Gr. shale w/limestone bds.
	118	140	Gr. silty shale
	140	163	Gr. sandstone

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-4A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/27,28,29/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-4A	163	170	Gr. sandstone
	170	174	Gr. sandstone
	174	181	Gr. shale 6" coal @ 180½' (Waynesburg No. 11)
	181	182	Clay
	182	207	Limestone w/shale bds.
	207	233	Gr. silty shale w/limestone bds.
	233	242	Limestone w/shale bds.
	242	252	Shale w/limestone bds.
	252	256	Gr. sandstone
	256	259	Gr. shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-4A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/27/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-4B	0	1	Topsoil
	1	13	Br. clay
	13	20	Br. gr. sandstone
	20	26	Gr. shale/water @ 20'
	26	27	Limestone
	27	30	Gr. silty shale
	30	40	Clay shale
	40	45	Gr. silty shale w/limestone bds.
	45	50	Trace of coal - clay
	50	52	Dr. shale
	52	56	Coal WASHINGTON (No. 12)
	56	57	Clay

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-4B
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/27 & 29/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-4C	0	1	Topsoil
	1	13	Br. clay
	13	20	Br. gr. sandstone
	20	24	Gr. shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-4C
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001

Project: Hydrogeologic Investigation

Diamond Drill Hole: CG-01-5A

Driller: Randy McKay, McKay & Gould Drilling, Inc.

Coordinates: N 695,518.10 E 2,412,309.91 (1927 State Plane)
Elevation: 1158.98 Feet MSL
Start: 12 March 2001
Finish: 20 March 2001
Engineer: W. J. Siplivy

Location: Ridge west of refuse area #2
Township: Wayne
Section: 3
County: Belmont
State: Ohio

Thickness	Depth	Description	Construction Use	Bottom Elevation	Acres	Volume (cubic yds.)
22.00	22.00	Non-coring, soil and weathered rock	General fill	1136.98		
1.70	23.70	Claystone, olive-gray, Fe-stained	Clay liner	1135.28		
3.30	27.00	Claystone, gray (1.7' lost)	Clay liner	1131.98		
1.30	28.30	Limestone, Middle Washington, tan-light gray	Riprap or road base	1130.68		
1.00	29.30	Shale, gray, calcareous	General fill	1129.68		
3.70	33.00	Limestone, Middle Washington, tan-light gray	Riprap or road base	1125.98		
3.10	36.10	Claystone, gray	Clay liner	1122.88		
0.50	36.60	Claystone, red	Clay liner	1122.38		
1.10	37.70	Claystone, greenish-gray	Clay liner	1121.28		
1.80	39.50	Claystone, greenish-gray w/limestone nods.	General fill	1119.48		
1.00	40.50	Shale, greenish-gray, sandy w/ls nods.	General fill	1118.48		
3.00	43.50	Sandstone, Lower Marietta, l. gray, calcareous	Riprap or road base	1115.48		
2.40	45.90	Shale, gray w/sandstone partings, x-bedded	General fill	1113.08		
4.60	50.50	Shale, gray	General fill	1108.48		
0.10	50.60	Limestone, tan-light gray	General fill	1108.38		
1.60	52.20	Claystone, gray w/occasional limestone nods.	General fill	1106.78		
2.70	54.90	Shale, gray w/sandstone partings, x-bedded	General fill	1104.08		
0.80	55.70	Shale, gray, silty	General fill	1103.28		
0.60	56.30	Claystone, gray	Clay liner	1102.68		
0.30	56.60	Claystone, gray & red	Clay liner	1102.38		
1.40	58.00	Claystone, gray	Clay liner	1100.98		
0.80	58.80	Shale, gray, silty	Clay liner	1100.18		
4.00	62.80	Claystone, gray w/occasional limestone nods.	General fill	1096.18		
5.90	68.70	Shale, gray w/sandstone partings	General fill	1090.28		
0.90	69.60	Shale, gray	General fill	1089.38		
5.90	75.50	Claystone, gray	Clay liner	1083.48		
0.55	76.05	Shale, black, carbonaceous w/pyrite	Dispose as refuse	1082.93		
3.70	**79.75**	**Washington (No. 12) Coalbed**	None	1079.23		
12.55	92.30	Claystone, gray (6.05' lost)	Clay liner	1066.68		
3.40	95.70	Claystone, gray w/abundant limestone nods.	General fill	1063.28		
3.80	99.50	Claystone, gray, silty	General fill	1059.48		
0.50	100.00	Shale, gray	General fill	1058.98		
5.40	105.40	Sandstone, Mannington, l. gray, calcareous	Riprap or road base	1053.58		
14.20	119.60	Claystone, gray, silty	General fill	1039.38		
3.95	123.55	Claystone, red	Clay liner	1035.43		
4.95	128.50	Claystone, gray (2.45')	Clay liner	1030.48		
0.75	129.25	Shale, black, carbonaceous	Dispose as refuse	1029.73		
0.25	**129.50**	**Coal**	None	1029.48		
1.65	131.15	Shale, dark gray	General fill	1027.83		
0.85	**132.00**	**WAYNESBURG "A" COALBED, w/shale**	None	1026.98		
0.50	132.50	Shale, black, carbonaceous	Dispose as refuse	1026.48		
7.20	139.70	Shale, gray	General fill	1019.28		
5.20	144.90	Claystone, gray w/limestone nodules	General fill	1014.08		
11.70	156.60	Shale, gray w/occasional limestone nodules	General fill	1002.38		
4.90	161.50	Claystone, gray w/limestone nodules	General fill	997.48		
2.75	164.25	Shale, gray	General fill	994.73		
7.35	171.60	Claystone, gray w/occasional limestone nods.	General fill	987.38		
0.45	172.05	Sandstone, Waynesburg, light gray	Riprap or road base	986.93		
5.45	177.50	Shale, gray w/abundant sandstone partings	General fill or road base	981.48		
1.60	179.10	Shale, dark gray w/sandstone partings	General fill or road base	979.88		
1.45	180.55	Shale, dark gray-black	Dispose as refuse	978.43		
0.10	180.65	Shale, black, carbonaceous	Dispose as refuse	978.33		
3.62	**184.27**	**WAYNESBURG (No. 11) COALBED**	None	974.71		
1.33	185.60	Claystone, gray	Clay liner	973.38		
7.55	193.15	Shale, gray	General fill	965.83		
0.10	**193.25**	**Coal, broken**	None	965.73		
0.30	193.55	Claystone, gray		965.43		

AEC 10351

Diamond Drill Hole: CG-01-5A (Continued)

Thickness	Depth	Description	
0.25	193.80	Limestone, tan-light gray	965.18
0.35	194.15	Claystone, gray	964.83
0.15	194.30	Shale, gray w/carbonaceous streaks	964.68
1.70	196.00	Shale, gray, calcareous	962.98
2.70	198.70	Limestone, tan, very hard	960.28
3.30	202.00	Shale, gray, calcareous	956.98
0.55	202.55	Limestone, tan, very hard	956.43
2.90	205.45	Claystone, gray w/limestone nodules	953.53
0.80	206.25	Limestone, tan, very hard	952.73
1.70	207.95	Claystone, greenish-gray w/limestone nodules	951.03
2.45	210.40	Limestone, Waynesburg, tan, nodular	948.58
6.60	217.00	Claystone, greenish-gray	941.98
1.65	218.65	Limestone, tan-light gray	940.33
1.00	219.65	Claystone, greenish-gray	939.33
0.15	219.80	Shale, gray w/carbonaceous streaks	939.18
0.25	220.05	Claystone, greenish-gray w/limestone nodules	938.93
0.85	220.90	Shale, gray w/carbonaceous streaks (Uniontown No. 10 coal horizon)	938.08
3.40	224.30	Claystone, greenish-gray	934.68
4.60	228.90	Shale, greenish-gray w/sandstone streaks	930.08
1.60	230.50	Shale, greenish-gray	928.48
0.70	231.20	Shale, gray, calcareous	927.78
1.25	232.45	Shale, olive-gray	926.53
0.90	233.35	Limestone, tan-light gray	925.63
2.85	236.20	Shale, gray, calcareous	922.78
1.15	237.35	Shale, greenish-gray	921.63
7.15	244.50	Shale, gray	914.48
0.65	245.15	Shale, greenish-gray	913.83
0.80	245.95	Limestone, tan-light gray	913.03
1.05	247.00	Claystone, gray	911.98
7.55	254.55	Shale, gray, calcareous, Fe-stained upper 4'	904.43
2.65	257.20	Limestone, Arnoldsburg, tan-light gray	901.78
1.70	258.90	Claystone, greenish-gray	900.08
2.50	261.40	Shale, gray, calcareous	897.58
1.60	263.00	Claystone, greenish-gray w/occasional limestone nods.	895.98
5.00	268.00	Sandstone, Morningview, light gray, Fe-stained	890.98
4.45	272.45	Shale, gray	886.53
2.40	274.85	Shale, gray, calcareous	884.13
2.60	277.45	Limestone, Benwood, tan-light gray	881.53
0.60	278.05	Shale, gray	880.93
2.25	280.30	Limestone, Benwood, tan-light gray, shaly	878.68
2.70	283.00	Claystone, green	875.98

End of Log

Respectfully submitted,

William J. Siplivy

William J. Siplivy, P.E., C.P.G.

AMERICAN INSTITUTE OF PROFESSIONAL GEOLOGISTS
CERTIFICATE NUMBER
4599
AIPG
WILLIAM J. SIPLIVY
CERTIFIED PROFESSIONAL GEOLOGIST

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County Belmont Date 3/12,13,14,15,16,19,20/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-5A	0	2	Br. clay
	2	7	Br. sandstone w/mud seams
	7	22	Gr. br. shale w/mud seams
	22	27	Core - Retrieved 3'3" of 5'
	27	42	Core - Retrieved 14'5" of 15'
	22	27	Gr. clay shale/22-24' water
	27	38	Gr. dr. gr. & 1' red @ 36' of
			clay shale
	38	40	Siltstone w/limestone
	40	42	Gr. siltstone
	42	58½	Core - Retrieved 16'4"
	58½	65	Core - Retrieved 6'8"
	65	86	Core - Retrieved 13'
	42	51	Gr. silty shale w/sandstone bds.
	51	52	Clay shale
	52	56	Silty shale
	56	57	Clay shale
	57	59	Silty shale
	59	66	Clay shale w/silty bds.

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-5A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/12,13,14,15,16,19,20/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-5A	66	69	Silty shale
	69	75	Dr. silty shale w/clay bds.
	75	79	Coal WASHINGTON (No.12)
	79	86	Lost
	86	99½	Core
	86	92	Dr. gr. silty shale
	92	96	Gr. shale w/imbedded limestone
	96	99½	Gr. silty shale
	99½	109	Core
	109	126	Core
	126	142	Core
	142	159½	Core
	99½	108	Gr. siltstone
	108	110	Clay shale
	110	121	Gr. silty shale
	121	126	Red gr. clay shale - lost 2'
	126	131	Gr. & dr. gr. silty shale
	131	132	Coal 9" WAYNESBURG "A"
	132	142	Clay shale
	142	159½	Clay shale w/limestone bds.

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-5A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/12,13,14,15,16,19,20/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-5A	159½	163	Gr. silty shale
	163	168¼	Clay shale - lost 1'
	168¼	171	Clay shale
	171	178	Gr. silty shale
	178	180½	Dr. gr. silty shale
	180½	184	Coal 42" Waynesburg (No. 11)
	184	185½	Clay shale
	185½	188	Dr. gr. shale
	188	189	Dr. gr. shale drilled 6"
	189	193½	Dr. gr. shale w/trace of coal
	193½	208½	Limestone
	208½	218½	Limestone
	218½	229¼	Green gr. silty shale
	229¼	247	Core
	247	263	Core
	263	283	Core
	229¼	232½	Gr. silty shale
	232½	236½	Limestone
	236½	245	Gr. silty shale
	245	246	Limestone
	246	247	Clay shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-5A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/12,13,14,15,16,19,20/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-5A	247	250	Gr. silty shale
	250	257	Limestone
	257	263	Gr. silty shale
	263	268	Gr. sandy limestone
	268	271	Dr. gr. silty shale
	271	280	Limestone
	280	283	Gr. silty shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-5A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/20/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-5B	0	1	Br. clay
	1	7	Br. sandstone
	7	27	Gr. br. shale clay
	27	33	Limestone
	33	38	Dr. gr. shale
	38	40	Gr. silty shale
	40	44	Gr. silty limestone
	44	58	Gr. silty shale
	58	64	Gr. silty shale w/limestone bds.
	64	77½	Br. gr. shale
	77½	81	Coal WASHINGTON (No. 12)
	81	82	Clay shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-5B
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/20/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-5C	0	3	Br. clay
	3	8	Br. sandstone
	8	12	Br. clay
	12	24	Red & br. shale
	24	25	Gr. clay shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-5C
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/30/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-6B	0	8	Br. silty shale
	8	19	Br. shale w/clay bands
	19	23	Gr. clay shale
	23	30	Limestone w/shale bands
	30	42	Gr. shale
	42	44	Gr. sandstone
	44	57	Gr. silty shale w/clay bds.
	57	64	Gr. fine sandstone
	64	72	Gr. clay shale
	72	74	Dr. shale
	74	78	Coal WASHINGTON (No. 12)
	78	79	Clay

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-6B
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001

Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/30/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-6C	0	8	Br. silty shale
	8	19	Br. shale w/clay bands
	19	23	Gr. clay shale
	23	30	Limestone w/shale bands
	30	42	Gr. shale
	42	44	Gr. sandstone

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-6C
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

ADDENDUM TO ATTACHMENT 14B, A.R.P., PERMIT D-0425
AMERICAN ENERGY CORPORATION

The first continuous zone of saturation underlying the proposed refuse disposal area occurs in Zone C. Zone C is approximately ninety (90) feet in vertical distance, at its closest point, below the bottom of the proposed refuse disposal area. Zone C has a vertical extent of approximately ***132*** feet max., and a lateral extent equal to the extent of the 'Cassville' Shale, with the Waynesburg #11 Coal seam as a bedding plane.

Temporal fluctuations are entirely dependent upon rainfall as the recharge of groundwater is confined to the immediate ridgetop areas. Groundwater flow directions will not be affected by the proposed refuse disposal operation. Due to the existing rock structure and topography, recharge of groundwater is confined to the immediate ridgetop areas. Discharge areas within the boundaries of the refuse disposal area can be seen in spring discharge elevations between 1143 and 1140 (Zone A), spring discharge and well static water level between the elevations of 1097 and 1060 (Zone B), and spring discharge and well static water level between the elevations of 1009 and 950 (Zone C).

Zone A discharge ranges from a high of 1.5 gpm during "high flow" conditions to less than 1 gpm during "low flow" conditions.

Zone B discharge ranges from a high of 9.1 gpm during "high flow" conditions to 0 gpm during "low flow" conditions. Fluctuations in water levels in Zone B are illustrated by well DW-7A. The static water level in this well has ranged from a high of 6 feet (elevation 1076) to a low of 9 feet (elevation 1073).

Zone C discharge, based on flows from undeveloped springs, does not exceed <1 gpm. Static water levels at W-7 have ranged from a high of 22 feet (elevation 1040) to a low of 64 feet (elevation 998).

Zones A and B will be isolated from the refuse by 2 feet of non-toxic material will be placed against the open highwall, followed by 2 feet of compacted low permeability material. In areas where water seepage occurs from the highwall, shot rock will be placed against the highwall, followed by the 2 feet of compacted clay material. A 6" drain pipe will be installed approximately 2 feet below the pit floor to direct all drainage from the highwall area. See cross sections A-A' through G-G' and details. Zone C will be isolated by its 90 feet in vertical distance between it and the bottom of the refuse area. Zone D (identified in the original permit) is 238 feet below the proposed refuse disposal area. Zones C and D will not be affected by the proposed refuse disposal.

The uppermost aquifer system, and all zones of saturation above the uppermost aquifer system were determined by existing undeveloped spring elevations, and static water levels in existing wells utilizing a Fisher M-Scope static water level meter. The Generalized Section of Ohio, Division of Geological Survey, Table 1, as well as site specific information noted above, were utilized to define vertical extent of the separate zones of saturation.

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 14B
(WELL/SPRING INVENTORY)

Applicant's Name AMERICAN ENERGY CORPORATION (R-1159-4)

Aquifer/Zone Identification	Aquifer/Zone Lithology	Aquifer/Zone Thickness Well/Spring	Aquifer/Zone Elev. (msl)	Aquifer/Zone Horizontal Extent	Aquifer/Zone Known Uses	Approx. Rate of Discharge/Usage of Aquifer/Zone (gpm or cfs)
A	SANDSTONE, SHALE	117'	1239' TO 1122'	UPPER RIDGE OUTCROP TO OUTCROP	S-23, S-24	NONE, <1 TO 1.5 GPM
B	SANDSTONE, SHALE, #12 COAL	50'	1110 TO 1060	MID-RIDGE OUTCROP TO OUTCROP	DW-7A, DS-10, S-1, 2, 3, 5, 20, 25, 26, 27	DOMESTIC, AGRICULTURAL, NONE, 0 TO 9.1GPM
C	SHALE, #11 COAL	132'	1009 TO 877	LOWER-RIDGE OUTCROP TO OUTCROP	W-7	DOMESTIC

9/88

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 14A
(HYDROLOGIC MEASUREMENTS AND ANALYSES)

APPLICANT AMERICAN ENERGY CORPORATION (REFUSE DISPOSAL)

1	Identification No. of Sampling Station from Hydrology Map	S-23	S-23	S-23			
2	Identification Number	01-07-503	01-10-722	02-02-849			
3	High (H)/Low (L) Intermediate (I) Designation (if applicable)	I	L	H			
4	Surface Elevation for Sampling Station (msl)	1125	1125	1125			
5	Depth of Well Below Land Surface (feet)	--	--	--			
6	Static Water Level of Well Below Land Surface (feet)	--	--	--			
7	Flow for Spring and Stream (gpm or cfs)	.34 GPM	.05 GPM	1.8 GPM			
8	Date Above Measurements Made	7-11-01	10-19-01	02-27-02			
9	Aquifer/Zone Identification For Well/Spring	A	A	A			
10	pH (Standard Units)	8.09	8.12	8.18			
11	Total Acidity (mg/l CaCO3)	6.20	13.40	3.20			
12	Total Alkalinity (mg/l CaCO3)	207.80	240.40	147.60			
13	Specific Conductivity (umhos/cm at 25° C)	667.00	756	485			
14	Total Dissolved Solids (mg/l)	---	---	---			
15	Total Manganese (mg/l)	<0.02	<0.02	0.04			
16	Total Sulfates (mg/l)	94.00	122.00	82.0			
17	Total Iron (mg/l)	0.04	0.33	1.20			
18	Total Suspended Solids (mg/l)	3	4	34.0			
19	Total Hardness (mg/l as CaCO3)	320.00	370.00	220.00			
20	Nitrates	---	---	---			
21	Date Sampled for Analysis	7-11-01	10-19-01	02-27-02			
22	Date Last Precipitation Event Occurred	7-8-01	10-16-01	02-27-02			

Laboratory Name INDUSTRIAL LAB ANALYSIS, INC.
Address 2240 WILLIAMSBURG DRIVE City GLEN DALE
State WEST VIRGINIA Zip 26038

NOTE: If information required by items 5, 6, and 9 is unobtainable, submit as an addendum to Attachment 14A a statement giving the reasons why the information is unobtainable.
NOTE: For each sample provide data for either item 13 or 14.

9/88

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 14A
(HYDROLOGIC MEASUREMENTS AND ANALYSES)

APPLICANT AMERICAN ENERGY CORPORATION (REFUSE DISPOSAL)

1	Identification No. of Sampling Station from Hydrology Map	D-8	D-8	D-8			
2	Identification Number	01-07-505	01-10-682	02-02-829			
3	High (H)/Low (L) Intermediate (I) Designation (if applicable)	I	L	H			
4	Surface Elevation for Sampling Station (msl)	925	925	925			
5	Depth of Well Below Land Surface (feet)	--	--	--			
6	Static Water Level of Well Below Land Surface (feet)	--	--	--			
7	Flow for Spring and Stream (gpm or cfs)	.01 CFS	.002 CFS	.02 CFS			
8	Date Above Measurements Made	7-7-01	10-19-01	2-27-02			
9	Aquifer/Zone Identification For Well/Spring	--	--	--			
10	pH (Standard Units)	7.93	7.70	8.10			
11	Total Acidity (mg/l CaCO3)	4.20	7.00	4.60			
12	Total Alkalinity (mg/l CaCO3)	102.00	67.80	102.00			
13	Specific Conductivity (umhos/cm at 25° C)	847.00	1192.00	959			
14	Total Dissolved Solids (mg/l)	---	---	---			
15	Total Manganese (mg/l)	0.07	0.22	0.32			
16	Total Sulfates (mg/l)	283.00	429.00	332.0			
17	Total Iron (mg/l)	0.10	0.53	0.33			
18	Total Suspended Solids (mg/l)	3	15	<2			
19	Total Hardness (mg/l as CaCO3)	326.00	300.00	360.0			
20	Nitrates	---	---	---			
21	Date Sampled for Analysis	7-7-01	10-19-01	02-27-02			
22	Date Last Precipitation Event Occurred	7-5-01	10-16-01	02-27-02			

Laboratory Name INDUSTRIAL LAB ANALYSIS, INC.
Address 2240 WILLIAMSBURG DRIVE City GLEN DALE
State WEST VIRGINIA Zip 26038

NOTE: If information required by items 5, 6, and 9 is unobtainable, submit as an addendum to Attachment 14A a statement giving the reasons why the information is unobtainable.
NOTE: For each sample provide data for either item 13 or 14.

(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

01-May-01

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-01	Date & Time Sampled:	03-30-01 0825
Analysis Number:	104012	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.5	S.U.	03-30-01 0825	QES (DR)	150.1	[2]	
pH, Lab	7.45	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	960	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	1.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	470	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	320	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.11	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	100	mg/l.	04-06-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0012	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	0.11	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	<0.0010	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	190	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-01
Analysis Number: 104012

01-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	24	mg/l.	04-09-01 1300	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.05	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	250	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0060	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	<0.01	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	1500	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

27-Apr-01
Page 1 of 2

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-02	Date & Time Sampled:	03-30-01 0800
Analysis Number:	104013	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.9	S.U.	03-30-01 0800	QES (DR)	150.1	[2]	
pH, Lab	7.99	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	550	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	<1.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	200	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	160	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.09	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	26	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0024	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	0.16	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0013	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	96	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-02
Analysis Number: 104013

27-Apr-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	47	mg/l.	04-09-01 1300	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.07	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	160	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0056	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	<0.01	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	900	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

01-May-01

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-3A	Date & Time Sampled:	03-30-01 0930
Analysis Number:	104014	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.9	S.U.	03-30-01 0930	QES (DR)	150.1	[2]	
pH, Lab	7.98	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	270	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	<1.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	57	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	210	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.12	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	14	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0031	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	0.19	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0019	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	80	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-3A
Analysis Number: 104014

01-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	1.6	mg/l.	04-09-01 1300	WB	4500 ClB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-26-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.04	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	53	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	<0.0001	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	<0.01	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	460	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

27-Apr-01
Page 1 of 2

By: Andrew R Kuhn II
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-3B	Date & Time Sampled:	03-30-01 0940
Analysis Number:	104016	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.5	S.U.	03-30-01 0940	QES (DR)	150.1	[2]	
pH, Lab	7.96	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	340	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	4.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	57	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	250	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.07	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	19	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0038	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	0.30	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0017	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	110	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-3B
Analysis Number: 104015

27-Apr-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	1.5	mg/l.	04-09-01 1300	WB	4500 ClB	[1]	0.50 mg/l.
Total Chromium	0.03	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.10	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	51	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0070	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.01	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	610	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

01-May-01
Page 1 of 2

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-3C	Date & Time Sampled:	03-30-01 0950
Analysis Number:	104016	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.4	S.U.	03-30-01 0950	QES (DR)	150.1	[2]	
pH, Lab	7.34	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	170	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	4.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	33	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	120	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.19	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	6.8	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0012	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	0.10	mg/l	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	<0.001	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	67	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-3C
Analysis Number: 104016

01-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	<0.5	mg/l.	04-09-01 1300	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.04	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	9.7	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0046	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.02	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	280	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

[redacted]

LABORATORY ANALYSES
MAY 3 1 2001

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

02-May-01
Page 1 of 2

By: [signature]
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-4A	Date & Time Sampled:	03-30-01 1020
Analysis Number:	104017	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL.
pH, Field	9.9	S.U.	03-30-01 1020	QES (DR)	150.1	[2]	
pH, Lab	9.66	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	1400	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	120	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	220	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	300	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	23	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	7.1	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0022	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	22	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0019	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-06-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	28	mg/l.	04-05-01 1645	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-4A
Analysis Number: 104017

02-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	7.3	mg/l.	05-01-01 1400	WB	4500 ClB	[1]	0.50 mg/l.
Total Chromium	0.06	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.31	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	330	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0007	mg/l.	04-19-01 1345	AC	246.1	[2]	0.0001 mg/l.
Total Zinc	0.08	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	830	µmhos	04-05-01 1415	RW	120.1	[2]	1.5 µmhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P.O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

INVOICE

MAY 31 2001
LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

02-May-01
Page 1 of 2

By: [signature]
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-4B	Date & Time Sampled:	03-30-01 1030
Analysis Number:	104018	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	8.5	S.U.	03-30-01 1030	QES (DR)	150.1	[2]	
pH, Lab	8.52	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	600	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	22	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	240	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	160	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	1.9	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	4.9	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0044	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	4.6	mg/l.	04-06-01 1800	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0025	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	24	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9809

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-4B
Analysis Number: 104018

02-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	4.4	mg/l.	05-01-01 1400	WB	4500 ClB	[1]	0.50 mg/l.
Total Chromium	0.03	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.02	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	280	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0012	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.02	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	850	µmhos	04-05-01 1415	RW	120.1	[2]	1.5 µmhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

MAY 31 2001
LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

02-May-01
Page 1 of 2

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-4C	Date & Time Sampled:	03-30-01 1040
Analysis Number:	104019	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.7	S.U.	03-30-01 1040	QES (DR)	150.1	[2]	
pH, Lab	7.16	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	170	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	44	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	46	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	120	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	1.0	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	8.5	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0014	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	1.2	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	<0.001	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	45	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

IRA-LET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-0094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-4C
Analysis Number: 104019

02-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	1.5	mg/l.	05-01-01 1400	WB	4500 ClB	[1]	0.50 mg/l.
Total Chromium	0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.07	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	20	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0003	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.03	mg/l.	04-11-01 1500	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	270	µmhos	04-05-01 1415	RW	120.1	[2]	1.5 µmhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

27-Apr-01

By: Andrew R. Walker II
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-5A	Date & Time Sampled:	03-30-01 0800
Analysis Number:	104009	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	9.3	S.U.	03-30-01 0800	QES (DR)	150.1	[2]	
pH, Lab	8.85	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	1600	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	200	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	180	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	270	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	19	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	8.3	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0021	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	250	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0024	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	30	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

FROM : WISIPLIVY,PE INC. FAX NO. : 330-686-8911 Mar. 08 2002 10:18AM P9

(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-5A
Analysis Number: 104009

27-Apr-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	6.0	mg/l.	04-09-01 1300	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	0.11	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.24	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	390	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0001	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.10	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	610	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

27-Apr-01

By: Andrew R. Weber II
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-5B	Date & Time Sampled:	03-30-01 0805
Analysis Number:	104010	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.6	S.U.	03-30-01 0805	QES (DR)	150.1	[2]	
pH, Lab	7.73	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	770	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	<1.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	230	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	360	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.59	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	6.2	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0030	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	1.0	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0040	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	37	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

FROM : WJSIPLIUY,PE INC. FAX NO. : 330-686-8911 Mar. 08 2002 10:29AM P2

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-5B
Analysis Number: 104010

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	13	mg/l.	04-09-01 1300	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.16	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	380	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0001	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.05	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	1200	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

FROM : WISIPLUV,PE INC. FAX NO. : 330-686-8911 Mar. 08 2002 10:30AM P3

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

27-Apr-01

By: [signature]
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-5C	Date & Time Sampled:	03-30-01 0815
Analysis Number:	104011	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.4	S.U.	03-30-01 0815	QES (DR)	150.1	[2]	
pH, Lab	7.28	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	120	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	<1.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	24	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	77	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	<0.05	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	8.8	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0017	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	<0.1	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0013	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	39	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

FROM : WJSIPLIVY,PE INC. FAX NO. : 330-686-8911 Mar. 08 2002 10:30AM P4

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-5C
Analysis Number: 104011

27-Apr-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	<0.5	mg/l.	04-09-01 1300	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	<0.02	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	720	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0010	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	<0.01	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	140	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

FROM : WISIPLIUY,PE INC. FAX NO. : 330-686-8911 Mar. 08 2002 10:31AM P5

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

15-May-01
Page 1 of 2

By: Andrew R. Wolfe
TraDet, Inc.

Company:	Century Mine	Sampled By:	QES (DR)
Source:	CG-01-6A	Date & Time Sampled:	03-30-01 1145
Analysis Number:	104087	Date & Time Received:	04-05-01 0900

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	8.1	S.U.	03-30-01 1145	QES (DR)	150.1	[2]	
pH, Lab	8.23	S.U.	05-01-01 1600	WB	150.1	[2]	
Total Dissolved Solids	790	mg/l.	04-24-01 0930	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	<1.0	mg/l.	04-24-01 0930	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	370	mg/l.	05-01-01 0945	BL	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	170	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.39	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	10.4	mg/l.	04-11-01 1815	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0021	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	0.66	mg/l.	04-26-01 1620	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0017	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	67	mg/l.	04-26-01 1600	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Century Mine
Source: CG-01-6A
Analysis Number: 104087

15-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	13	mg/l.	05-01-01 1400	WB	4500 ClB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-25-01 1515	RW	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-30-01 1600	AC	239.1	[2]	0.05 mg/l.
Total Manganese	0.02	mg/l.	04-17-01 1430	RW	243.1	[2]	0.02 mg/l.
Total Sodium	240	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0007	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.06	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	1100	µmhos/cm	04-05-01 1415	RW	120.1	[2]	1.5 µmhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.

P.O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

02-May-01
Page 1 of 2

By: [signature]
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-6B	Date & Time Sampled:	03-30-01 1310
Analysis Number:	104020	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	8.3	S.U.	03-30-01 1310	QES (DR)	150.1	[2]	
pH, Lab	8.10	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	460	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	8.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	100	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	260	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.56	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	11	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0031	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	1.1	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0011	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	42	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

IRA-LIET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-6B
Analysis Number: 104020

02-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	10	mg/l.	05-01-01 1400	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.03	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	170	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0002	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.02	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	740	µmhos	04-05-01 1415	RW	120.1	[2]	1.5 µmhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 14C
(WELL/SPRING INVENTORY)

Applicant's Name AMERICAN ENERGY CORPORATION (R-1159-4)

Well/Spring Identification Number	Name of Owner of Well/Spring	Surface Elevation of Well/Spring	Depth of Well in Feet Below Land Surface	Static Water Level of Well in Feet Below Land Surface	Lithology of Supplying Aquifer/ Waterbearing Zone	Known Uses of Well/Spring (if spring give discharge rate)
CG-01-3A	American Energy Corporation	1161.21	284.62'	209.85'	C	Domestic (Outside Adj. Area)
CG-01-3B	American Energy Corporation	1161.31	88.89'	83.13'	B	Domestic, Agricultural, None, 0 to 9.1 gpm
CG-01-3C	American Energy Corporation	1160.66	26.01	18.46'	A	None, 0 to 1.5 gpm
CG-01-4A	American Energy Corporation	1152.95	258.39'	143.94'	C	Domestic, (Outside Adj. Area)
CG-01-4B	American Energy Corporation	1152.30	57.82'	55.54'	B	Domestic, Agricultural, None, 0 to 9.1 gpm
CG-01-4C	American Energy Corporation	1151.96	25.00'	4.35'	A	None, 0 to 1.5 gpm
CG-01-5A	American Energy Corporation	1158.98	265.41'	201.03'	C	Domestic, (Outside Adj. Area)
CG-01-5B	American Energy Corporation	1158.57	83.77'	75.47'	B	Domestic, Agricultural, None, 0 to 9.1 gpm
CG-01-5C	American Energy Corporation	1158.98	24.28'	5.36'	A	None, 0 to 1.5 gpm
CG-01-6B	American Energy Corporation	1165.52	81.72'	74.64'	B	Domestic (Outside Adj. Area)
CG-01-6C	American Energy Corporation	1165.64	43.96'	29.54'	A	Domestic, Agricultural, None, 0 to 9.1 gpm

The consequences of the proposed refuse disposal on the contents of total suspended and dissolved solids, total iron, total manganese, acidity, and pH will be minimal. The proposed disposal area is designed to reduce infiltration by utilizing materials of acceptably low permeability to completely surround the waste. Compaction of the refuse further reduces permeability, which minimizes seepage of effluent into the refuse. Adverse impact to the hydrologic balance will be minimal.

Water from the mining area is controlled by a series of drainage ditches and sediment ponds to minimize quality and quantity changes in the vicinity of the site. The drainage control plan also minimizes the possibility of stream flow alteration for off-site areas. All sediment control structures will be cleaned out when 60% design capacity is reached. Any standing water will be pumped to another existing structure. Wide track dozers will then move sediment to a point where it is accessible for a Gradall machine to collect and load it into trucks which will transport it to an approved refuse disposal site.

The refuse proposed to be disposed of is composed mainly of roof and floor material. Naturally occurring on-site materials will be used to underlie, line the highwall, and cover the refuse material. The highwall liner (2 feet out from the highwall) and cap cover material consists of clay/claystone as shown in the drill logs for monitoring wells CG01-5A, CG01-3A, CG01-4A, and CG01-6B. See attached logs.

Undeveloped springs S-23 and S-24 are developed in Zone A. Dug well DW-7A, developed spring DS-10, and undeveloped springs S-1, S-2, S-3, S-5, S-20, S-25, S-26, and S-27 are developed in Zone B. Drilled well W-7, and undeveloped springs S-10 and S-22 are developed in Zone C. None of the undeveloped springs, or developed spring DS-10 are in use. W-7 and DW-7A are domestic (W-7) and agricultural (DW-7A) supplies located 1200 feet and 1000 feet, respectively, east of the proposed refuse disposal area. See Addendum to Attachment 14B for a more detailed discussion of Zones A, B, and C.

SZ-1 (identified in the original D-1159 permit) is located on the opposite, or east side of Piney Creek from the proposed refuse disposal area. It is generated from a pre-law disposal site as shown on past maps of this area. The reclaimed refuse disposal area located immediately southeast of the proposed site does not produce any seeps of this nature, nor does the Pond 008 series monitoring in permit D-0425, which collects all runoff from the reclaimed disposal area, reflect impacted drainage.

Within the proposed refuse disposal area, aquifer Zones A & B will be temporarily disturbed by coal removal, and by highwall lining operations, but this will have no affect on existing developed ground water sources. Legitimately-used developed supplies are protected by their distance from the proposed disposal area. The southeast dip of the strata will also help to protect these zones from impact. Measures to prevent water from Zones A & B from entering the refuse disposal area are shown on cross section A - A' through G - G' (lining of the highwall, and capping with 1.5 feet of non-toxic, low permeability material).

Impact to Zones A & B will be negligible. Zone A will be intercepted during coal removal, however, its recharge zone will not be disturbed, and it occurs within the elevation of refuse disposal.

Zone B may show some diminution, but should recover following mining, refuse disposal, and reclamation. Drainage from Zones A and B will not come in contact with the refuse proposed to be disposed of. Zone C occurs at least 90 feet below the proposed bottom of refuse disposal, which will quite effectively provide the recommended minimum five foot isolation distance between the uppermost aquifer system underlying the site and the bottom of the refuse. Impacts to Zones C and D are not anticipated due to their respective locations, 90 feet and 238 feet below the proposed refuse disposal.

American Energy Corporation does not anticipate the water table reestablishing within the refuse disposal area. Please note that the existing reclaimed site does not exhibit any seepage, nor does nearby surface water sampling exhibit any adverse impacts. As with the analyses submitted for monitoring wells at this site, quarterly monitoring analyses of monitoring wells at nearby permit D-0360, Perkins Run area also showed fluctuations in mercury levels that were below, within, and above the published drinking water standard levels prior to issuance of that permit. Quarterly monitoring data of the monitoring wells for this site is currently being assembled, and will be submitted by Bill Siplivy under separate cover for D-0425-2 project area.

Zone A will be monitored quarterly at S-23, as well as monitoring wells CG01-3C, CG01-4C, CG01-5C, and CG01-6C. Zone B will be monitored quarterly at monitoring wells CG01-3B, CG01-4B, CG01-5B, and CG01–6B. Zone C will be monitored at wells CG01-3A, CG01-4A, and CG01-5A. (See attached monitoring well installation logs, submitted as addenda to Attachment 28, Page 3, Item 15) Surface water will be monitored at site D-8A, as well as discharge from sediment ponds 001, 009, and 010. A current sample of site D-8A does not exist at this time. Therefore, sampling at site D-8 has been submitted with this ARP to demonstrate current downstream quality and quantity.

See Attachment 28 for chemical analysis of refuse material and sealant material.

Total sediment yield from the area disturbed by refuse disposal will not differ from the sediment yield from the area disturbed by coal removal. Sediment yield will increase during mining due to newly exposed surface.

The surface will be less permeable after construction of the clay cap seal which will lead to increases in peak flow in the immediate vicinity of the site. These changes will be minimal since the associated watershed is small. Chances of flooding and stream flow alteration for the small tributaries draining the site will not change significantly. The drainage control plan will also minimize the possibility of flooding and stream flow alteration. Stream flow will be maintained by discharge from the sediment ponds.

The proposed activity should have no impact on ground and surface water availability. Mining activities have been ongoing in this area for many years, with no quantity problems noted or reported. No refuse will be disposed of within 100 feet of a stream channel, or, within the buffer zone of a stream. The plan is to isolate the refuse material from contact with water. Placing the material on the pit floor above the insitu clay floor will be above the reestablished water. The highwall and cap liners, and drainage pipes to collect water from the highwall, will isolate waste from contact with ground water.

The western portion of the proposed refuse disposal area does not overlie existing or future planned areas of underground mining. The eastern portion of the proposed refuse disposal area does overlie an existing abandoned portion of the #8 seam underground mine. The coalbed elevation here is approximately 724 feet. The interval between the mine and the coal refuse foundation is at least 360 feet. The mine was active in this location about 30 years ago. Based on field observations today, there is no indication of surface subsidence to either the abandoned refuse pile or surrounding area. This is due to mine extraction rate, stratigraphy and interval between the mine and refuse foundation. The mine was a room and pillar operation. The mine map shows the maximum extraction rate was about 50% in the production sections (butt panels), and 40% in the main development entries. The stratigraphy contains numerous rigid beds of sandstone and limestone. These beds are capable of bridging overburden loads over large areas supported by solid coal and large barrier pillars. Due to these factors, subsidence is not expected in the future over the old #8 mine workings. Should subsidence occur within the old works, the distance between the mine and the disposal area (360' min.) Will protect the disposal area from damage.

ADDENDUM TO ATTACHMENT 28, PAGE 3, ITEM 17.,
AMERICAN ENERGY CORPORATION

Legitimately-used ground water supplies DW-7A and W-7 will not experience contamination, diminution, or interruption as a result of the proposed refuse disposal. Their distance from the proposed refuse disposal area, as well as dip of the strata will protect these sources. Monitoring of sediment ponds, and treatment if necessary, will protect surface water in the vicinity of the proposed disposal. See approved permit D-1159 and D-1159-1 responses Part 2, Items F(1) and F(2).

Rights of present ground water users will be respected and protected by measures as described in the sealing plan. Based on the measures to be undertaken to minimize the impact of the refuse disposal area on surface and ground water, Bennoc, Inc. does not anticipate that the rights of present users will be affected. However, if users rights are infringed upon, an alternate source will be provided. If the quality and quantity of water available for domestic use is diminished, alternate water sources within the underlying aquifer could be tapped by drilling and casing to a greater depth, depending on the quality and quantity required.

4/95

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT

ATTACHMENT 28
(COAL WASTE DISPOSAL PLAN)

Applicant's Name AMERICAN ENERGY CORPORATION

1. The coal mine waste to be disposed of on the coal mining operation is from a: (check appropriate response)

   _____ Wash plant facility
   __X__ Tipple facility
   _____ Other (e.g. large pre-existing gob pile)

2. Submit an Attachment 12 for the material to include at a minimum: pH, percent of total or pyritic sulfur, neutralization potential, potential acidity, and calcium carbonate deficiency. **See Attachment 12**

3. State the size fractions and percentages of the size fractions of the waste material. **See Attachment 12.**

4. Submit as an addendum a stability analysis to address how placement of the waste material will not cause instability within the backfilled area. Include all necessary calculations and analyses. **See Attached Stability Analysis.**

5. State the estimated amount of refuse material in tons to be disposed of on the proposed permit area: **2,937,457**

6. State the percent moisture and density of the refuse material, if the coal waste is from a wash plant.

   N/A

7. Describe how infiltration of water into the disposal area will be minimized.

In areas proposed to be utilized for refuse disposal, the highwall face will be reclaimed by placing a 2 foot thickness of non-toxic spoil, in 2 foot compacted lifts, against the highwall, followed by 2 feet of compacted clay material. The entire pit floor and coal bench is underlain by a 20 foot+- thick insitu low permeability claystone material. The refuse will be placed directly on this material. The entire disposal area surface will be covered with 1.5 feet of non-toxic low permeability material and sloped to drain. Above the 1.5 foot cover material, an additional 2 foot cover and six inches of a moderately dry growth medium soil and topsoil will be placed. By developing the reclamation cover in this manner, water infiltration and leachate formation will be minimized by the use of low permeability materials. Based on the small amount of anticipated infiltration after reclamation, the proposed disposal area should have a minimal impact on the area ground water conditions.

04/94

OHIO DEPARTMENT [illegible]URAL RESOURCES
DIVISION OF R[illegible]AMATION

ATTACHMENT 12
(DRILLING REPORT - SURFACE MINE)

This data obtained from public information for permit D-0360 as a representative #8 coal seam refuse analysis. Permit D-0360 is less 3 miles northeast of Permit D-1159.

Applicant's Name _ American Energy Corporation

(Check one: __X__ core drilled _____ rotary air, _____ other (describe)_____)

Test Hole # _

State Plane Coordinates X _____

Y _____

Lithologic Unit (1)	* Thickness Feet	pH	CaCo3 Deficiency (1000 Tons)	Neutralization Potential (1000 Tons)	Potential Acidity	Total Sulfur %	Physical Properties (2)			
Topsoil										
Subsoil							Compactible	Erodible	Color	Grain Size
Roof Rock	266.20-276.20	9.38	-314	355	40.6	1.30				
Floor Rock	358.70-368.70	9.23	-167	269	102	3.26				
Roof Rock	339.10-349.10	9.26	-179	241	61.9	1.96				
Floor Rock	284.30-294.30	9.37	21.0	44.9	65.9	2.11				
Roof Rock	236.30-246.30	9.34	-160	204	44.1	1.41				
Floor Rock	353.00-363.00	9.39	-75.8	167	91.2	2.92				
Roof Rock	332.40-342.40	9.34	-173	210	36.6	1.17				
Floor Rock	308.70-318.70	9.38	-282	319	37.1	1.19				
Floor Rock	251.30-261.30	8.96	-44.8	107	62.2	1.99				
Floor Rock	328.60-338.60	9.03	-54.0	178	124	3.96				
Floor Rock	328.10-338.10	9.18	-140	199	59.0	1.89				
Roof Rock	311.40-321.40	9.37	-256	296	40.0	1.28				
Floor Rock	299-309	9.27	-119	214	95.0	3.04				
Roof Rock	281.10-291.10	9.48	-247	286	38.7	1.24				

_____ Total Thickness _____ Surface elevation of test hole

Coal Seam Information

NAME	NUMBER	TOTAL SULFUR %	PYRITE/MARCASITE SULFUR %

(1) If subsurface water was encountered, identify the stratum in which it was encountered by an asterisk (*).
(2) Describe any observable physical properties of such stratum (e.g. color, grain size, compactiblity, erodiblity, etc.)

* The thickness column refers to depth ranges. Roof rock consists of the immediate ten feet above the roof coal. Floor rock is the immediate ten feet below the Pittsburgh No. 8 coalbed.

AEC 10397

04/94

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 12
(DRILLING-REPORT - SURFACE MINE)

Applicant's Name American Energy Corporation

(Check one: ___ core drilled ___ rotary air, X other (describe) Grab)

Test Hole # REFUSE MATERIAL SIZE FRACTIONS

State Plane Coordinates X _____

Y _____

Lithologic Unit (1)	Thickness	pH	CaCo Deficiency (1000 tons)	Neutralization Potential (1000 tons)	Potential Acidity	Total or Pyritic Sulfur %	Physical Properties (2)			
Topsoil										
Subsoil							Compactible	Erodible	Color	Grain Size
SIZE FRACTION	**DISTRIBUTION**									
Plus 2 inch SQ	40.31%									
2 x 1 inch SQ	26.77%									
1 x 1/2 inch SQ	23.17%									
½ in. SQ x 8 mesh	7.64%									
Minus 8 mesh	2.11%									
Cumulative	100%									

(Dry Basis) _____ Total Thickness _____ Surface Elevation of test hole

Coal Seam Information

NAME	NUMBER	TOTAL SULFUR %	PYRITE/MARCASITE SULFUR %

(1) If subsurface water was encountered, identify the stratum in which it was encountered by an asterick (*)
(2) Describe any observable physical properties of each stratum (e.g. color, grain size, compactibility, erodibility, etc.)

AEC 10398

American Energy Corporation
Century Mine

Stability Analysis of Coal Refuse as Highwall Backfill

The stability of the coal refuse backfill has been calculated using the Rotational Equilibrium Analysis of Multilayered Embankments (REAME) computer program developed by Dr. Yang H. Huang, Sc.D. of the University of Kentucky. The REAME program is a personal computer adaptation based on a variety of slope stability analysis procedures. The simplified Bishop method of slope evaluation was used in this analysis.

The strata underlying the #12 coal seam was determined to be gray claystone. The material that will be used as a liner material under and around the coal refuse will be a mixture of brown and gray clay. Conservative strength values for the soils were taken from page 36 of *Stability Analysis of Earth Slopes* by Dr. Yang H. Huang, Sc.D. The following coefficients were used for the claystone: cohesion = 1400 psf, phi angle = 32° and a unit weight of 109 pcf. The clay liner material was assumed to be weaker with a cohesion of 500 psf, a phi angle of 30° and a unit weight of 107 pcf.

The values used for the coal refuse were taken from a previous stability analysis performed by D'Appolonia for prelaw refuse that was placed at the Allison Mine. See the original permit D-0425 D'Appolonia drawing No. 81-250-E4, Sheet No. 4 of 21, Figure No. 11. Their values were based on experience, field and laboratory test data and previous test results for similar materials. The values used are as follows: cohesion = 0 psf, phi angle = 30° and unit weight = 113 psf.

A phreatic surface was included in the REAME run even though the installed or natural seal will prevent water from reaching the top of the coal underclay. The phreatic surface was assumed to run along the top of the #12 coal seam and then down along the top of the claystone. The parameters above were utilized to check the stability of the highwall backfill under a "worst case" condition. A minimum safety factor of 1.82 was determined by the REAME program. Please refer to the attached output sheets and drawings for more information.

Donald M. Brafford, P.E.
4-11-02

STATE OF OHIO
DONALD M.
BRAFFORD
E-29449
REGISTERED
PROFESSIONAL ENGINEER

REAME (ROTATIONAL EQUILIBRIUM ANALYSIS OF MULTILAYERED EMBANKMENTS)
THIS 2000 VERSION (REAME2k) IS LICENSED BY CIVIL ENGINEERING SOFTWARE CENTER TO:
Jack A. Hamilton & Associates, Inc.

INPUT FILE NAME -C:\Reamedat\625SCRHW.DAT

TITLE -Century Mine - Highwall Backfill Stability

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1

NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 0

TWO-DIMENSIONAL ANALYSIS (THREED = 0)

CASE NO. 1 SEISMIC COEFFICIENT (SEIC) =0.000

NO. OF BOUNDARY LINES (NBL) = 4

NO. OF POINTS ON BOUNDARY LINE 1 = 3
1 X COORD.=-500 Y COORD.= 1065
2 X COORD.= 0 Y COORD.= 1065
3 X COORD.= 500 Y COORD.= 1065

NO. OF POINTS ON BOUNDARY LINE 2 = 4
1 X COORD.= 71 Y COORD.= 1085
2 X COORD.= 260 Y COORD.= 1085
3 X COORD.= 262 Y COORD.= 1089
4 X COORD.= 276 Y COORD.= 1150

NO. OF POINTS ON BOUNDARY LINE 3 = 5
1 X COORD.= 71 Y COORD.= 1085
2 X COORD.= 97 Y COORD.= 1089
3 X COORD.= 240 Y COORD.= 1089
4 X COORD.= 253 Y COORD.= 1138
5 X COORD.= 276 Y COORD.= 1150

NO. OF POINTS ON BOUNDARY LINE 4 = 9
1 X COORD.=-500 Y COORD.= 1075
2 X COORD.= 0 Y COORD.= 1075
3 X COORD.= 55 Y COORD.= 1080
4 X COORD.= 71 Y COORD.= 1085
5 X COORD.= 276 Y COORD.= 1150
6 X COORD.= 286 Y COORD.= 1155
7 X COORD.= 383 Y COORD.= 1170
8 X COORD.= 425 Y COORD.= 1175
9 X COORD.= 500 Y COORD.= 1180

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000	0.000				
2	0.000	2.000	4.357			
3	0.154	0.000	3.769	0.522		
4	0.000	0.091	0.313	0.317	0.500	0.155
	0.119	0.067				

MIN. DEPTH OF TALLEST SLICE (DMIN) = 1
NO. OF RADIUS CONTROL ZONES (NRCZ) = 1

AEC 10400

RADIUS DECREMENT (RDEC) FOR ZONE 1 = 0
NO. OF CIRCLES (NCIR) FOR ZONE 1 = 5
ID NO. FOR FIRST CIRCLE (INFC) FOR ZONE 1 = 1
NO. OF BOTTOM LINES (NOL) FOR ZONE 1 = 1

LINE NO. (LINO)	BEG. NO. (NBP)	END NO. (NEP)
1	1	3

UNIT WEIGHT OF WATER (GW) = 62.4

SOIL NO.	COHESION	FRIC. ANGLE	UNIT WEIGHT
1	1400	32	109
2	500	30	107
3	0	30	113

USE PHREATIC SURFACE
USE GRID
NO. OF SLICES (NSLI) = 10
NO. OF ADD. CIRCLES (NAC) = 3
ANALYSIS BY SIMPLIFIED BISHOP METHOD (MTHD=2)
NUMBER OF FORCES (NFO)= 0
SOFT SOIL NUMBER (SSN)= 0

NO. OF POINTS ON WATER TABLE (NPWT) = 7

1	X COORD.=-500	Y COORD.= 1075
2	X COORD.= 0	Y COORD.= 1075
3	X COORD.= 55	Y COORD.= 1080
4	X COORD.= 71	Y COORD.= 1085
5	X COORD.= 260	Y COORD.= 1085
6	X COORD.= 262	Y COORD.= 1089
7	X COORD.= 500	Y COORD.= 1089

NO. OF SOILS WITH DIFFERENT WATER TABLE (NSDW) = 0
NO. OF SOILS WITH DIFFERENT PORE PRESSURE RATIO (NSDP) = 0

INPUT COORD. OF GRID POINTS 1, 2,AND 3

POINT 1 X COORD. = 40 Y COORD. = 1395
POINT 2 X COORD. = 40 Y COORD. = 1145
POINT 3 X COORD. = 240 Y COORD. = 1145

X INCREMENT (XINC) = 5 Y INCREMENT (YINC) = 5
NO. OF DIVISIONS BETWEEN POINTS 1 AND 2 (ND12) = 5
NO. OF DIVISIONS BETWEEN POINTS 2 AND 3 (ND23) = 4
ONLY A SUMMARY TABLE IS PRINTED (NPRT = 0)
SLICES WILL BE SUBDIVIDED

AUTOMATIC SEARCH WILL FOLLOW AFTER GRID

FACTORS OF SAFETY BASED ON GRID

IN THE FOLLOWING TABLE, WARNING INDICATES HOW MANY TIMES THE MAXIMUM RADIUS IS LIMITED BY THE END POINTS OF GROUND LINES:

AEC 10401

CENTER X COORDINATE	CENTER Y COORDINATE	NO. OF CIRCLE TOTAL	CRITIC.	RADIUS	LOWEST F.S.	WARNING
40	1395	8	8	306.128	1.827	0
40	1345	8	8	258.349	1.828	0
40	1295	8	8	210.571	1.829	0
40	1245	5	1	180.000	5.539	0
40	1195	5	1	130.000	6.721	0
40	1145	5	1	80.000	9.263	0
90	1395	8	8	291.771	1.832	0
90	1345	8	8	243.993	1.833	0
90	1295	8	8	196.214	1.835	0
90	1245	8	8	148.436	1.839	0
90	1195	8	8	100.657	1.846	0
90	1145	8	8	52.879	1.865	0
140	1395	11	6	305.091	2.883	0
140	1345	8	8	229.636	1.839	0
140	1295	8	8	181.857	1.843	0
140	1245	8	8	134.079	1.850	0
140	1195	8	8	86.301	1.864	0
140	1145	8	8	38.522	1.914	0
190	1395	11	8	304.971	3.495	0
190	1345	11	3	252.749	3.367	0
190	1295	11	7	197.106	3.208	0
190	1245	8	8	119.722	1.864	0
190	1195	8	8	71.944	1.890	0
190	1145	8	8	24.165	2.030	0
240	1395	11	7	304.311	4.215	0
240	1345	11	7	254.647	4.143	0
240	1295	11	7	205.209	4.092	0
240	1245	11	3	148.428	4.104	0
240	1195	11	9	80.455	4.134	0
240	1145	8	8	9.809	2.591	0

GRID IS EXPANDED AS FOLLOWS SO MINIMUM FACTOR OF SAFETY FALLS WITHIN THE GRID

40	1445	8	8	353.906	1.827	0
90	1445	8	8	339.549	1.831	0
140	1445	11	6	354.039	3.065	0
190	1445	11	8	353.917	3.623	0
240	1445	11	2	355.723	4.306	1
40	1495	8	8	401.684	1.827	0
90	1495	11	8	405.295	2.707	0
140	1495	11	3	405.988	3.208	0
190	1495	11	8	403.153	3.760	0
240	1495	5	1	408.442	4.438	1
40	1545	8	8	449.463	1.827	0
90	1545	11	8	454.009	2.922	0
140	1545	11	3	454.573	3.362	0
190	1545	11	7	455.708	3.840	1
240	1545	5	1	448.135	4.619	1
40	1595	8	8	497.241	1.826	0
90	1595	11	7	505.203	3.080	0
140	1595	11	3	503.436	3.503	0
190	1595	11	2	504.471	3.979	1
240	1595	5	1	489.719	4.940	1
40	1645	11	4	557.907	2.811	0
90	1645	11	10	553.873	3.258	0

AEC 10402

140	1645	11	8	555.951	3.589	0
190	1645	5	1	558.861	4.198	1
240	1645	5	1	532.752	5.337	1
-10	1645	8	8	559.377	1.824	0
-10	1595	8	8	511.598	1.824	0
-10	1545	7	7	464.671	1.827	0
-10	1495	7	7	416.776	1.827	0
-10	1445	7	7	368.880	1.826	0
-10	1395	5	1	330.000	10.738	0
-10	1345	5	1	280.000	15.339	0
-10	1295	5	1	230.000	24.919	0
-10	1245	5	1	180.000	46.028	0
-10	1195	5	1	130.000	58.940	0
-10	1145	5	1	80.000	73.559	0
-60	1645	6	6	574.500	1.824	0
-60	1595	3	1	530.000	28.205	0
-60	1545	3	1	480.000	65.812	0
-60	1495	2	1	430.000	190.667	0
-60	1445	2	1	380.000	249.659	0
-60	1395	2	1	330.000	367.780	0
-60	1345	4	1	280.000	693.819	0
-60	1295	1	1	230.000	2723.353	0
-60	1245	1	1	180.000	1000.000	0
-60	1195	1	1	130.000	1000.000	0
-60	1145	1	1	80.000	1000.000	0

LOWEST FACTOR OF SAFETY AT EACH GRID POINT IS TABULATED BELOW

COORDINATE	-60.000	-10.000	40.000	90.000	140.000	190.000	240.000
1645.000	1.824	1.824	2.811	3.258	3.589	4.198	5.337
1595.000	28.205	1.824	1.826	3.080	3.503	3.979	4.940
1545.000	65.812	1.827	1.827	2.922	3.362	3.840	4.619
1495.000	190.667	1.827	1.827	2.707	3.208	3.760	4.438
1445.000	249.659	1.826	1.827	1.831	3.065	3.623	4.306
1395.000	367.780	10.738	1.827	1.832	2.883	3.495	4.215
1345.000	693.819	15.339	1.828	1.833	1.839	3.367	4.143
1295.000	2723.353	24.919	1.829	1.835	1.843	3.208	4.092
1245.000	1000.000	46.028	5.539	1.839	1.850	1.864	4.104
1195.000	1000.000	58.940	6.721	1.846	1.864	1.890	4.134
1145.000	1000.000	73.559	9.263	1.865	1.914	2.030	2.591

MINIMUM FACTORS OF SAFETY OCCUR AT THE FOLLOWING 3 CENTERS:

FACTOR OF SAFETY = 1.824 AT (-60.000,1645.000)
FACTOR OF SAFETY = 1.824 AT (-10.000,1595.000)
FACTOR OF SAFETY = 1.826 AT (-10.000,1445.000)

AUTOMATIC SEARCHES WILL BE MADE ONLY ON THE CENTER WITH THE SMALLEST F.S. MORE SEARCHES FROM OTHER CENTERS MAY BE NEEDED TO ENSURE THAT MINIMUM F.S. IS OBTAINED.

AT POINT (-10 1595) RADIUS 511.598 THE MINIMUM FACTOR OF SAFETY IS 1.824

FACTORS OF SAFETY BASED ON SEARCH

AEC 10403

IN THE FOLLOWING TABLE, WARNING INDICATES HOW MANY TIMES THE MAXIMUM RADIUS IS LIMITED BY THE END POINTS OF GROUND LINES:

CENTER X COORDINATE	CENTER Y COORDINATE	NO. OF CIRCLE TOTAL	CRITIC.	RADIUS	LOWEST F.S.	WARNING
-10	1595	8	8	511.598	1.824	0
-5	1595	8	8	510.162	1.824	0
-15	1595	7	7	513.927	1.826	0
-10	1600	8	8	516.376	1.824	0
-10	1590	7	7	507.777	1.827	0
-8.75	1595	8	8	511.239	1.824	0
-11.25	1595	7	7	512.907	1.827	0
-10	1596.25	8	8	512.793	1.824	0
-10	1593.75	8	8	510.404	1.824	0
-10	1592.5	8	8	509.209	1.824	0
-8.75	1593.75	8	8	510.045	1.824	0
-11.25	1593.75	7	7	511.709	1.827	0

AT POINT (-10 1593.75) RADIUS 510.404

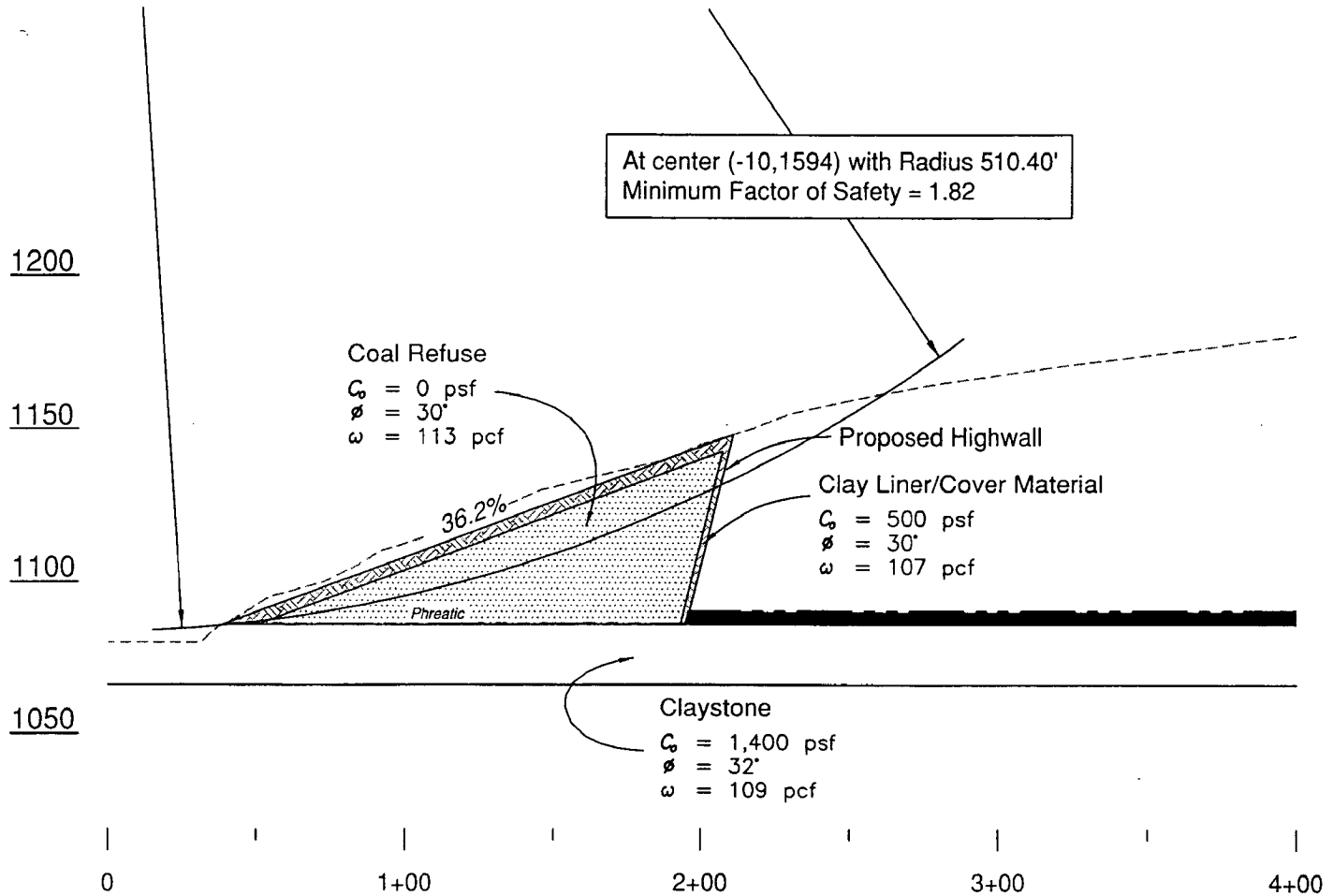
THE MINIMUM FACTOR OF SAFETY IS 1.824

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	SLICE HEIGHT	WATER HEIGHT	BOTTOM SINE	TOTAL WEIGHT	EFFECT. WEIGHT	RESIST. MOMENT	DRIVING MOMENT
1	3	5.983	0.189	0.000	.249	.128E+03	.128E+03	.365E+05	.163E+05
2	3	5.983	0.510	0.000	.261	.345E+03	.345E+03	.981E+05	.459E+05
3	3	5.983	0.753	0.000	.272	.509E+03	.509E+03	.144E+06	.707E+05
4	3	5.983	0.917	0.000	.284	.620E+03	.620E+03	.175E+06	.898E+05
5	3	5.983	1.001	0.000	.296	.677E+03	.677E+03	.190E+06	.102E+06
6	3	5.983	1.005	0.000	.308	.679E+03	.679E+03	.190E+06	.107E+06
7	3	5.983	0.927	0.000	.319	.627E+03	.627E+03	.175E+06	.102E+06
8	3	5.983	0.767	0.000	.331	.519E+03	.519E+03	.144E+06	.876E+05
9	3	5.983	0.524	0.000	.343	.354E+03	.354E+03	.981E+05	.620E+05
10	3	5.983	0.196	0.000	.354	.133E+03	.133E+03	.365E+05	.240E+05
							SUM	.129E+07	.707E+06

AT CENTER (-10.000 , 1593.750) WITH RADIUS 510.404 AND SEIS. COEFF. 0.00
FACTOR OF SAFETY BY NORMAL METHOD IS 1.822
FACTOR OF SAFETY BY SIMPLIFIED BISHOP METHOD IS 1.824

AEC 10404



AMERICAN ENERGY CORPORATION

Highwall Backfill Stability Section

Scale: 1" = 60'

I HEREBY CERTIFY THAT THIS SLOPE STABILITY ANALYSIS HAS BEEN PREPARED TO MEET THE APPLICABLE REQUIREMENTS OF RULE 1501: 13-09-09 (A)(3)(b)OF THE ADMINISTATIVE CODE.

Donald M Brafford 4/11/02

STATE OF OHIO
DONALD M. BRAFFORD
E-29449
REGISTERED
PROFESSIONAL ENGINEER

AEC 10405

8. Specifically describe how the disposal plan will comply with paragraph (J) of rule 1501:13-9-14 of the Administrative Code.
See response to Attachment 28, Page 1, Item 7.

9. Does the disposal plan propose to neutralize wash plant waste with spoil material? _____ Yes, __X__ No. If "yes," submit as an addendum an acid/base account of the refuse and spoil materials.

10. Does the disposal plan propose to seal the disposal area? __X__ Yes, _____ No. If "yes," submit an Attachment 12 for the sealant material which includes pH, percent of total or pyritic sulfur, neutralization potential, potential acidity, calcium carbonate deficiency, and lithology.
See Sealant Material Attachment 12.

11. If a sealant material is to be used, submit a permeability analysis of the material to be used as a sealant. Also, address below how the sealant material will be compacted and the anticipated permeability coefficient to be achieved following compaction.

Cover materials termed "clay/silty clay" on Attachment 12 will be comprised of soils found in Test Pits 1 and 4, and materials identified in the Addendum to ARP, Item 4., 3rd paragraph. Over compaction of the soil will be avoided because some settlement of the refuse is expected. Placement of these soils will be accomplished using either truck haulage or tractor scraper haulage. The soils will be spread by bulldozer with uniformity to be achieved by a light to medium weight sheepsfoot type roller. Sealing will involve lining of the highwall, insitu claystone material beneath, installation of pipe drains if springs, wet weather seeps or other areas producing water are encountered, and capping with the clay/silty clay material described above. See Addendum to A.R.P., Item 4. *Pipe drains will be installed during periods of 'low flow' (<1 gpm) and/or all areas where drainage is currently seen at the surface in the form of springs. If the pipe drains were not installed, and water flowed from the highwall, it would flow vertically down the 2 foot spoil drain and terminate in clay. Pipe drains at all 'wet areas' should effectively direct all water from the highwall safely beneath the refuse floor.* **(The #12 underclay will not be compacted. Chemical analysis of same is attached. The #12 underclay was tested at a neighboring permit. Compaction will only be performed on the highwall liner and cap.**

12. Show the location of the coal mine waste storage and disposal areas and the location of cross sections on the application map. **See A.R.P. Application Map**

13. Describe how the disposal plan will meet requirements of paragraph (J)(3) of rule 1501:13-9-04 of the Administrative Code.

During active refuse disposal, all water impacted by the refuse material will be passed through sediment Ponds 001, 009, or 010 for treatment, if necessary, prior to discharge. When disposal operations are completed, refuse material will be buried under at least 1.5 feet of non-toxic material, and sloped to drain.

04/94

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

Date: October 27, 1998

ATTACHMENT 12
(DRILLING REPORT - SURFACE MINE)

Applicant's Name American Energy Corporation Property: _____

(Check one: __ core drilled, X rotary air, __ other (describe) ___)

Test Hole # #12 Coal Underclay / claystone
State Plane Coordinates X: _____
Y: _____

Lithologic Unit (1)	Thickness	pH	$CaCO_3$ Deficiency (1000 Tons)	Neutralization Potential (1000 Tons)	Potential Acidity	Total Sulfur %	Physical Properties(2)			
Topsoil										
Subsoil							Compactible	Erodible	Color	Grain Size
Grey Claystone	3' 8"	9.37	-25.00	66.25	41.25	1.32	Moderately	Slightly	Gray	Fine
Grey Claystone	30'	8.90	-36.56	36.88	0.31	0.01	Moderately	Slightly	Gray	Fine

_____ Total thickness _____ Surface elevation of test hole

Coal Seam Information

Name	Number	Total Sulfur %	Pyrite/Marcasite Sulfur %

(1) If subsurface water was encountered, identify the stratum in which it was encountered by an asterick (*)
(2) Describe any observable physical properties of each stratum (e.g. color, grain size, compactibility, erodibility, etc.).

AEC 10407

Moisture-Density Curve No. 2

Project Perkins Run Refuse Disposal

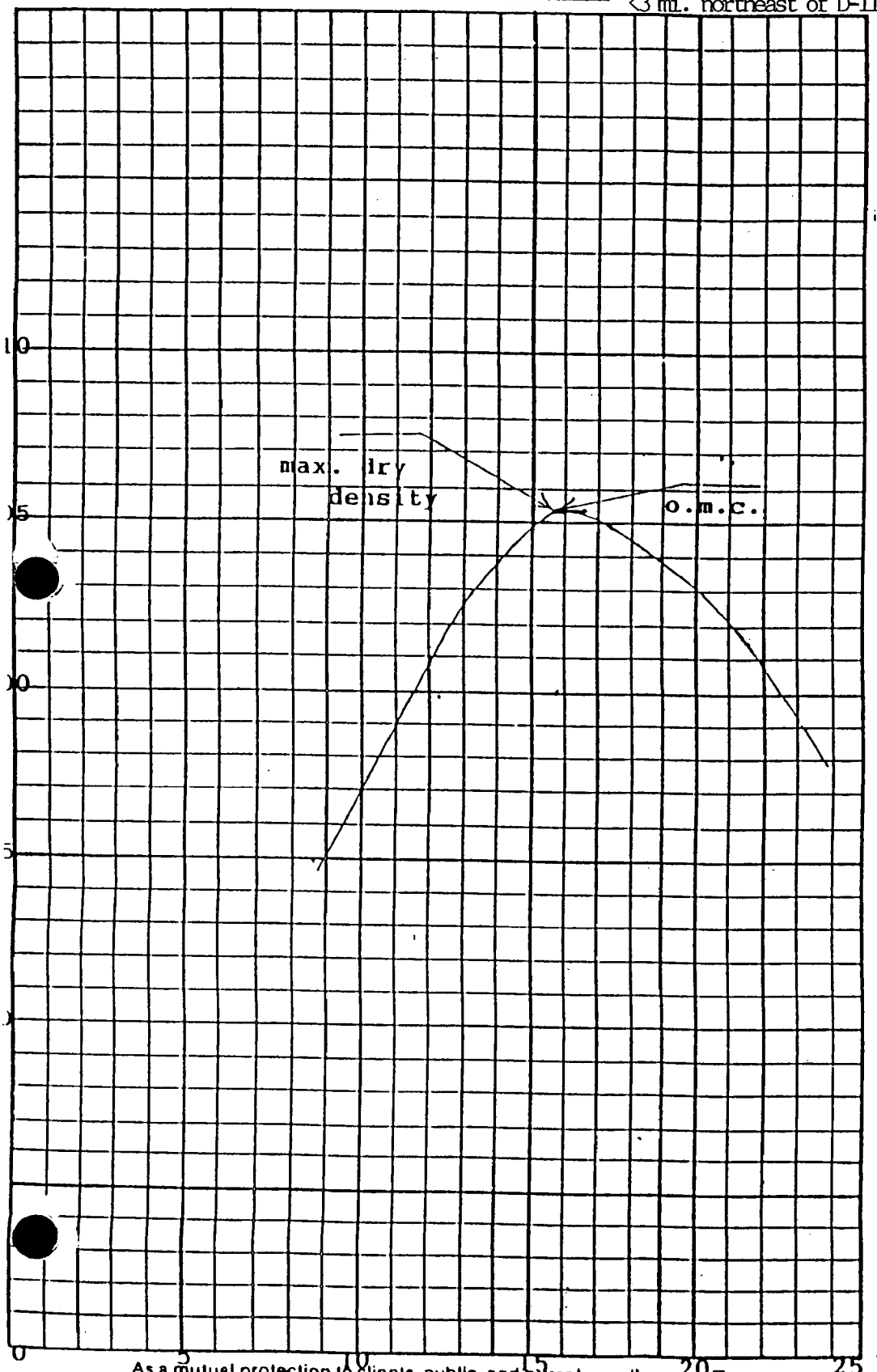
Date 4-20-98

GREEN AND ASSOCIATES
Design • Engineering • Surveying
156 Woodrow Avenue • Suite 3
St. Clairsville, Ohio 43950
Phone (740) 695-9977

Soil Description Very moist, grayish brown sand some clayey silt

Source East Knob Borrow Area **TP-13**

This data obtained from public information for D-0360 as a representative permeability of the #12 coal underclay. D-0360 i <3 mi. northeast of D-1159.



Job # 98-131

Sample # 2, S39,100 W70,400

Specific Gravity:

AASHTO Test

ASTM Test D-698

Method A

Hammer Wt. 5½ Lbs.

Hammer Drop 12"

No. Blows/Layer 25

No. Layers 3

Mold Size 4" Dia.

Grain Size Distribution

% Aggregate

% Coarse Sand

% Fine Sand

% Silt

% Clay

Note:
Agg. = Above #10 sieve
C.S. = bet. #10 & #40 sieve
F.S. = bet. #40 & #200 sieve

L.L. 38.7

P.L. 27.2

P.I. 11.5

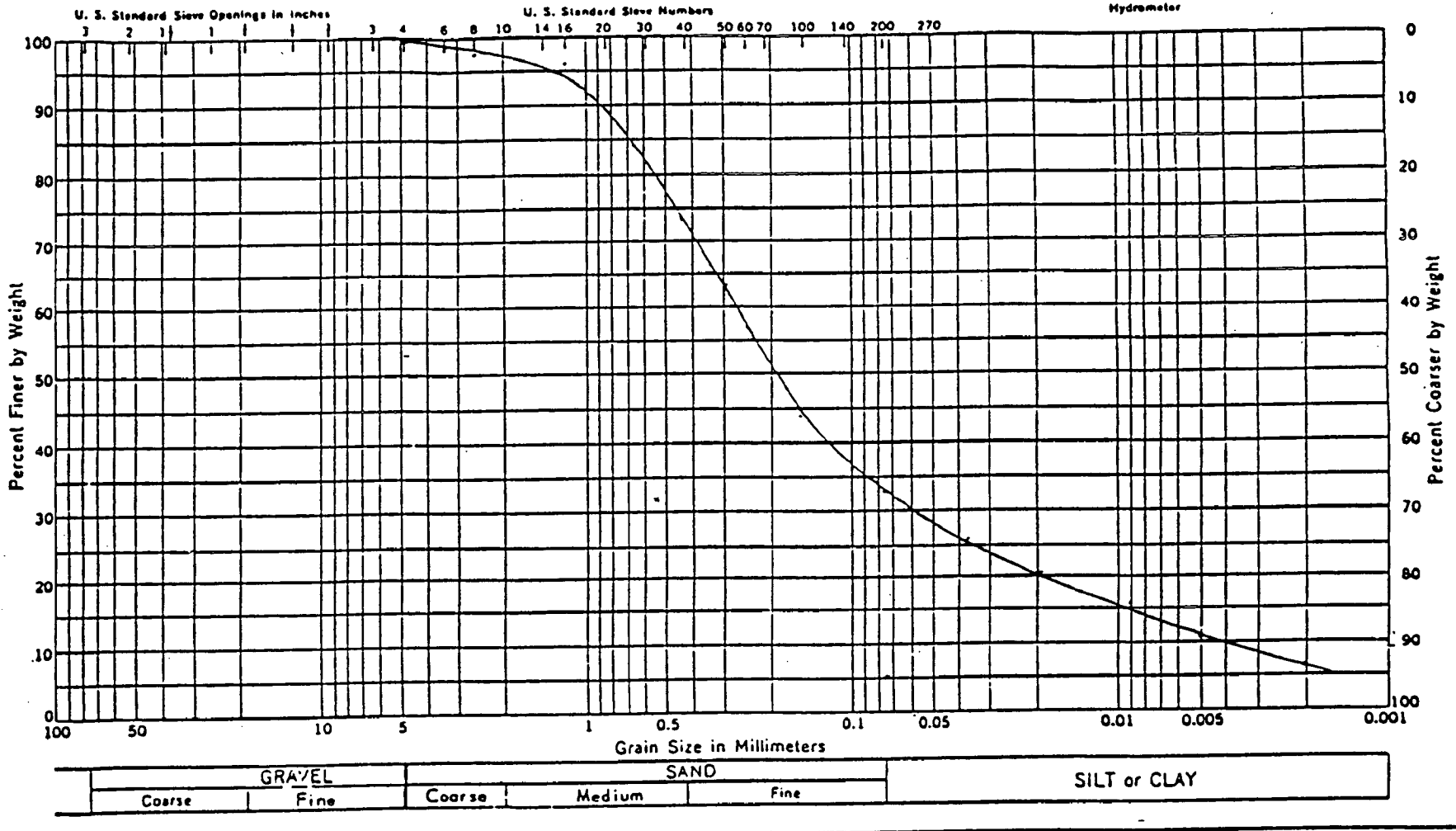
Nat. W_C 21.8%

Max. Dry Density 105.4 p.c.f

Optimum Moisture 15.8%

*Sieve	% Passing

As a mutual protection to clients, public, and ourselves, all reports are submitted as the confidential property of clients, and authorization for



HOLE NO.	SAMPLE NO.	DEPTH	M.C		CLASSIFICATION
			21.8%		Very moist, grayish brown sand
					some clayey silt " SP - ML "
					Coeff.of perm. k=1.1x10 cm/sec
					@94.7% of ASTM D-698, Max. dry
					density=105.4pcf @15.8% moisture
					Sample #2, East knob borrow area
					S39,100 W70,400
					LL= 38.7, PL=27.2, PI= 11.5

Project: Perkins Run Refuse Disposal

Job No: 98-131

Laboratory Soil Testing

April, 1998

TP-13

This data obtained from public information for D-0360 as a representative permeability of the #12 coal underclay. D-0360 is less than 3 miles northeast of D-1159.

WILLIAM J. SIPLIVY, P.E., C.P.G.

Geotechnical Engineer

8 March 2002

Ms. Ellen Greer
Jack A. Hamilton & Associates, Inc.
Consulting Engineers and Surveyors
342 High Street
Flushing, Ohio 43977

Re: CENTURY MINE COARSE COAL REFUSE DISPOSAL

Dear Ms. Greer:

In response to your interest in the underclay of the Washington No. 12 coalbed, my experience has been it is suitable for use as a low permeability liner and cap material in landfill applications.

This is based on recent lab testing and liner installation for another coal company's coarse coal refuse disposal facility, several miles east of the Century mine, in Belmont County. A permeability of less than E-07 is normally achieved there when the moisture content is 0 to 4 percent wet of optimum, at a minimum compactive effort of 95 percent Standard Proctor.

Please feel free to call if there are further questions.

Sincerely,

William J. Siplivy, P.E., Inc.

William J. Siplivy, P.E., C.P.G.

cc: Ryan Desko – Century mine

4667 Turnberry Trail • Stow, OH 44224 • 330-678-0027 • wjsiplivy@aol.com

TEST PIT LOGS
COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
WAYNE TOWNSHIP, BELMONT COUNTY, OHIO
23 AUGUST 2001

TP-1

Thickness (ft.)	Description
1.2	Silt loam, brown, rooted
0.7	Silty clay loam, brown
5.3	Clay, red (sampled for geotechnical tests)
7.2	Total pit depth (dry)

TP-2

Thickness (ft.)	Description
1.0	Silt loam, brown, rooted (at tree line)
2.8	Silty clay, brown
0.4	Clay w/weathered sandstone, brown
4.2	Total pit depth (dry, pit stopped in sandstone)

TP-3

Thickness (ft.)	Description
4.9	Clay, brown, saturated
4.4	Coal fines (old pond?), saturated
0.8	Clay, gray
10.1	Total pit depth (wet)

TP-4

Thickness (ft.)	Description
0.7	Silt loam, brown, rooted
1.3	Silty clay, brown
0.8	Clay w/limestone boulders
1.0	Clay, brown
4.2	Clay, red (sampled for geotechnical tests)
8.0	Total pit depth (dry)

TP-5

Thickness (ft.)	Description
3.2	Shaly limestone, brownish-gray (stripped)
3.2	Total pit depth (dry)

TP-6

Thickness (ft.)	Description
5.4	Clay, brown (saturated)
3.2	Clay, gray (seepage at top)
0.7	Clay, brown (saturated)
9.3	Total pit depth (wet)

TP-7

Thickness (ft.)	Description
0.8	Silt loam, brown, rooted
0.7	Clay, brown
1.0	Sandstone, brownish-gray
2.5	Total pit depth (dry, pit stopped in sandstone)

TP-8

Thickness (ft.)	Description
0.4	Silt loam, brown, rooted
2.8	Silty clay, brown
0.6	Clay, brown w/weathered sandstone
3.8	Total pit depth (dry, pit stopped in sandstone)

AMERICAN INSTITUTE OF PROFESSIONAL GEOLOGISTS
CERTIFICATE NUMBER
4599
AIPG
WILLIAM J. SIPLIVY
CERTIFIED PROFESSIONAL GEOLOGIST

Respectfully submitted:

William J. Siplivy, P.E., C.P.G.

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

STRATA ANALYSIS
SAMPLES RECEIVED 22 OCTOBER, 2001

SAMPLE NO. INTERVAL DESCRIPTION	TOTAL MOISTURE %	pH S.U.	NEUTRALIZATION POTENTIAL TONS/1000 TONS AS CACO3	TOTAL SULFUR %	PYRITIC SULFUR %	POTENTIAL ACIDITY TONS/1000 TONS AS CACO3 (TOTAL SULFUR)	POTENTIAL ACIDITY TONS/1000 TONS AS CACO3 (PYRITIC SULFUR)	CACO3 DEFICIENCY TONS/1000 TONS AS CACO3 (TOTAL SULFUR)	CACO3 DEFICIENCY TONS/1000 TONS AS CACO3 (PYRITIC SULFUR)
C-110623 TP-4 REDDISH BROWN SILTY CLAY	15.39	4.93	1.84	0.05	0.10	1.56	3.13	-0.28	1.29
C-110624 TP-1 REDDISH BROWN CLAY	19.78	7.00	8.38	0.08	0.24	2.50	7.50	-5.88	-0.88

PRESTON R. MOCZEK 11/19/01

NOTE:
Sulfur analysis is based on high temperature combustion that causes the Sulfur bearing compounds to breakdown, converting the Sulfur to Sulfur Dioxide for subsequent Infrared absorption and detection. With inorganic materials such as soils, the combustion and sulfur release process may not go to completion; resulting in Total Sulfur concentrations being less than the sum of the forms of Sulfur. In such cases it is suggested to place more reliance on the Forms of Sulfur Analysis.

Permeability Test Report

ASTM D 5084 - Method C

Boring: TP-2

Press Tube: No

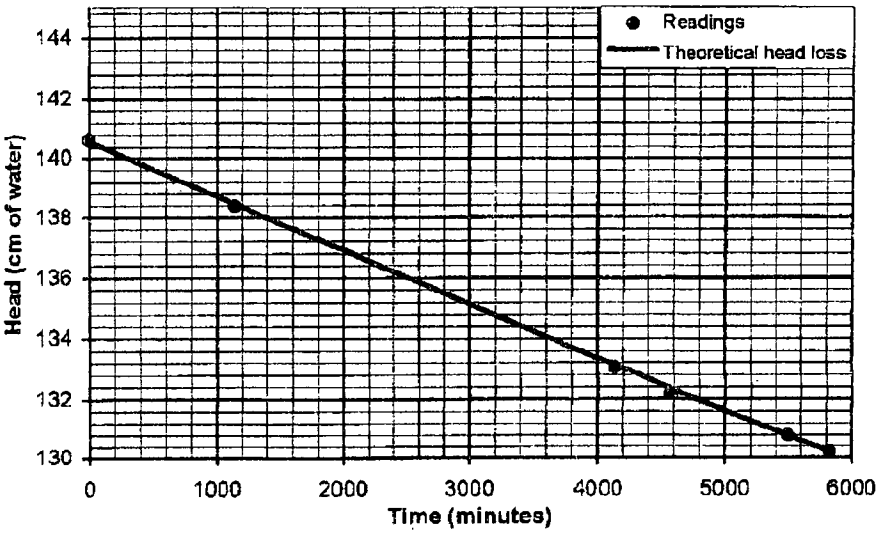
Sample: Bag Sample (Brown)

Depth:

Liquid Limit	40
Plasticity Index	19
Specific Gravity	2.7

Permeant Liquid
De-aired, deionized water

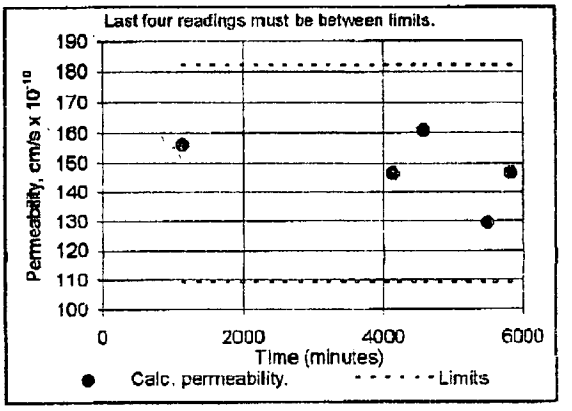
Temp. (°C)
21.0



	Diameter (cm)	Area, A (cm^2)	Length, L (cm)	Moisture (%)	Dry Density (pcf)	Saturation (%)
Initial	7.148	40.12	7.668	25.2	98.3	95.3
Final	7.148	40.12	7.668	26.4	98.3	99.9

Chamber Pressure (psi)	Backpressure (psi)		Consolidation Stress (psi)		Hydraulic Gradient (-)		
	Inflow	Outflow	Max.	Min.	Max.	Min.	Avg.
60.0	58.0	56.0	4.0	2.0	18.3	17.0	17.7

Date	Time	Buret Readings Inflow	Buret Readings Outflow	Flow Ratio	Head, h (cm)	$k_{20°C}$ (cm/sec)
9/28/01	12:36	1.9	16.1	-----	140.6	-----
9/29/01	7:45	2.7	15.3	1.00	138.4	1.6E-08
10/1/01	9:35	4.6	13.4	1.00	133.0	1.5E-08
10/1/01	16:55	4.9	13.1	1.00	132.2	1.6E-08
10/2/01	8:13	5.4	12.6	1.00	130.8	1.3E-08
10/2/01	13:40	5.6	12.4	1.00	130.2	1.5E-08



$$k_{20°C} = R_T \frac{aL}{2At} \ln\left(\frac{h_1}{h_2}\right) = \mathbf{1.5E\text{-}08} \quad \text{cm/sec}$$

a - Area of burets (0.71 cm^2)
t - Elapsed time between readings
R_T - Temperature correction factor = (0.980)

Remarks:
Sample was remolded to 98% of standard moisture density curve maximum dry density @ 2% wet of optimum moisture content.

DLZ

Client: William J. Siplivy, P.E., CPG
Project: Century Mine
Job No: 0121-4543.00

Permeability Test Report

ASTM D 5084 - Method C

Boring: TP-1

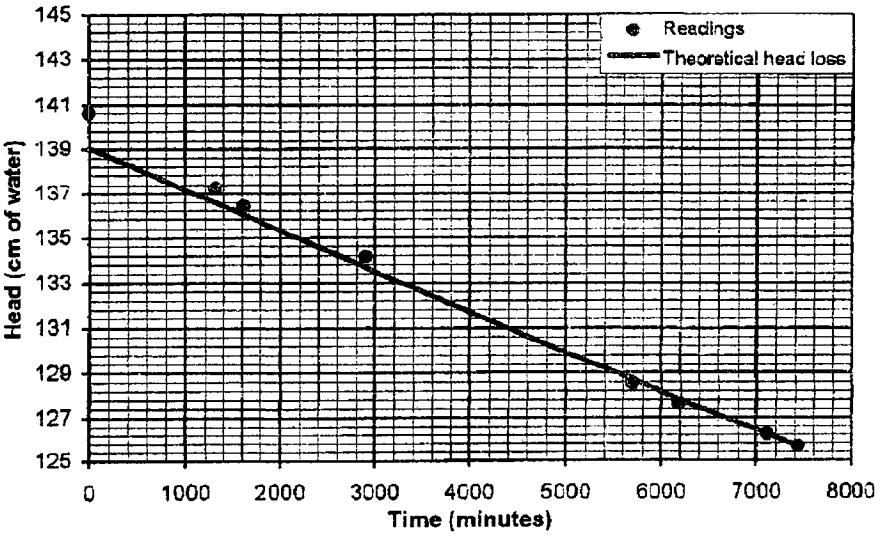
Press Tube: No

Sample: Bag Sample (Red Clay)

Depth:

Liquid Limit	39
Plasticity Index	17
Specific Gravity	2.7

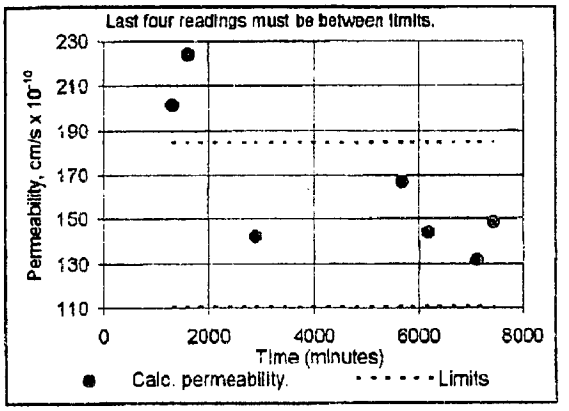
Permeant Liquid
De-aired, deionized water
Temp. (°C)
21.0



	Diameter (cm)	Area, A (cm^2)	Length, L (cm)	Moisture (%)	Dry Density (pcf)	Saturation (%)
Initial	7.163	40.30	7.564	24.2	99.3	93.9
Final	7.163	40.30	7.564	25.8	99.3	100.0

Chamber Pressure (psi)	Backpressure (psi)		Consolidation Stress (psi)		Hydraulic Gradient (-)		
	Inflow	Outflow	Max.	Min.	Max.	Min.	Avg.
60.0	58.0	56.0	4.0	2.0	18.6	16.6	17.6

Date	Time	Buret Readings Inflow	Buret Readings Outflow	Flow Ratio	Head, h (cm)	$k_{20°C}$ (cm/sec)
9/27/01	9:40	3.2	18.8	-----	140.6	-----
9/28/01	7:36	4.4	17.6	1.00	137.3	2.0E-08
9/28/01	12:36	4.7	17.3	1.00	136.4	2.2E-08
9/29/01	9:55	5.5	16.5	1.00	134.1	1.4E-08
10/1/01	8:35	7.5	14.5	1.00	128.5	1.7E-08
10/1/01	16:55	7.8	14.2	1.00	127.7	1.4E-08
10/2/01	8:12	8.3	13.7	1.00	126.3	1.3E-08
10/2/01	13:40	8.5	13.5	1.00	125.7	1.5E-08



$$k_{20°C} = R_T \frac{aL}{2At} \ln\left(\frac{h_1}{h_2}\right) = \mathbf{1.5E\text{-}08\ cm/sec}$$

a - Area of burets (0.71 cm^2)
t - Elapsed time between readings
R_T - Temperature correction factor = (0.980)

Remarks:
Sample was remolded to 98% of standard moisture density curve maximum dry density @ 2% wet of optimum moisture content.

DLZ

Client: William J. Slplivy, P.E., CPG
Project: Century Mine
Job No: 0121-4543.00

14. Submit a cross section showing the elevation, final profile, saturated zones (existing and proposed), and reclaimed surface profile of the disposal area.

See Cross Sections A - A' through G - G'.

15. Identify surface and ground water monitoring sites which will specifically determine hydrologic impact which may proximately occur as a result of the disposal plan. If monitoring wells are to be constructed as part of this plan, submit information as to well construction, development, and design.

Surface water site D-8A, and sediment Ponds 001, 009, and 010, and ground water sites *as listed in the Addendum to* Part 2, Page 14, Item E(1) will be monitored quarterly for quality and quantity to determine hydrologic impact as a result of the proposed disposal plan. See monitoring well installation logs, submitted as Addenda to this item.

16. Ensure that Part II, item E of the permit application addresses the probable hydrologic consequences of the disposal area on the hydrologic balance of the area. Specifically address changes in ground water and surface water quality in detail.

See Addendum to Part 2, Page 14, Item E

17. Submit a detailed assessment plan for the disposal area and ensure that Part II, items F(1) and F(2) of the permit application identify surface and ground water supplies which may be adversely affected by the disposal area and acceptable alternative sources.

See Addendum to Part 2, Page 14, Item E, and *Addendum to Attachment 28, Page 3, Item 17.*

18. If the material to be disposed is slurry, then submit data characterizing soil materials to be utilized in construction, if applicable.

N/A, No slurry disposal, coarse refuse only.

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-3A

Collar Elevation (feet, msl): 1163.04
Location: N 694,963.93 E 2,413,390.24
Date Started: 22 March 2001
Date Completed: 23 March 2001
Water Depth: 209.68 feet
Water Elevation: 953.36 feet, msl

Well Materials List

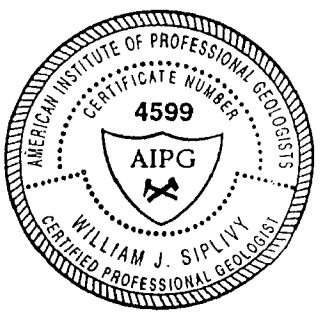
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 47 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 5 bags
11. Installation method: Gravity

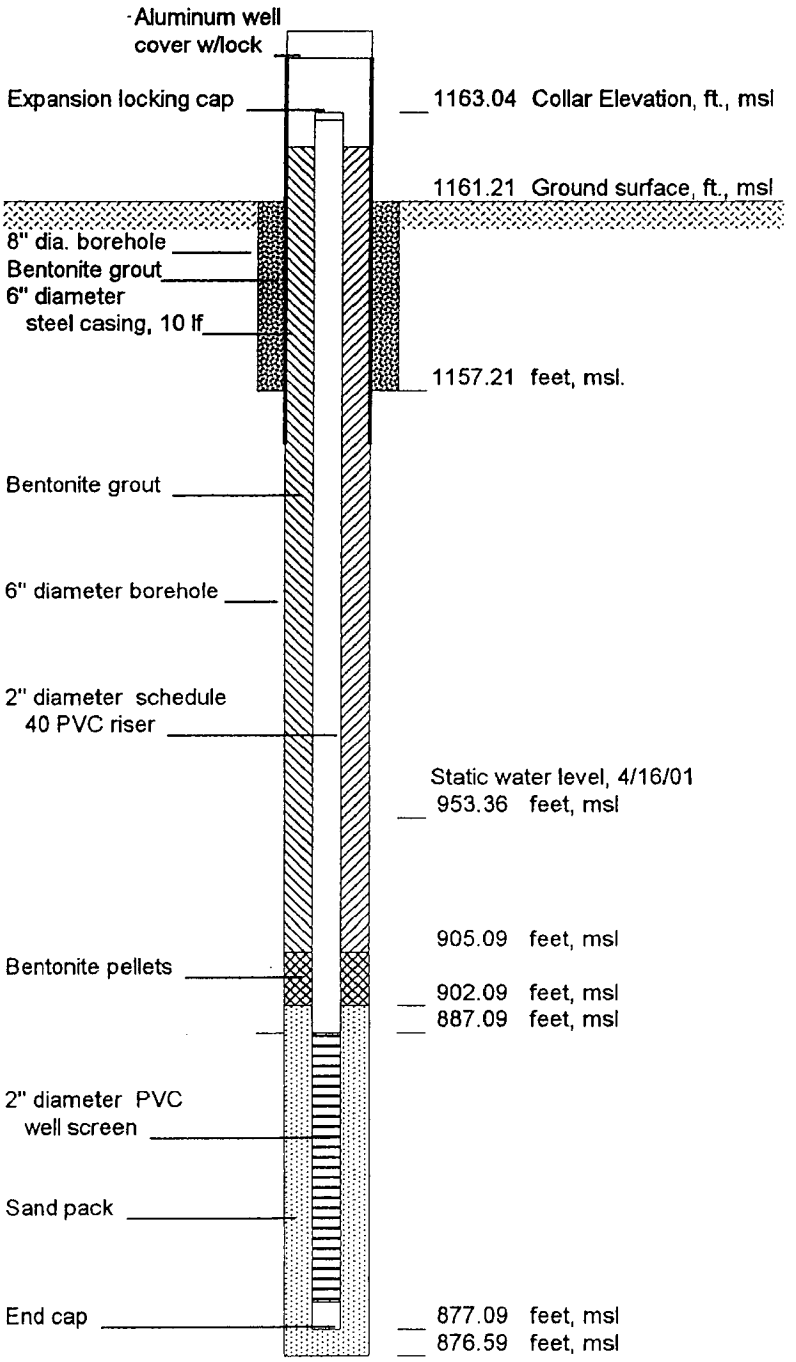
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-3A.WK4

WJS

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-3B

Collar Elevation (feet, msl): 1163.22
Location: N 694,960.31 E 2,413,398.70
Date Started: 23 March 2001
Date Completed: 23 March 2001
Water Depth: 85.04 feet
Water Elevation: 1078.18 feet, msl

Well Materials List

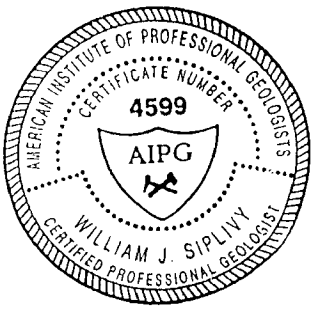
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 15 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

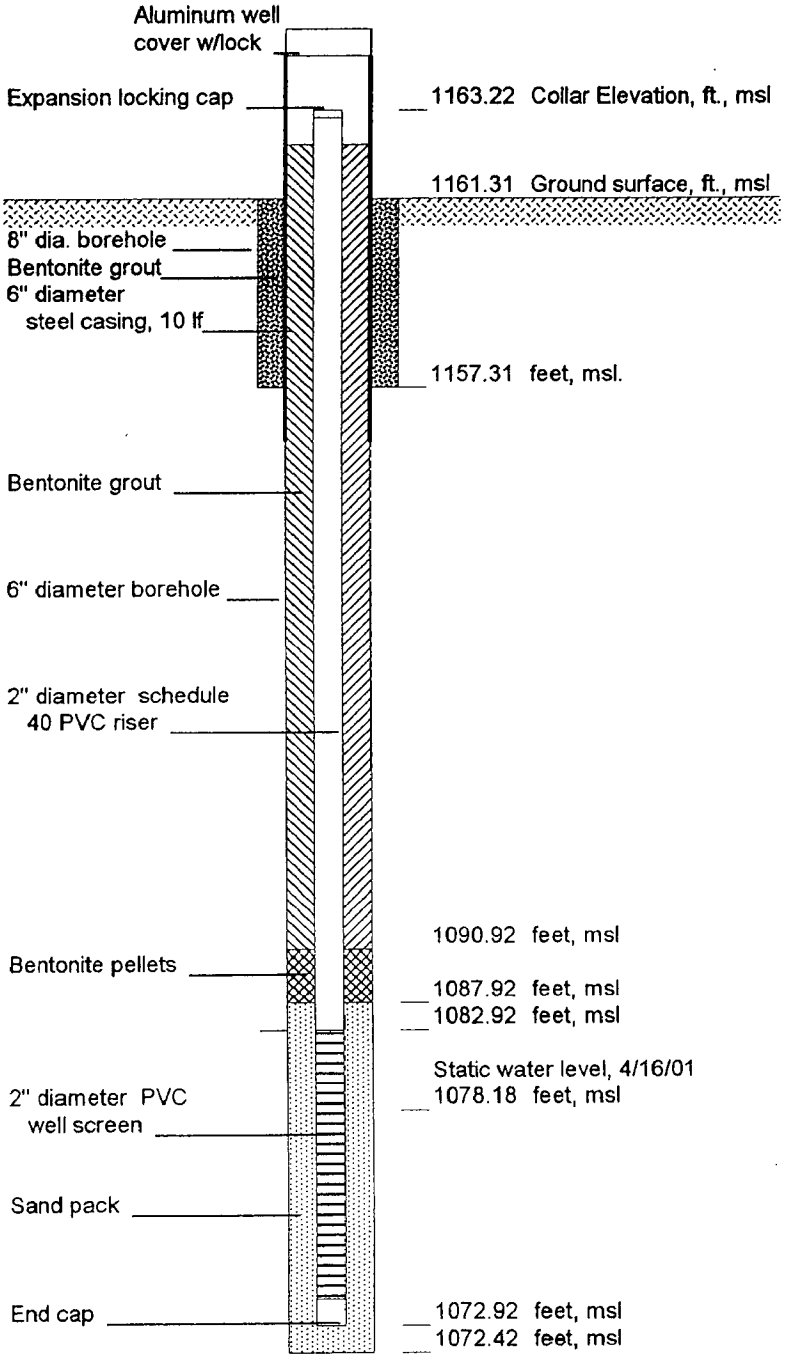
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-3B.WK4

WJS

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-3C

Collar Elevation (feet, msl): 1162.35
Location: N 694,958.80 E 2,413,381.85
Date Started: 26 March 2001
Date Completed: 26 March 2001
Water Depth: 20.15 feet
Water Elevation: 1142.2 feet, msl

Well Materials List

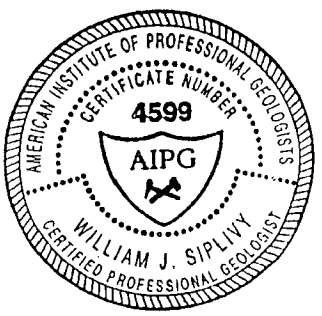
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 2 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

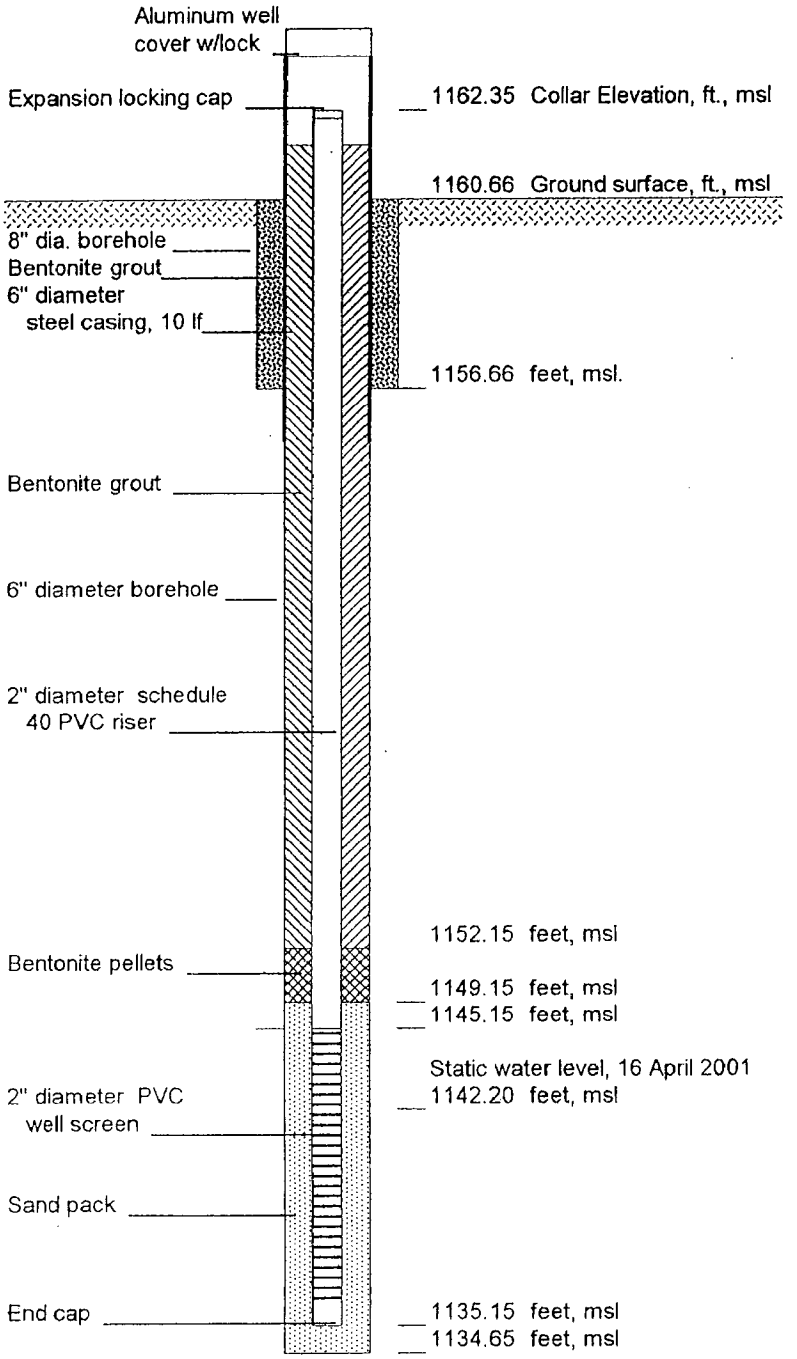
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-3C.WK4

WJS

AEC 10418

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-4A

Collar Elevation (feet, msl): 1154.06
Location: N 696,720.93 E 2,412,001.29
Date Started: 27 March 2001
Date Completed: 29 March 2001
Water Depth: 145.05 feet
Water Elevation: 1009.01 feet, msl

Well Materials List

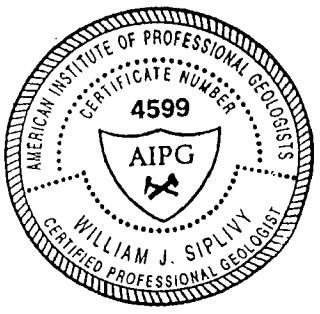
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 50 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

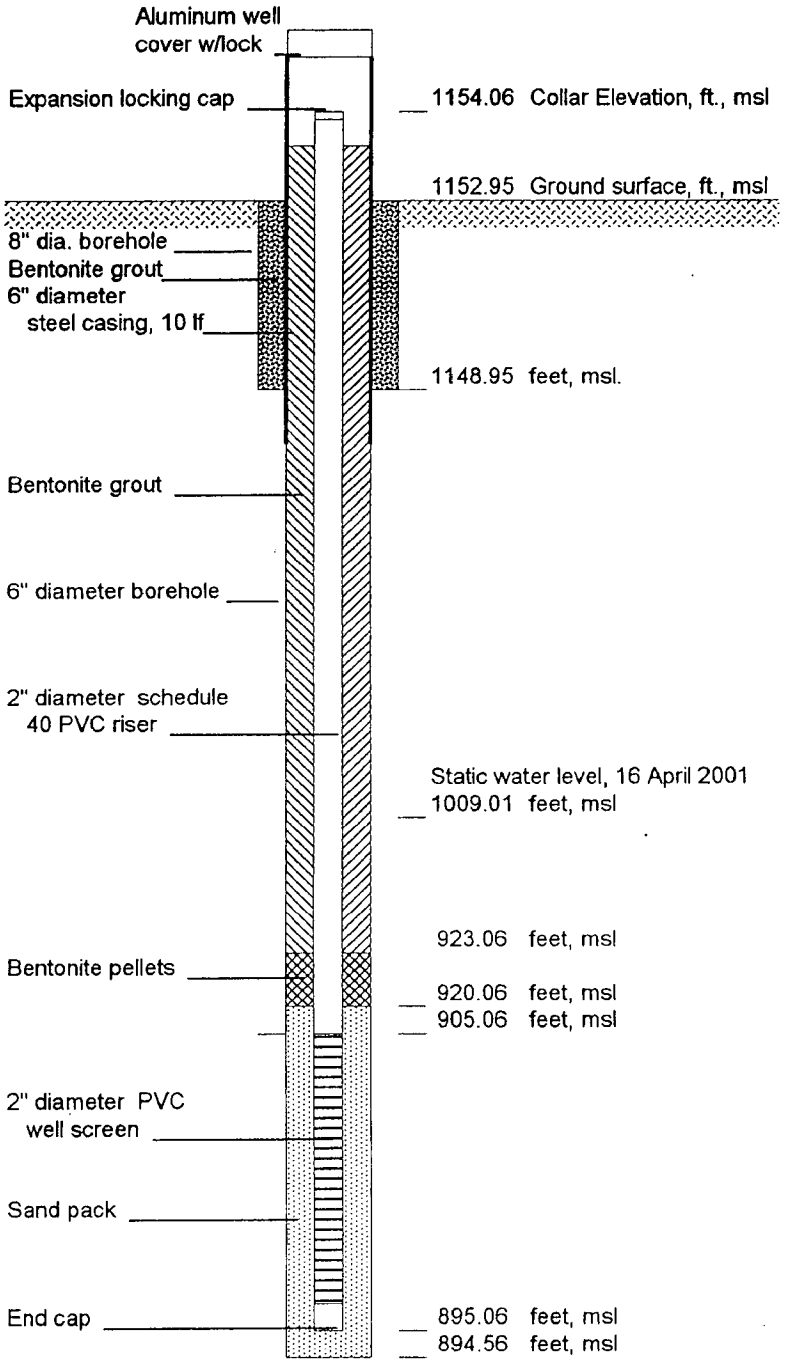
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-4A.WK4

WJS

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-4B

Collar Elevation (feet, msl): 1153.58
Location: N 696,716.79 E 2,412,008.57
Date Started: 27 March 2001
Date Completed: 27 March 2001
Water Depth: 56.82 feet
Water Elevation: 1096.76 feet, msl

Well Materials List

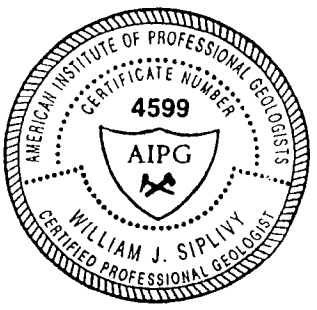
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 9 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

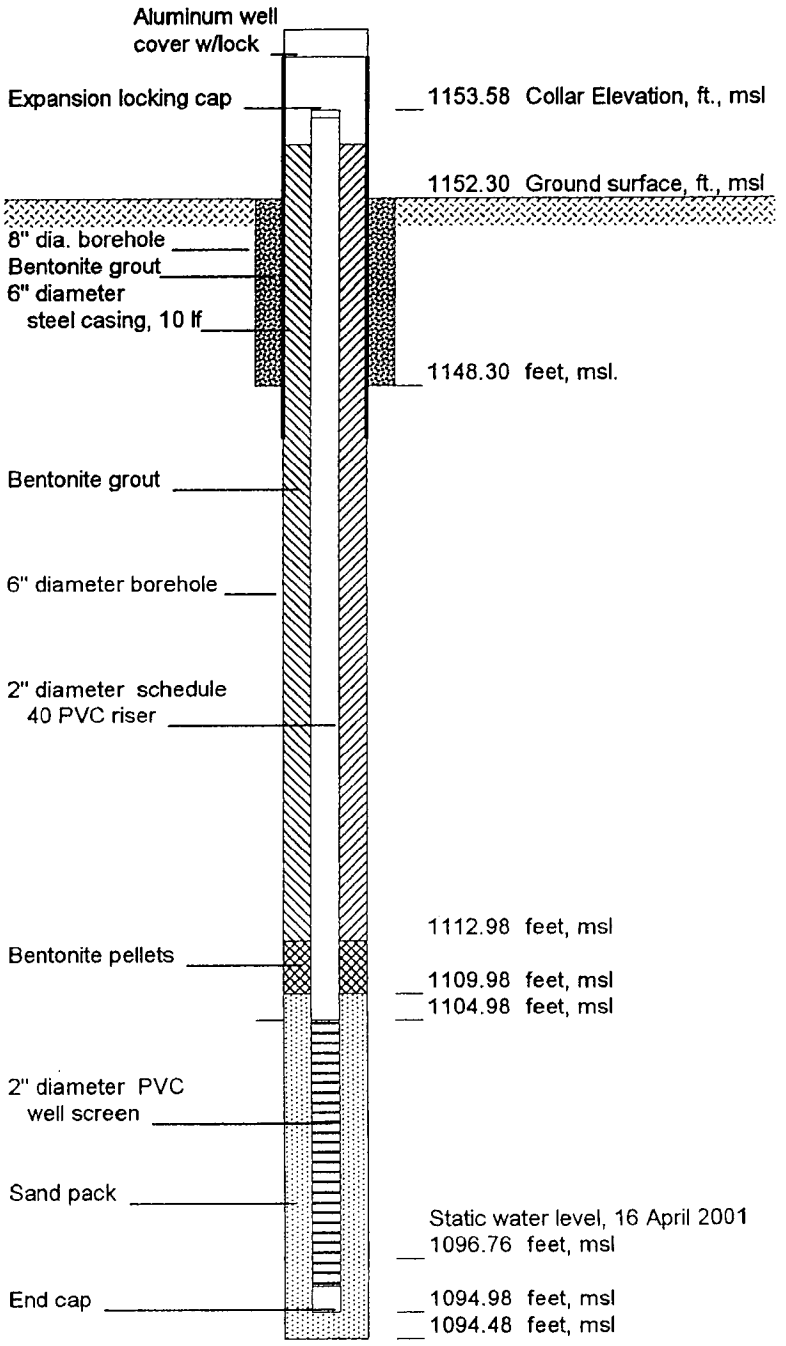
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-4B.WK4

WJS

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-4C

Collar Elevation (feet, msl): 1153.26
Location: N 696,713.01 E 2,412,015.57
Date Started: 27 March 2001
Date Completed: 29 March 2001
Water Depth: 5.65 feet
Water Elevation: 1147.61 feet, msl

Well Materials List

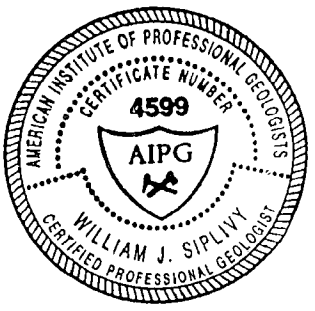
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 4 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

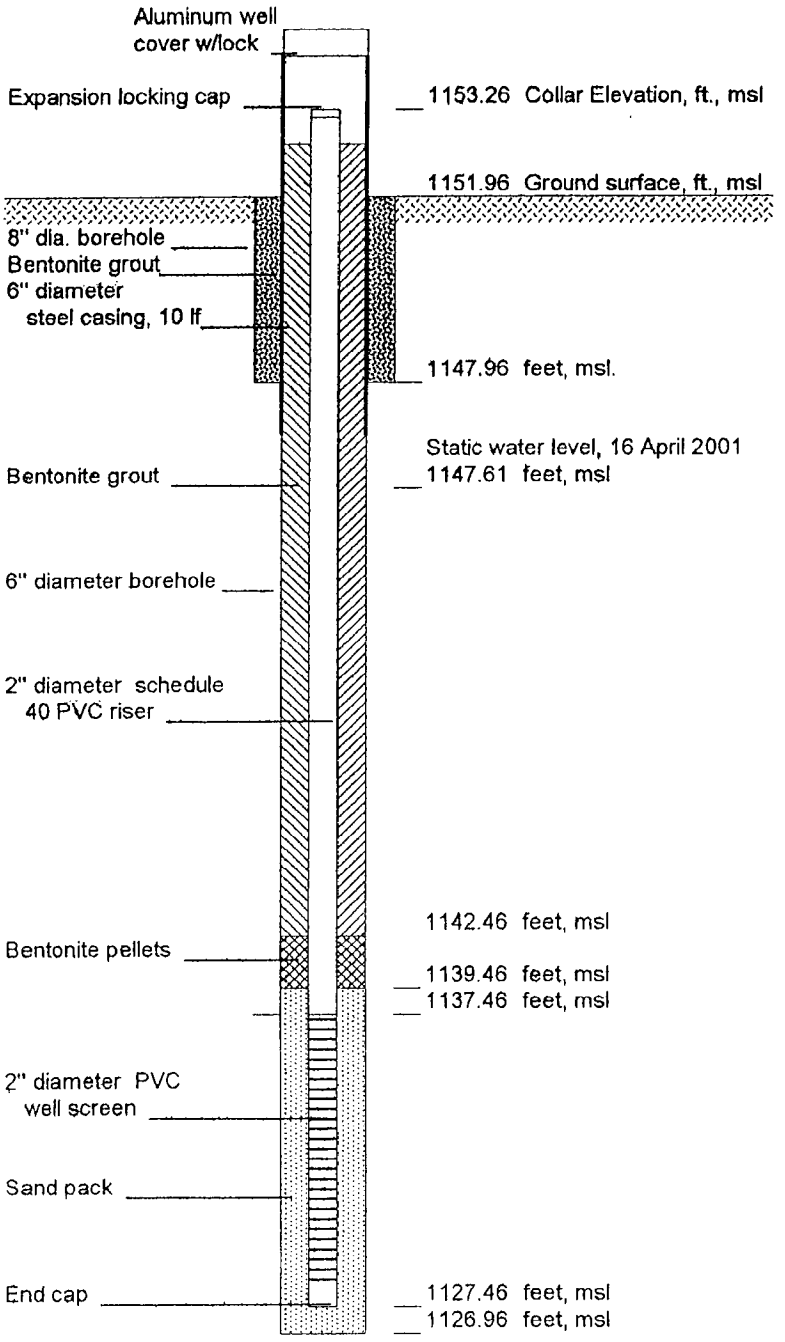
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-4C.WK4

WJS

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-5A

Collar Elevation (feet, msl): 1161.07
Location: N 695,518.10 E 2,412,309.91
Date Started: 12 March 2001
Date Completed: 20 March 2001
Water Depth: 203.12 feet
Water Elevation: 957.95 feet, msl

Well Materials List

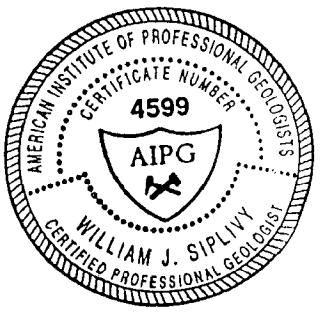
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 56 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 4 bags
11. Installation method: Gravity

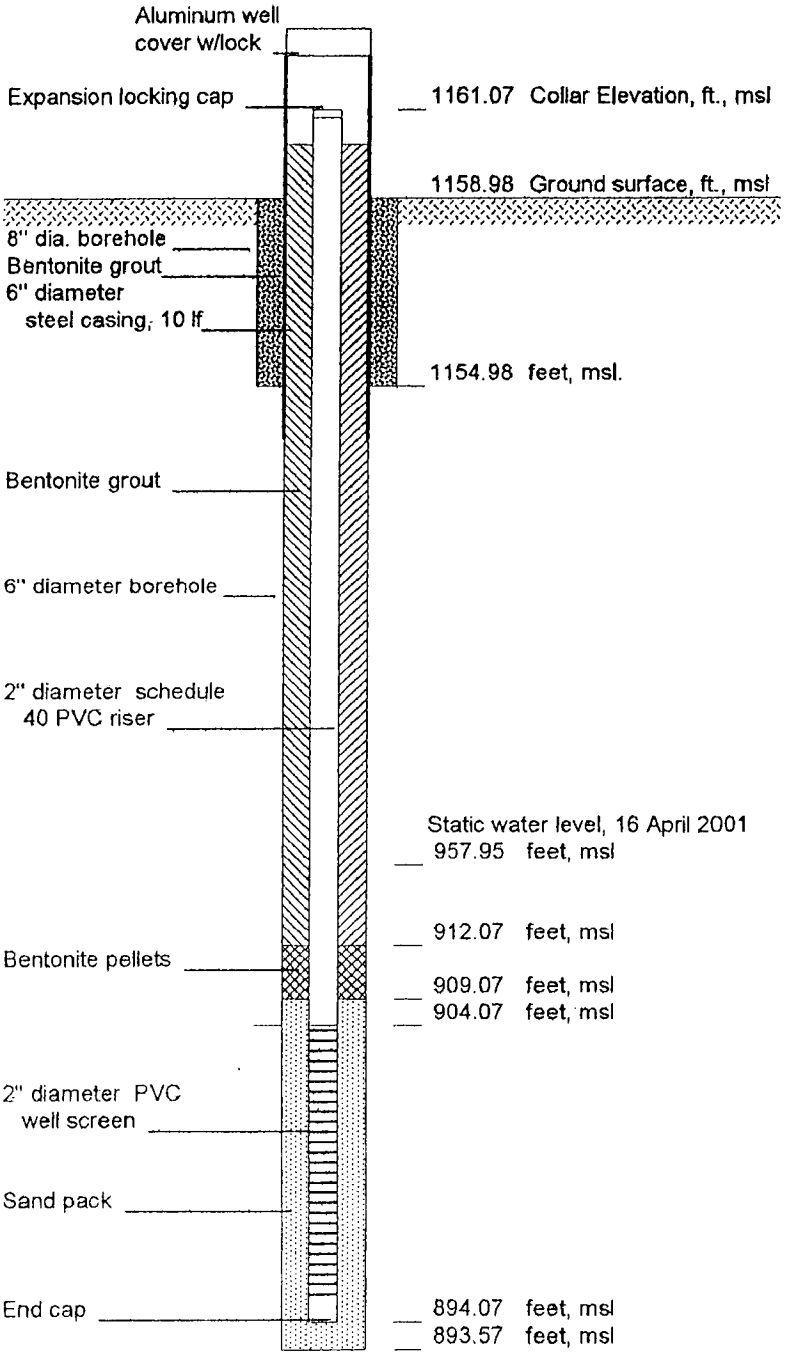
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy w/rain, high 30's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-5A.WK4

WJS

AEC 10422

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-5B

Collar Elevation (feet, msl): 1160.16
Location: N 695,537.87 E 2,412,307.73
Date Started: 20 March 2001
Date Completed: 20 March 2001
Water Depth: 77.06 feet
Water Elevation: 1083.1 feet, msl

Well Materials List

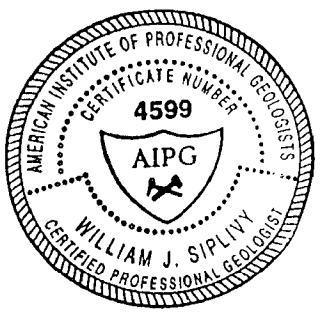
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 14 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010 .
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

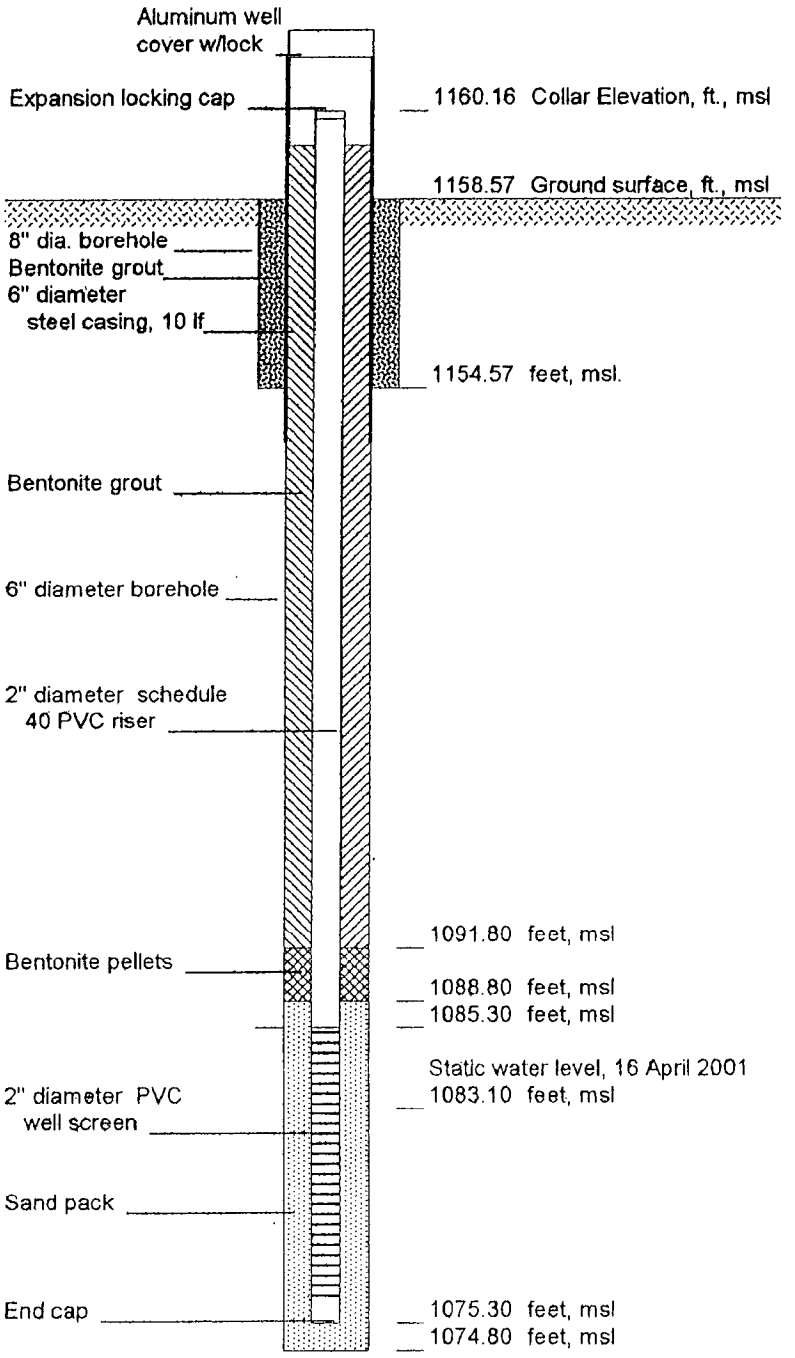
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-5B.WK4

WJS

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-5C

Collar Elevation (feet, msl): 1160.86
Location: N 695,528.14 E 2,412,308.76
Date Started: 20 March 2001
Date Completed: 20 March 2001
Water Depth: 7.24 feet
Water Elevation: 1153.62 feet, msl

Well Materials List

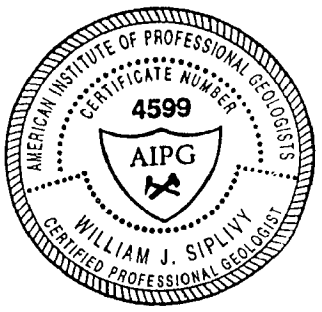
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 2 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 5 bags
11. Installation method: Gravity

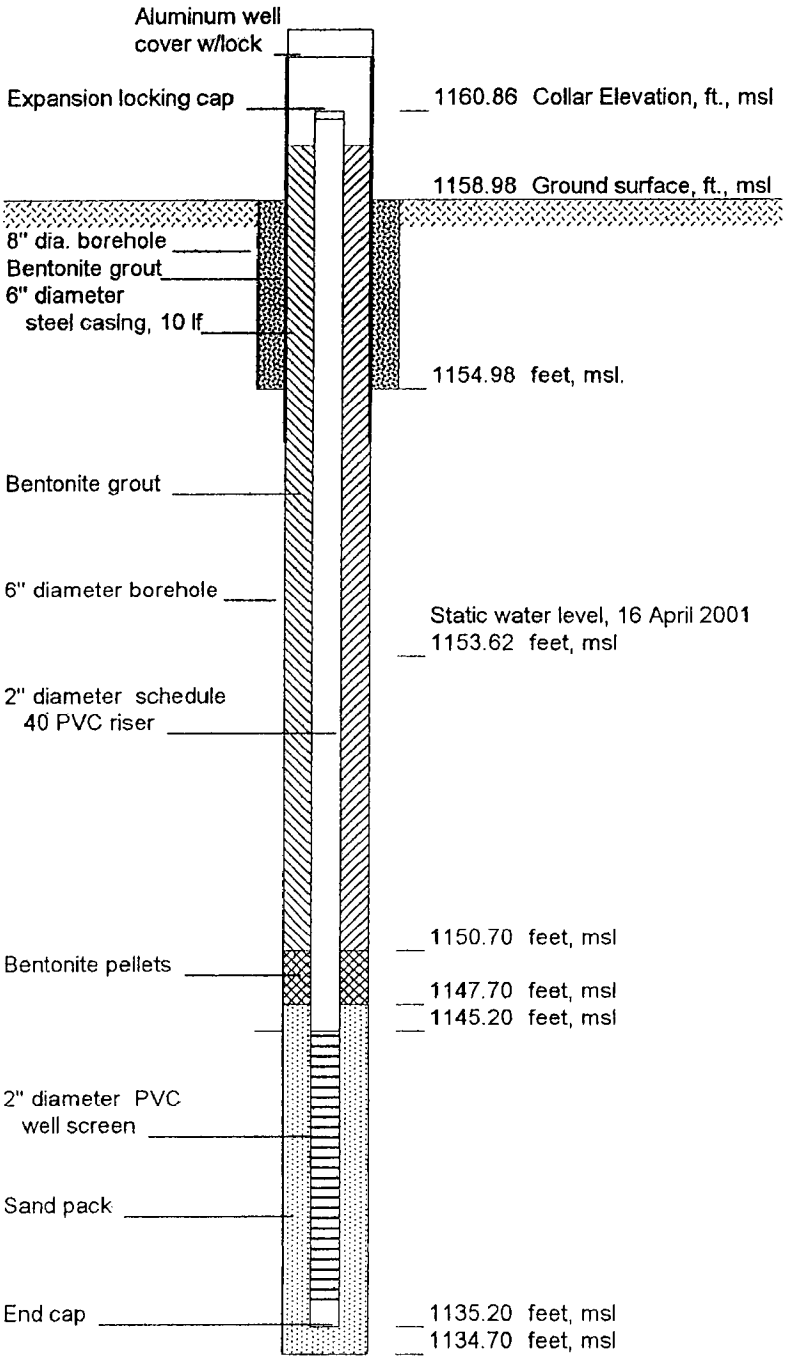
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-5C.WK4

WJS

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 4, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-6B

Collar Elevation (feet, msl): 1166.7
Location: N 696,894.84 E 2,413,834.75
Date Started: 30 March 2001
Date Completed: 30 March 2001
Water Depth: 74.64 feet
Water Elevation 1092.06 feet, msl

Well Materials List

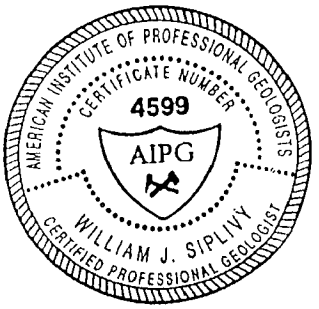
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 12 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

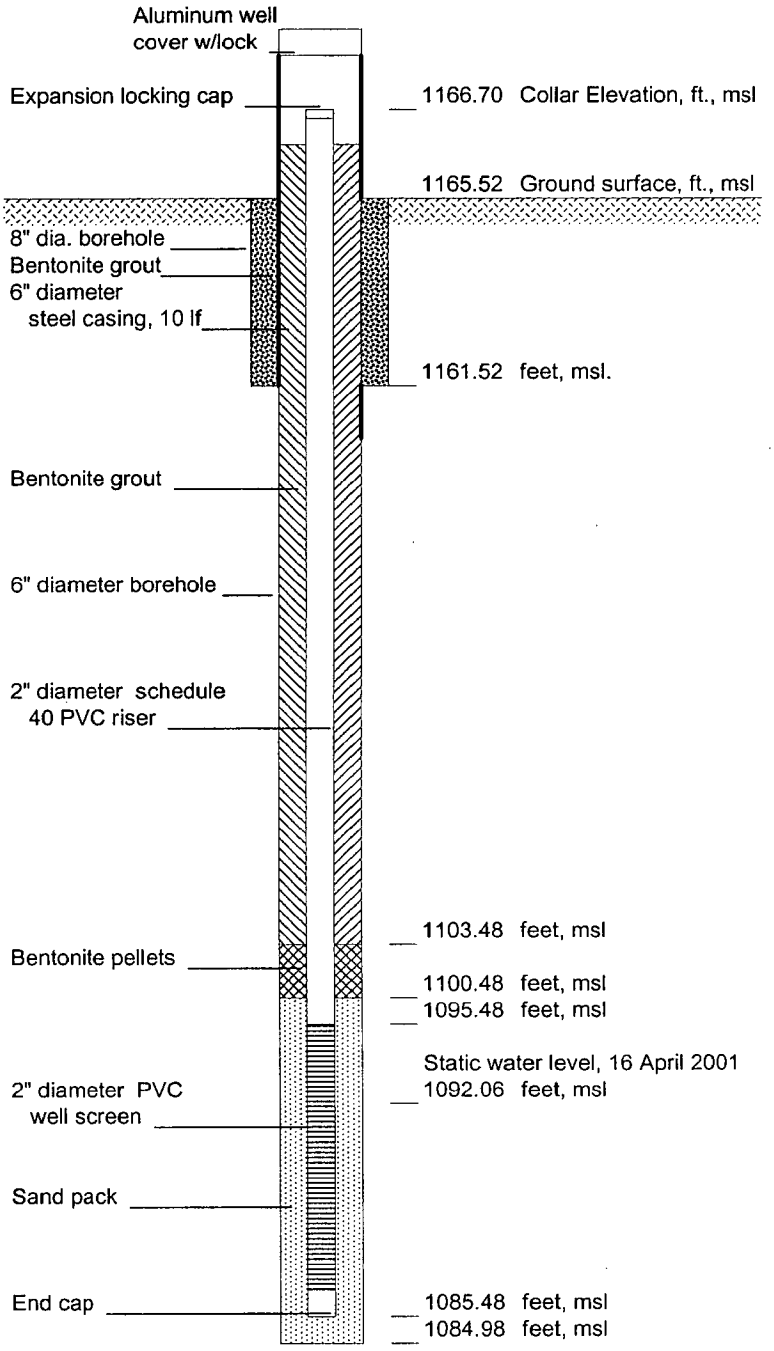
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Sunny, mid 50's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-6B.WK4

WJS

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 4, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-6C

Collar Elevation (feet, msl): 1167.01
Location: N 696,895.79 E 2,413,842.77
Date Started: 30 March 2001
Date Completed: 30 March 2001
Water Depth: 30.91 feet
Water Elevation: 1136.1 feet, msl

Well Materials List

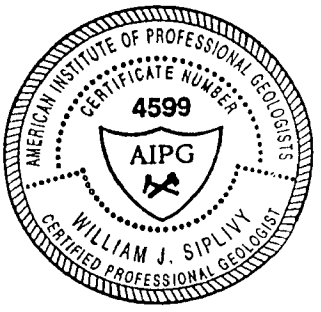
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 6 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

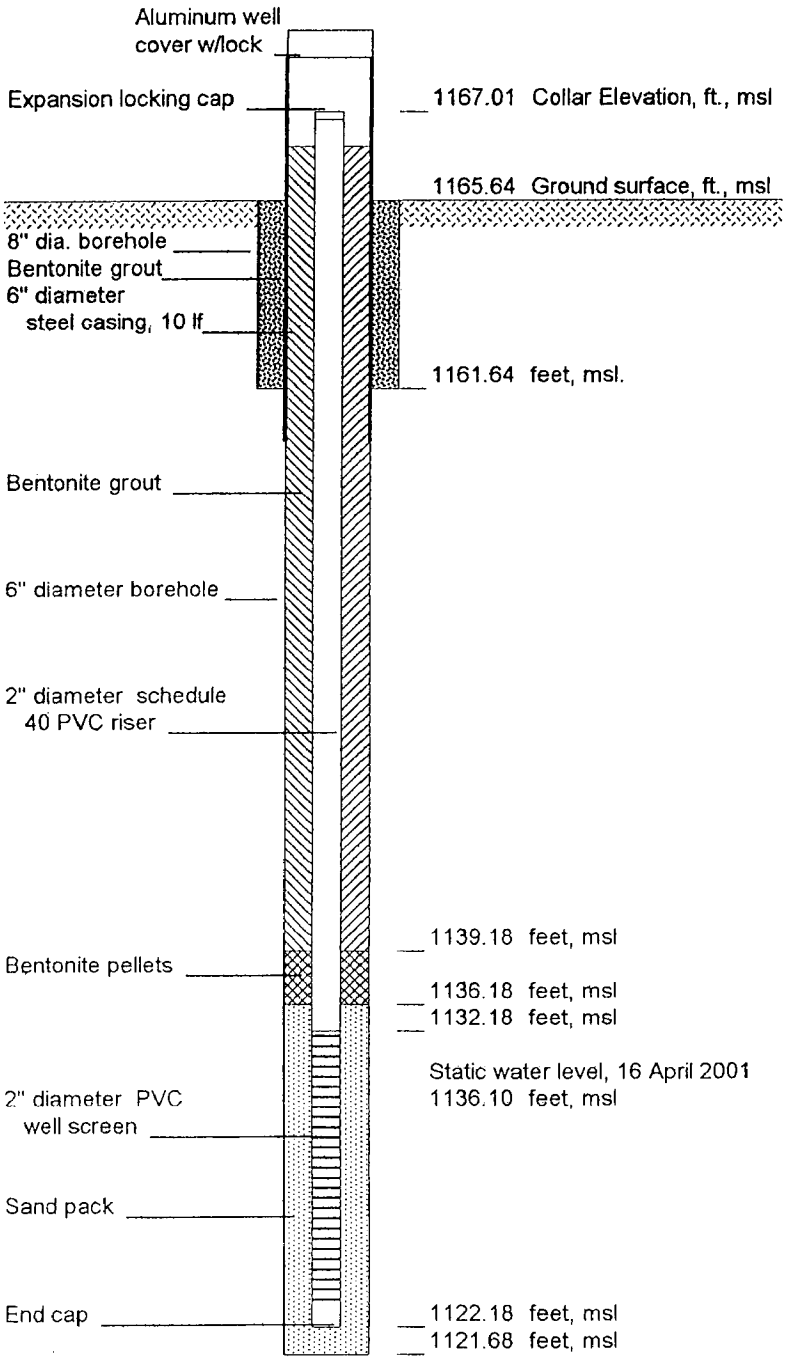
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Sunny, mid 50's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-6C.WK4

WJS

AEC 10426

ADDENDUM TO ATTACHMENT 28, PAGE 3, ITEM 17.,
AMERICAN ENERGY CORPORATION

Legitimately-used ground water supplies DW-7A and W-7 will not experience contamination, diminution, or interruption As a result of the proposed refuse disposal. Their distance from the proposed refuse disposal area, as well as dip of the strata will protect these sources. Monitoring of sediment ponds, and treatment if necessary, will protect surface water in the vicinity of the proposed disposal. See approved permit D-1159 and D-1159-1 responses Part 2, Items F(1) and F(2).

Rights of present ground water users will be respected and protected by measures as described in the sealing plan. Based on the measures to be undertaken to minimize the impact of the refuse disposal area on surface and ground water, ***American Energy Corporation*** does not anticipate that the rights of present users will be affected. However, if users rights are infringed upon, an alternate source will be provided. If the quality and quantity of water available for domestic use is diminished, alternate water sources within the underlying aquifer could be tapped by drilling and casing to a greater depth, depending on the quality and quantity required.

19. Describe in detail the monitoring plan and analytical procedures to be followed for this disposal plan.

Ground and surface water sites as referenced and listed in item 15. above will be monitored quarterly for quality and quantity. See A.R.P. Application Map for location of these sites. Pond monitoring will be conducted as required by NPDES/Stormwater General Permit OHM000001, Facility No.3GM00018. Analytical procedures as identified by the U.S. EPA, Methods for Chemical Waste Analysis of Water and Waste, will be utilized for all water quality analysis. (Pond 008 is monitored under Permit D-0425)

20. Identify the parameter limits and frequencies to be met as set by the OEPA by the disposal area, if different from the NPDES/NSPS requirements.

NPDES/Stormwater General Permit No. OHM000001, Facility No. 3GM00018 parameter limits and frequency requirements for monitoring at Ponds 001, 009, and 010 will be observed.

21. If required per the modified MOA, submit an OEPA Application for Permit to Install or Plan Approval (Form 4309) as an addendum to this attachment.

N/A

Ohio Department of Natural Resources

BOB TAFT, GOVERNOR SAMUEL W. SPECK, DIRECTOR

Division of Mineral Resources Management
Michael L. Sponsler • Chief
1855 Fountain Square Court-Bldg. H-2
Columbus, Ohio 43224-1383
Phone (614) 265-6633 Fax: (614) 265-7999

April 5, 2002

American Energy Corporation
43521 Mayhugh Hill Road
Beallsville, Ohio 43716

Gentlemen:

The Division of Mineral Resources Management completed our review of your revisions on the Application to Revise a Permit (ARP) R-1159-4 in which you propose to allow coal waste disposal to the permitted mining and/or reclamation plan. The following additional revisions are required before we can further consider your request.

ARP Review:

1. Addendum to ARP, item 4: Revise to address duration and protective measures to be employed for the excess overburden storage areas. Also, address at what thickness will the excess overburden be re-distributed over the disposal area.

Hydrology Review:

1. Sealing is proposed for the disposal of the refuse. Since sealing is the method used for the waste disposal, isolation from water is implied. However, based on the cross sections, disposal is planned right on the pit floor, above the #12 underclay. Springs in Waterbearing Zone B (#12 Coal and overlying sandstone and shale) occur between the elevations of 1097 and 1060 feet mean sea level and have flows from less than one gallon per minute to 83 gallons per minute. This would imply that significant amounts of water might collect above this underclay. The comment in the previous revision letter was not meant to imply that the four feet of nontoxic material beneath the refuse and the 20 feet against the highwall should be deleted, only that there should be assurances that an appropriate thickness of impermeable material would also be present. In fact, these thicknesses provide a buffering and an important offset. However, if the liner against the highwall and the cap work appropriately, then saturation of the lower part of Waterbearing Zone B above the #12 pit floor will likely be prevented. Clarify the plan to ensure that water will be appropriately impeded from entering the waste disposal areas, both from the top and from the areas along the highwall. The narrative accompanying the stability analysis indicates that, "A phreatic

surface was included in the REAM run even though the installed or natural seal will prevent water from reaching the top of the coal underclay. The phreatic surface was assumed to run along the top of the #12 coal seam and then down along the top of the claystone." The clay cap does have some permeability, and, based on other information presented, at locations where the #12 Coal is unmined, the water table would be significantly above the top of the coal, as indicated by the flow of the springs at various elevations within Waterbearing Zone B. Clarify, and revise plans as necessary.

2. The cross sections show that 19 to 30 feet of claystone are present below the #12 Coal, and in the Addendum to ARP Item 4 it is stated that 7 to 22.5 feet of in situ claystone are present below the #12 Coal; however, this data is not shown on any Attachment 12 and the drill logs for the monitoring wells, report the thicknesses of the clay/claystone/clay shale underlying the #12 Coal as 1 to 20 feet thick. (However, it is understood that the reports that show only one foot may not be reporting the entire thickness.) Provide documentation for the reported thicknesses.

3. Addendum to Attachment 14B:

   a) The submitted Attachment 14B indicates that Zone C has a vertical extent of 59 feet, while paragraph 1 states that the vertical extent is 45 feet. Revise where appropriate for consistency.

   b) In the sixth paragraph, you state that Zones A and B will be isolated from the refuse by 20 feet of non-toxic material that will be placed against the open highwall. This part of the plan appears to have been revised elsewhere to delete the 20 feet. Revise.

4. Attachment 14C: Inventory the monitoring wells. Include elevations.

5. Addendum to Page 14, E:

   a) Some of the monitoring wells are deeper than the zones that are indicated to be monitored by the wells (especially the wells that are assigned to Zone C). Indicate on the logs or elsewhere the screened zones or state how these wells will be used to monitor the indicated zones. Also submit the well log for CG01-6A.

   b) In the second to last paragraph, you indicate that placing the refuse on the pit floor above the in situ clay will be above the reestablished water table. Provide evidence that this is the case. Note that usually the refuse is isolated in cells surrounded by low permeability material and separated from the pit floor and highwall by other non-toxic material. Refer to above comments.

c) In the original application, you indicate that SZ-1 is possibly "refuse disposal seepage." This seep is exhibiting high total dissolved solids, total hardness, total sulfates, and total iron, according to background sampling in the original application. Address this sampling with regard to the probable hydrologic consequences of this proposed operation.

d) Address the water quality in some of the borings that will be used as monitoring wells. For example, mercury is often above the primary drinking water standards.

6. Attachment 28:

a) Item 5: The response asks for the amount in tons, but, according to the response to ARP Item 4, the amount provided is in cubic yards. The tonnage should apparently be 2,937,457. Revise.

b) Item 11: See above comments. Comments from Bill Siplivy indicate that the #12 underclay is appropriate for a low permeability liner if compacted to 95 percent of Standard Proctor. Tests are presented from a neighboring permit as representative of the #12 underclay; however, it is not clear if these tests were actually run on the #12 underclay on the neighboring permit on or other clays. The material analyzed is described as "very moist, grayish brown sand some clayey silt." Clarify. The response indicates that over-compaction will be avoided, but that re-working of the soil will continue until an in-place weight is achieved. Will compaction of the in place #12 underclay occur to achieve the proper compaction, or will compaction only be performed on the highwall liner and the cap? How will the proper compaction and permeability of the underclay be documented? Indicate how the underlying material will be compacted in order to achieve the necessary impermeability. Perhaps the material will need to be excavated and recompacted. Indicate how the material underlying the #12 Coal will be compacted in order to achieve the necessary impermeability. Perhaps the material will need to be excavated and recompacted.

c) Item 17: The page number reference for Item F should apparently be 15. Recheck and revise as necessary.

Engineer Review:

1. Provide references for the friction angle of the coal refuse.

2. Demonstrate how the liner against the highwall will be constructed vertically at two feet wide.

3. How will the thin layer clayey soils against the highwall keep the coal refuse backfill from being recharged from waterbearing Zones A and B?

4. The disposal area needs to be lined with the clayey soils available on-site, as was proposed in the original ARP.

5. The ARP should state that underdrains will be installed if springs, wet weather seeps or other areas producing water are encountered during mining. A typical underdrain should be designed and presented in the ARP. Discuss the discharge point for underdrains that might be installed.

6. Clarify whether the slope of the pit floor and/or bottom liner will always slope towards the ground surface or will any areas impound water against the highwall.

7. Evaluate whether surface water drainage structures are necessary to safely convey waters off the capped area without eroding the cap. Evaluate the existing valleys and drainage ways.

8. Discuss how a subsidence event within the existing underground mine would affect the performance of the coal refuse disposal area.

Please submit the required revisions within thirty (30) days of this letter to avoid delays in our review of your proposal. Should you require additional time, please do not hesitate to contact me. Failure to submit the required revisions in a timely manner may result in your proposal being returned without further action.

Sincerely,

R. Scott Stiteler
Permitting, Hydrology & Bonding Section

Cc: Jack A. Hamilton & Associates, Inc.
John Puterbaugh
Jeff Emmons
Tom Barnitz
Mike Dillman

April 5, 2002

American Energy Corporation
43521 Mayhugh Hill Road
Beallsville, Ohio 43716

Gentlemen:

The Division of Mineral Resources Management completed our review of your revisions on the Application to Revise a Permit (ARP) R-1159-4 in which you propose to allow coal waste disposal to the permitted mining and/or reclamation plan. The following additional revisions are required before we can further consider your request.

ARP Review:

1. Addendum to ARP, item 4: Revise to address duration and protective measures to be employed for the excess overburden storage areas. Also, address at what thickness will the excess overburden be re-distributed over the disposal area.

Hydrology Review:

1. Sealing is proposed for the disposal of the refuse. Since sealing is the method used for the waste disposal, isolation from water is implied. However, based on the cross sections, disposal is planned right on the pit floor, above the #12 underclay. Springs in Waterbearing Zone B (#12 Coal and overlying sandstone and shale) occur between the elevations of 1097 and 1060 feet mean sea level and have flows from less than one gallon per minute to 83 gallons per minute. This would imply that significant amounts of water might collect above this underclay. The comment in the previous revision letter was not meant to imply that the four feet of nontoxic material beneath the refuse and the 20 feet against the highwall should be deleted, only that there should be assurances that an appropriate thickness of impermeable material would also be present. In fact, these thicknesses provide a buffering and an important offset. However, if the liner against the highwall and the cap work appropriately, then saturation of the lower part of Waterbearing Zone B above the #12 pit floor will likely be prevented. Clarify the plan to ensure that water will be appropriately impeded from entering the waste disposal areas, both from the top and from the areas along the highwall. The narrative accompanying the stability analysis indicates that, "A phreatic

surface was included in the REAM run even though the installed or natural seal will prevent water from reaching the top of the coal underclay. The phreatic surface was assumed to run along the top of the #12 coal seam and then down along the top of the claystone." The clay cap does have some permeability, and, based on other information presented, at locations where the #12 Coal is unmined, the water table would be significantly above the top of the coal, as indicated by the flow of the springs at various elevations within Waterbearing Zone B. Clarify, and revise plans as necessary.

2. The cross sections show that 19 to 30 feet of claystone are present below the #12 Coal, and in the Addendum to ARP Item 4 it is stated that 7 to 22.5 feet of in situ claystone are present below the #12 Coal; however, this data is not shown on any Attachment 12 and the drill logs for the monitoring wells, report the thicknesses of the clay/claystone/clay shale underlying the #12 Coal as 1 to 20 feet thick. (However, it is understood that the reports that show only one foot may not be reporting the entire thickness.) Provide documentation for the reported thicknesses.

3. Addendum to Attachment 14B:

   a) The submitted Attachment 14B indicates that Zone C has a vertical extent of 59 feet, while paragraph 1 states that the vertical extent is 45 feet. Revise where appropriate for consistency.

   b) In the sixth paragraph, you state that Zones A and B will be isolated from the refuse by 20 feet of non-toxic material that will be placed against the open highwall. This part of the plan appears to have been revised elsewhere to delete the 20 feet. Revise.

4. Attachment 14C: Inventory the monitoring wells. Include elevations.

5. Addendum to Page 14, E:

   a) Some of the monitoring wells are deeper than the zones that are indicated to be monitored by the wells (especially the wells that are assigned to Zone C). Indicate on the logs or elsewhere the screened zones or state how these wells will be used to monitor the indicated zones. Also submit the well log for CG01-6A.

   b) In the second to last paragraph, you indicate that placing the refuse on the pit floor above the in situ clay will be above the reestablished water table. Provide evidence that this is the case. Note that usually the refuse is isolated in cells surrounded by low permeability material and separated from the pit floor and highwall by other non-toxic material. Refer to above comments.

c) In the original application, you indicate that SZ-1 is possibly "refuse disposal seepage." This seep is exhibiting high total dissolved solids, total hardness, total sulfates, and total iron, according to background sampling in the original application. Address this sampling with regard to the probable hydrologic consequences of this proposed operation.

d) Address the water quality in some of the borings that will be used as monitoring wells. For example, mercury is often above the primary drinking water standards.

6. Attachment 28:

a) Item 5: The response asks for the amount in tons, but, according to the response to ARP Item 4, the amount provided is in cubic yards. The tonnage should apparently be 2,937,457. Revise.

b) Item 11: See above comments. Comments from Bill Siplivy indicate that the #12 underclay is appropriate for a low permeability liner if compacted to 95 percent of Standard Proctor. Tests are presented from a neighboring permit as representative of the #12 underclay; however, it is not clear if these tests were actually run on the #12 underclay on the neighboring permit on or other clays. The material analyzed is described as "very moist, grayish brown sand some clayey silt." Clarify. The response indicates that over-compaction will be avoided, but that re-working of the soil will continue until an in-place weight is achieved. Will compaction of the in place #12 underclay occur to achieve the proper compaction, or will compaction only be performed on the highwall liner and the cap? How will the proper compaction and permeability of the underclay be documented? Indicate how the underlying material will be compacted in order to achieve the necessary impermeability. Perhaps the material will need to be excavated and recompacted. Indicate how the material underlying the #12 Coal will be compacted in order to achieve the necessary impermeability. Perhaps the material will need to be excavated and recompacted.

c) Item 17: The page number reference for Item F should apparently be 15. Recheck and revise as necessary.

Engineer Review:

1. Provide references for the friction angle of the coal refuse.

2. Demonstrate how the liner against the highwall will be constructed vertically at two feet wide.

3. How will the thin layer clayey soils against the highwall keep the coal refuse backfill from being recharged from waterbearing Zones A and B?

4. The disposal area needs to be lined with the clayey soils available on-site, as was proposed in the original ARP.

5. The ARP should state that underdrains will be installed if springs, wet weather seeps or other areas producing water are encountered during mining. A typical underdrain should be designed and presented in the ARP. Discuss the discharge point for underdrains that might be installed.

6. Clarify whether the slope of the pit floor and/or bottom liner will always slope towards the ground surface or will any areas impound water against the highwall.

7. Evaluate whether surface water drainage structures are necessary to safely convey waters off the capped area without eroding the cap. Evaluate the existing valleys and drainage ways.

8. Discuss how a subsidence event within the existing underground mine would affect the performance of the coal refuse disposal area.

Please submit the required revisions within thirty (30) days of this letter to avoid delays in our review of your proposal. Should you require additional time, please do not hesitate to contact me. Failure to submit the required revisions in a timely manner may result in your proposal being returned without further action.

Sincerely,

R. Scott Stiteler
Permitting, Hydrology & Bonding Section

Cc: Jack A. Hamilton & Associates, Inc.
John Puterbaugh
Jeff Emmons
Tom Barnitz
Mike Dillman

342 High St., Box 471
Flushing, OH 43977
Ph: (740) 968-4947
Fax: (740) 968-4225
e-mail: hamilton@1st.net
www.hamiltonandassoc.com

Jack A. HAMILTON & Associates, Inc.

Civil Engineering
Land Surveying
Mine Permitting
GIS Data Services
Land Development
Global Positioning Systems

April 11, 2002

R. Scott Stiteler
ODNR, Division of Mineral Resources Management
1855 Fountain Square Court, Bldg. H-3
Columbus, Ohio 43224-1383

Dear Scott,

In response to your letter dated April 5, 2002, requiring revisions to American Energy Corporation's R-1159-4 A.R.P., the following revisions have been completed. The numbers and letters to the left of the responses correspond to the numbers and letters in your letter.

ARP Review:

1. Addendum to ARP, item 4: See revised response to this item, first paragraph.

Hydrology Review:

1. The 83 gpm flow rate reported in the original permit was a typographical error, and should have been reported as 8 gpm. Current sampling from the same aquifer zones reveal flow rates of 9.1 gpm during high flow, while intermediate sampling revealed flows of generally <1 gpm, and "no flow" conditions during low flow. See revised response to this item in the Addendum to ARP, Item 4, second paragraph. The assumed in the stability analysis was utilized for "worst case" scenario for failure analysis and is stated as such in the narrative.

2. Revised response as necessary to reference insitu material thicknesses, See revised response to this item in the Addendum to ARP, Item 4, second paragraph.

3. Addendum to Attachment 14B:

   a) Revised Zone C vertical extent to 45' on Attachment 14B.

   b) Revised 20 foot thickness appropriately.

4. Attachment 14C: Inventoried monitoring wells, see Attachment 14C.

5. Addendum to Page 14, E:

   a) Submitted monitoring well installation logs. There is no well CG01-6A.

Cathy M. Bihlman, P.S. • Donald M. Brafford, P.E.• Jack A. Hamilton, P.S. • Paul R. Hamilton, P.S.• Charles W. Johnson, P.S.• David J. Siembab, P.S.• Terry L. Steffl, P

b) See revised plan for encapsulating the refuse and providing drain pipes.

c) See revised addendum for response to this item.

d) See revised addendum for response to this item.

Attachment 28:

a) Item 5: Revised amount to tons.

b) Item 11: See revised response to this item.

c) Item 17: The page number reference refers to Page 3, Item 17. in the Attachment 28. Did not revise.

Engineer Review:

1. Provided reference for the friction angle of the coal refuse.

2. See revised plan. The low permeability clay material has been moved further from the highwall.

3. See revised plan.

4. See revised plan.

5. Revised to include underdrains in the plan. See revised cross section Sheet 2 of 2 for detailed plan.

6. See revised Addendum to ARP, Item 4, 2nd paragraph for response to this item.

7. See revised Addendum to ARP, Item 4, 2nd paragraph for response to this item.

8. See revised Addendum to Part 2, Page 14, Item E, 1st paragraph on Page 3 of 3.

ARP Map: Also submitting a revised ARP map due to a discrepancy in pond numbering.

Yours truly,

Jack A. Hamilton & Associates, Inc.
Consultants for American Energy Corporation

Ellen M. Greer

Ellen M. Greer, Permitting

ADDENDUM TO A.R.P., ITEM 4., AMERICAN ENERGY CORPORATION

American Energy Corporation is proposing to utilize a portion of Permit D-1159 as a coal refuse disposal site. See attached map and cross sections for location and detail. After coal removal is completed, a portion of the pit and coal bench areas will be left open for coal refuse disposal, which will be generated by American Energy Corp.'s Century Mine (D-0425) located near Alledonia, Ohio. The pit and coal bench areas will be open from the time of coal removal for a period not exceeding six (6) months. During this time, any water that collects in the pit will be promptly pumped to a sediment pond for treatment, if necessary. Due to the volume of waste generated from the D-0425 deep mine, the approved reclamation time table will be met.

A ***1 foot to 30' foot thick*** layer of insitu claystone exists below the #12 coal seam. ***See Test Hole #1 from original permit D-1159 for 30 foot thick #12 underclay.*** The refuse will be disposed of in two foot lifts using rubbed tired vehicles and/or sheeps foot roller to meet compaction requirements of 90% of maximum dry density directly atop this insitu claystone material. In conjunction with the layering of coal refuse, a minimum of 2 feet of non-toxic ***compacted spoil*** material will be placed in layers against the final highwall, ***followed by 2 feet of low permeability compacted clay material,*** as the lifts are completed. ***Underdrains will be installed if springs, wet weather seeps or other areas producing water are encountered during mining. In these areas, 2 feet of shot rock will be placed against the highwall with the 2 foot clay compacted against the shot rock. (See details on cross section Sheet 2 of 2) The underdrains will be installed so as to direct drainage to naturally occurring swales and existing stream valleys. The pit floor will always slope toward ground surface to assure that water will not impound against the highwall.*** After the refuse lifts are completed, ***1.5*** feet of non-toxic, low permeability material will be placed over the refuse and an additional 2 feet of cover will be applied over the low permeability material prior to placing 6 inches of topsoil on the area. This will result in a minimum 4 foot of cover over the coal refuse area. ***Refuse will be encapsulated, including sides, where the #12 coal is mined or unmined.*** The placement of the cover material completely over the disposal site will minimize surface water, ground water, and oxygen contact with the coal refuse thereby eliminating the formation of acid or toxic leachate. This approach will result in a negligible impact on the environment.

The low permeability material will be identified in the field by a registered professional engineer. The low permeability material that will be used to cap the refuse will be stockpiled above the final highwall for placement after final grade for the top of the refuse is reached. sufficient low permeable material exists on the area to cap the refuse. The 1.5 foot cap for the 52.7 acre area will require 128,000 cubic yards of low permeability material. This material has an intermittent areal extent encompassing the entire refuse disposal area, contained in the variable clay strata lying directly above, 5 to 10 feet above, and 33 to 40 feet, respectively, above the #12 coal as indicated in drill logs for monitoring wells CG01-5A, CG01-3A, CG01-4A, and CG01-6B. The available cap material is listed below:

ADDENDUM TO A.R.P., ITEM 4., AMERICAN ENERGY CORPORATION

2.7 Ac. x 8' (average thickness) x 43,560 / 27 =	34,848 cubic yards
1.9 Ac. x 10' (average thickness) x 43,560 / 27 =	30,653 cubic yards
11.5 Ac. x 14.8' (average thickness) x 43,560 / 27 =	274,589 cubic yards
0.6 Ac. x 7' (average thickness) x 43,560 / 27 =	6,776 cubic yards
Total	346,866 cubic yards

See Attachment 28 for physical and chemical analysis of the liner/cover material.

Since the proposed refuse disposal area will be reclaimed to approximate original contour, surface water drainage structures, other than those previously existing and proposed in D-1159 and Pond 008 series in permit D-0425, will not be necessary. Existing valleys and drainage ways will safely carry the discharge from the refuse disposal area to Ponds 001, 009, 010, and 008.

The coal refuse material will be hauled to the site by trucks and placement will begin south east of test hole #1, and will continue easterly. Disposal will then start on the east side of the proposed #12 mining pit and coal bench located west of Permit D-0425, and will continue in a west, southwest direction. The open pits and coal bench will have the capacity to store approximately 2,514,970 cubic yards of refuse which amounts to approximately 2,937,457 tons. Spoil and clay generated during mining will be stockpiled above the proposed final highwall and utilized for cover material on the pending D-0425-2 refuse disposal area. ***Excess overburden storage areas will be seeded and mulched to protect them from wind and water erosion. Overburden storage duration may not exceed six months due to the volume of waste generated from the D-0425 deep mine. See cross sections A-A' through G-G' for redistributed thicknesses of excess overburden.***

As described above, the highwall will be lined before placement of refuse material. The placement of the refuse material will consist of layering the refuse in two foot lifts and compacting with rubber tired vehicles and/or sheepsfoot roller. These lifts will be repeated vertically until the final proposed grade (approximate original contour) has been achieved. The refuse will be covered with a 1.5 foot layer of non-toxic, low permeability material. Above the 1.5 foot low permeability material, a 2 foot thick cover material will be placed, followed by six (6) inches of moderately dry growth medium soil and topsoil. Topsoiling and seeding will be completed in the next appropriate planting season following placement of the cover material.

ADDENDUM TO ATTACHMENT 14B, A.R.P., PERMIT D-0425
AMERICAN ENERGY CORPORATION

The first continuous zone of saturation underlying the proposed refuse disposal area occurs in Zone C. Zone C is approximately ninety (90) feet in vertical distance, at its closest point, below the bottom of the proposed refuse disposal area. Zone C has a vertical extent of approximately forty-five (45) feet max., and a lateral extent equal to the extent of the 'Cassville' Shale, with the Waynesburg #11 Coal seam as a bedding plane.

Temporal fluctuations are entirely dependent upon rainfall as the recharge of groundwater is confined to the immediate ridgetop areas. Groundwater flow directions will not be affected by the proposed refuse disposal operation. Due to the existing rock structure and topography, recharge of groundwater is confined to the immediate ridgetop areas. Discharge areas within the boundaries of the refuse disposal area can be seen in spring discharge elevations between 1143 and 1140 (Zone A), spring discharge and well static water level between the elevations of 1097 and 1060 (Zone B), and spring discharge and well static water level between the elevations of ***1009*** and 950 (Zone C).

Zone A discharge ranges from a high of 1.5 gpm during "high flow" conditions to less than 1 gpm during "low flow" conditions.

Zone B discharge ranges from a high of ***9.1*** gpm during "high flow" conditions to ***0*** gpm during "low flow" conditions. Fluctuations in water levels in Zone B are illustrated by well DW-7A. The static water level in this well has ranged from a high of 6 feet (elevation 1076) to a low of 9 feet (elevation 1073).

Zone C discharge, based on flows from undeveloped springs, does not exceed <1 gpm. Static water levels at W-7 have ranged from a high of 22 feet (elevation 1040) to a low of 64 feet (elevation 998).

Zones A and B will be isolated from the refuse by ***2*** feet of non-toxic material will be placed against the open highwall, ***followed by 2 feet of compacted low permeability material. In areas where water seepage occurs from the highwall, shot rock will be placed against the highwall, followed by the 2 feet of compacted clay material. A 6" drain pipe will be installed approximately 2 feet below the pit floor to direct all drainage from the highwall area. See cross sections A-A' through G-G' and details.*** Zone C will be isolated by its 90 feet in vertical distance between it and the bottom of the refuse area. Zone D (identified in the original permit) is 238 feet below the proposed refuse disposal area. Zones C and D will not be affected by the proposed refuse disposal.

The uppermost aquifer system, and all zones of saturation above the uppermost aquifer system were determined by existing undeveloped spring elevations, and static water levels in existing wells utilizing a Fisher M-Scope static water level meter. The Generalized Section of Ohio, Division of Geological Survey, Table 1, as well as site specific information noted above, were utilized to define vertical extent of the separate zones of saturation.

See Permit D-1159 for Attachment 14B.

9-88

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 14B
(WELL/SPRING INVENTORY)

Applicant's Name AMERICAN ENERGY CORPORATION (R-1159-4)

Aquifer/Zone Identification	Aquifer/Zone Lithology	Aquifer/Zone Thickness Well/Spring	Aquifer/Zone Elev. (msl)	Aquifer/Zone Horizontal Extent	Aquifer/Zone Known Uses	Approx. Rate of Discharge/Usage of Aquifer/Zone (gpm or cfs)
A	SANDSTONE, SHALE	117'	1239' TO 1122'	UPPER RIDGE OUTCROP TO OUTCROP	S-23, S-24	NONE, <1 TO 1.5 GPM
B	SANDSTONE, SHALE, #12 COAL	50'	1110 TO 1060	MID-RIDGE OUTCROP TO OUTCROP	DW-7A, DS-10, S-1, 2, 3, 5, 20, 25, 26, 27	DOMESTIC, AGRICULTURAL, NONE, 0 TO 9.1GPM
C	SHALE, #11 COAL	45'	1009 TO 877	LOWER-RIDGE OUTCROP TO OUTCROP	W-7	DOMESTIC

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 14C
(WELL/SPRING INVENTORY)

Applicant's Name AMERICAN ENERGY CORPORATION (R-1159-4)

Well/Spring Identification Number	Name of Owner of Well/Spring	Surface Elevation of Well/Spring	Depth of Well in Feet Below Land Surface	Static Water Level of Well in Feet Below Land Surface	Lithology of Supplying Aquifer/ Waterbearing Zone	Known Uses of Well/Spring (if spring give discharge rate)
CG-01-3A	American Energy Corporation	1161.21	284.62'	208.85'	C	Domestic (Outside Adj. Area)
CG-01-3B	American Energy Corporation	1161.31	88.89'	83.13'	B	Domestic, Agricultural, None, 0 to 9.1 gpm
CG-01-3C	American Energy Corporation	1160.66	26.01	18.46'	A	None, 0 to 1.5 gpm
CG-01-4A	American Energy Corporation	1152.95	258.39'	143.94'	C	Domestic, (Outside Adj. Area)
CG-01-4B	American Energy Corporation	1152.30	57.82'	55.54'	B	Domestic, Agricultural, None, 0 to 9.1 gpm
CG-01-4C	American Energy Corporation	1151.96	25.00'	4.35'	A	None, 0 to 1.5 gpm
CG-01-5A	American Energy Corporation	1158.98	265.41'	201.03'	C	Domestic, (Outside Adj. Area)
CG-01-5B	American Energy Corporation	1158.57	83.77'	75.47'	B	Domestic, Agricultural, None, 0 to 9.1 gpm
CG-01-5C	American Energy Corporation	1158.98	24.28'	5.36'	A	None, 0 to 1.5 gpm
CG-01-6B	American Energy Corporation	1158.98	74.00'	66.92'	B	Domestic (Outside Adj. Area)
CG-01-6C	American Energy Corporation	1165.64	43.96'	29.54'	A	Domestic, Agricultural, None, 0 to 9.1 gpm

The consequences of the proposed refuse disposal on the contents of total suspended and dissolved solids, total iron, total manganese, acidity, and pH will be minimal. The proposed disposal area is designed to reduce infiltration by utilizing materials of acceptably low permeability to completely surround the waste. Compaction of the refuse further reduces permeability, which minimizes seepage of effluent into the refuse. Adverse impact to the hydrologic balance will be minimal.

Water from the mining area is controlled by a series of drainage ditches and sediment ponds to minimize quality and quantity changes in the vicinity of the site. The drainage control plan also minimizes the possibility of stream flow alteration for off-site areas. All sediment control structures will be cleaned out when 60% design capacity is reached. Any standing water will be pumped to another existing structure. Wide track dozers will then move sediment to a point where it is accessible for a Gradall machine to collect and load it into trucks which will transport it to an approved refuse disposal site.

The refuse proposed to be disposed of is composed mainly of roof and floor material. Naturally occurring on-site materials will be used to underlie, line the highwall, and cover the refuse material. The highwall liner ***(2 feet out from the highwall)*** and cap cover material consists of clay/claystone as shown in the drill logs for monitoring wells CG01-5A, CG01-3A, CG01-4A, and CG01-6B. See attached logs.

Undeveloped springs S-23 and S-24 are developed in Zone A. Dug well DW-7A, developed spring DS-10, and undeveloped springs S-1, S-2, S-3, S-5, S-20, S-25, S-26, and S-27 are developed in Zone B. Drilled well W-7, and undeveloped springs S-10 and S-22 are developed in Zone C. None of the undeveloped springs, or developed spring DS-10 are in use. W-7 and DW-7A are domestic (W-7) and agricultural (DW-7A) supplies located 1200 feet and 1000 feet, respectively, east of the proposed refuse disposal area. See Addendum to Attachment 14B for a more detailed discussion of Zones A, B, and C.

SZ-1 (identified in the original D-1159 permit) is located on the opposite, or east side of Piney Creek from the proposed refuse disposal area. It is generated from a pre-law disposal site as shown on past maps of this area. The reclaimed refuse disposal area located immediately southeast of the proposed site does not produce any seeps of this nature, nor does the Pond 008 series monitoring in permit D-0425, which collects all runoff from the reclaimed disposal area, reflect impacted drainage.

Within the proposed refuse disposal area, aquifer Zones A & B will be temporarily disturbed by coal removal, and by highwall lining operations, but this will have no affect on existing developed ground water sources. Legitimately-used developed supplies are protected by their distance from the proposed disposal area. The southeast dip of the strata will also help to protect these zones from impact. Measures to prevent water from Zones A & B from entering the refuse disposal area are shown on cross section A - A' through G - G' (lining of the highwall, and capping with 1.5 feet of non-toxic, low permeability material).

Impact to Zones A & B will be negligible. Zone A will be intercepted during coal removal, however, its recharge zone will not be disturbed, and it occurs within the elevation of refuse disposal.

Zone B may show some diminution, but should recover following mining, refuse disposal, and reclamation. ***Drainage from Zones A and B will not come in contact with the refuse proposed to be disposed of.*** Zone C occurs at least 90 feet below the proposed bottom of refuse disposal, which will quite effectively provide the recommended minimum five foot isolation distance between the uppermost aquifer system underlying the site and the bottom of the refuse. Impacts to Zones C and D are not anticipated due to their respective locations, 90 feet and 238 feet below the proposed refuse disposal.

American Energy Corporation does not anticipate the water table reestablishing within the refuse disposal area. Please note that the existing reclaimed site does not exhibit any seepage, nor does nearby surface water sampling exhibit any adverse impacts. As with the analyses submitted for monitoring wells at this site, quarterly monitoring analyses of monitoring wells at nearby permit D-0360, Perkins Run area also showed fluctuations in mercury levels that were below, within, and above the published drinking water standard levels prior to issuance of that permit. Quarterly monitoring data of the monitoring wells for this site is currently being assembled, and will be submitted by Bill Siplivy under separate cover for D-0425-2 project area.

Zone A will be monitored quarterly at S-23, as well as monitoring wells CG01-3C, CG01-4C, CG01-5C, and ***CG01-6C***. Zone B will be monitored quarterly at monitoring wells CG01-3B, CG01-4B, CG01-5B, and CG01–6B. Zone C will be monitored at wells CG01-3A, CG01-4A, and and CG01-6B. Zone C will be monitored at wells CG01-3A, CG01-4A, and CG01-5A. ***(See attached monitoring well installation logs, submitted as addenda to Attachment 28, Page 3, Item 15)*** Surface water will be monitored at site D-8A, as well as discharge from sediment ponds 001, 009, and 010. A current sample of site D-8A does not exist at this time. Therefore, sampling at site D-8 has been submitted with this ARP to demonstrate current downstream quality and quantity.

See Attachment 28 for chemical analysis of refuse material and sealant material.

Total sediment yield from the area disturbed by refuse disposal will not differ from the sediment yield from the area disturbed by coal removal. Sediment yield will increase during mining due to newly exposed surface.

The surface will be less permeable after construction of the clay cap seal which will lead to increases in peak flow in the immediate vicinity of the site. These changes will be minimal since the associated watershed is small. Chances of flooding and stream flow alteration for the small tributaries draining the site will not change significantly. The drainage control plan will also minimize the possibility of flooding and stream flow alteration. Stream flow will be maintained by discharge from the sediment ponds.

The proposed activity should have no impact on ground and surface water availability. Mining activities have been ongoing in this area for many years, with no quantity problems noted or reported. No refuse will be disposed of within 100 feet of a stream channel, or, within the buffer zone of a stream. The plan is to isolate the refuse material from contact with water. Placing the material on the pit floor above the insitu clay floor will be above the reestablished water. The highwall and cap liners, ***and drainage pipes to collect water from the highwall***, will isolate waste from contact with ground water.

The western portion of the proposed refuse disposal area does not overlie existing or future planned areas of underground mining. The eastern portion of the proposed refuse disposal area does overlie an existing abandoned portion of the #8 seam underground mine. The coalbed elevation here is approximately 724 feet. The interval between the mine and the coal refuse foundation is at least 360 feet. The mine was active in this location about 30 years ago. Based on field observations today, there is no indication of surface subsidence to either the abandoned refuse pile or surrounding area. This is due to mine extraction rate, stratigraphy and interval between the mine and refuse foundation. The mine was a room and pillar operation. The mine map shows the maximum extraction rate was about 50% in the production sections (butt panels), and 40% in the main development entries. The stratigraphy contains numerous rigid beds of sandstone and limestone. These beds are capable of bridging overburden loads over large areas supported by solid coal and large barrier pillars. Due to these factors, subsidence is not expected in the future over the old #8 mine workings. ***Should subsidence occur within the old works, the distance between the mine and the disposal area (360' min.) Will protect the disposal area from damage.***

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT

ATTACHMENT 28
(COAL WASTE DISPOSAL PLAN)

Applicant's Name AMERICAN ENERGY CORPORATION

1. The coal mine waste to be disposed of on the coal mining operation is from a: (check appropriate response)

   _____ Wash plant facility
   __X__ Tipple facility
   _____ Other (e.g. large pre-existing gob pile)

2. Submit an Attachment 12 for the material to include at a minimum: pH, percent of total or pyritic sulfur, neutralization potential, potential acidity, and calcium carbonate deficiency. **See Attachment 12**

3. State the size fractions and percentages of the size fractions of the waste material. **See Attachment 12.**

4. Submit as an addendum a stability analysis to address how placement of the waste material will not cause instability within the backfilled area. Include all necessary calculations and analyses. **See Attached Stability Analysis.**

5. State the estimated amount of refuse material in tons to be disposed of on the proposed permit area: **2,937,457**

6. State the percent moisture and density of the refuse material, if the coal waste is from a wash plant.

   N/A

7. Describe how infiltration of water into the disposal area will be minimized.

In areas proposed to be utilized for refuse disposal, the highwall face will be reclaimed by placing a *2* foot thickness of non-toxic spoil, in 2 foot compacted lifts, against the highwall, ***followed by 2 feet of compacted clay material.*** The entire pit floor and coal bench is underlain by a 20 foot+- thick insitu low permeability claystone material. The refuse will be placed directly on this material. The entire disposal area surface will be covered with 1.5 feet of non-toxic low permeability material and sloped to drain. Above the 1.5 foot cover material, an additional 2 foot cover and six inches of a moderately dry growth medium soil and topsoil will be placed. By developing the reclamation cover in this manner, water infiltration and leachate formation will be minimized by the use of low permeability materials. Based on the small amount of anticipated infiltration after reclamation, the proposed disposal area should have a minimal impact on the area ground water conditions.

8. Specifically describe how the disposal plan will comply with paragraph (J) of rule 1501:13-9-14 of the Administrative Code.

See response to Attachment 28, Page 1, Item 7.

9. Does the disposal plan propose to neutralize wash plant waste with spoil material? _____ Yes, __X__ No. If "yes," submit as an addendum an acid/base account of the refuse and spoil materials.

10. Does the disposal plan propose to seal the disposal area? __X__ Yes, _____ No. If "yes," submit an Attachment 12 for the sealant material which includes pH, percent of total or pyritic sulfur, neutralization potential, potential acidity, calcium carbonate deficiency, and lithology.

See Sealant Material Attachment 12.

11. If a sealant material is to be used, submit a permeability analysis of the material to be used as a sealant. Also, address below how the sealant material will be compacted and the anticipated permeability coefficient to be achieved following compaction.

Cover materials termed "clay/silty clay" on Attachment 12 will be comprised of soils found in Test Pits 1 and 4, *and materials identified in the Addendum to ARP, Item 4., 3rd paragraph.* **Over compaction of the soil will be avoided because some settlement of the refuse is expected. Placement of these soils will be accomplished using either truck haulage or tractor scraper haulage. The soils will be spread by bulldozer** ***with uniformity to be achieved*** **by a light to medium weight sheepsfoot type roller. Sealing will involve lining of the highwall, insitu claystone material beneath,** *installation of pipe drains if springs, wet weather seeps or other areas producing water are encountered,* **and capping with the clay/silty clay material described above. See Addendum to A.R.P., Item 4.** *The #12 underclay will not be compacted. Chemical analysis of same is attached. The #12 underclay was tested at a neighboring permit. Compaction will only be performed on the highwall liner and cap.*

12. Show the location of the coal mine waste storage and disposal areas and the location of cross sections on the application map. **See A.R.P. Application Map**

13. Describe how the disposal plan will meet requirements of paragraph (J)(3) of rule 1501:13-9-04 of the Administrative Code.

During active refuse disposal, all water impacted by the refuse material will be passed through sediment Ponds 001, 009, or 010 for treatment, if necessary, prior to discharge. When disposal operations are completed, refuse material will be buried under at least 1.5 feet of non-toxic material, and sloped to drain.

14. Submit a cross section showing the elevation, final profile, saturated zones (existing and proposed), and reclaimed surface profile of the disposal area.

See Cross Sections A - A' through G - G'.

15. Identify surface and ground water monitoring sites which will specifically determine hydrologic impact which may proximately occur as a result of the disposal plan. If monitoring wells are to be constructed as part of this plan, submit information as to well construction, development, and design.

Surface water site D-8A, and sediment Ponds 001, 009, and 010, and ground water sites *as listed in the Addendum to* Part 2, Page 14, Item E(1) will be monitored quarterly for quality and quantity to determine hydrologic impact as a result of the proposed disposal plan. *See monitoring well installation logs, submitted as Addenda to this item.*

16. Ensure that Part II, item E of the permit application addresses the probable hydrologic consequences of the disposal area on the hydrologic balance of the area. Specifically address changes in ground water and surface water quality in detail.

See Addendum to Part 2, Page 14, Item E

17. Submit a detailed assessment plan for the disposal area and ensure that Part II, items F(1) and F(2) of the permit application identify surface and ground water supplies which may be adversely affected by the disposal area and acceptable alternative sources.

See Addendum to Part 2, Page 14, Item E, and Addendum to Part 2, Page 18, Item F.

18. If the material to be disposed is slurry, then submit data characterizing soil materials to be utilized in construction, if applicable.

N/A, No slurry disposal, coarse refuse only.

American Energy Corporation
Century Mine

Stability Analysis of Coal Refuse as Highwall Backfill

The stability of the coal refuse backfill has been calculated using the Rotational Equilibrium Analysis of Multilayered Embankments (REAME) computer program developed by Dr. Yang H. Huang, Sc.D. of the University of Kentucky. The REAME program is a personal computer adaptation based on a variety of slope stability analysis procedures. The simplified Bishop method of slope evaluation was used in this analysis.

The strata underlying the #12 coal seam was determined to be gray claystone. The material that will be used as a liner material under and around the coal refuse will be a mixture of brown and gray clay. Conservative strength values for the soils were taken from page 36 of *Stability Analysis of Earth Slopes* by Dr. Yang H. Huang, Sc.D. The following coefficients were used for the claystone: cohesion = 1400 psf, phi angle = 32° and a unit weight of 109 pcf. The clay liner material was assumed to be weaker with a cohesion of 500 psf, a phi angle of 30° and a unit weight of 107 pcf.

The values used for the coal refuse were taken from a previous stability analysis performed by D'Appolonia for prelaw refuse that was placed at the Allison Mine. See the original permit D-0425 D'Appolonia drawing No. 81-250-E4, Sheet No. 4 of 21, Figure No. 11. Their values were based on experience, field and laboratory test data and previous test results for similar materials. The values used are as follows: cohesion = 0 psf, phi angle = 30° and unit weight = 113 psf.

A phreatic surface was included in the REAME run even though the installed or natural seal will prevent water from reaching the top of the coal underclay. The phreatic surface was assumed to run along the top of the #12 coal seam and then down along the top of the claystone. The parameters above were utilized to check the stability of the highwall backfill under a "worst case" condition. A minimum safety factor of 1.82 was determined by the REAME program. Please refer to the attached output sheets and drawings for more information.

Donald M. Brafford, P.E.
4-11-02

STATE OF OHIO
DONALD M. BRAFFORD
E-29449
REGISTERED PROFESSIONAL ENGINEER

REAME (ROTATIONAL EQUILIBRIUM ANALYSIS OF MULTILAYERED EMBANKMENTS)
THIS 2000 VERSION (REAME2k) IS LICENSED BY CIVIL ENGINEERING SOFTWARE CENTER TO:
Jack A. Hamilton & Associates, Inc.

INPUT FILE NAME -C:\Reamedat\625SCRHW.DAT

TITLE -Century Mine - Highwall Backfill Stability

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1

NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 0

TWO-DIMENSIONAL ANALYSIS (THREED = 0)

CASE NO. 1 SEISMIC COEFFICIENT (SEIC) =0.000

NO. OF BOUNDARY LINES (NBL) = 4

NO. OF POINTS ON BOUNDARY LINE 1 = 3
1 X COORD. -500 Y COORD.= 1065
2 X COORD. 0 Y COORD.= 1065
3 X COORD.= 560 Y COORD.= 1065

NO. OF POINTS ON BOUNDARY LINE 2 = 4
1 X COORD.= 71 Y COORD.= 1085
2 X COORD.= 260 Y COORD.= 1085
3 X COORD.= 262 Y COORD.= 1089
4 X COORD.= 276 Y COORD.= 1150

NO. OF POINTS ON BOUNDARY LINE 3 = 5
1 X COORD.= 71 Y COORD.= 1085
2 X COORD.= 97 Y COORD.= 1089
3 X COORD.= 240 Y COORD.= 1089
4 X COORD.= 253 Y COORD.= 1138
5 X COORD.= 276 Y COORD.= 1150

NO. OF POINTS ON BOUNDARY LINE 4 = 9
1 X COORD. -500 Y COORD.= 1075
2 X COORD. 0 Y COORD.= 1075
3 X COORD.= 55 Y COORD.= 1080
4 X COORD.= 71 Y COORD.= 1085
5 X COORD. 276 Y COORD.= 1150
6 X COORD.= 286 Y COORD.= 1155
7 X COORD. 383 Y COORD.= 1170
8 X COORD. 425 Y COORD.= 1175
9 X COORD.= 560 Y COORD. 1180

LINE NO. AIR DEPTHS OF EACH SEGMENT ARE:

1	0.000	0.000				
2	0.000	2.000	4.357			
3	0.154	0.000	3.769	0.522		
4	0.000	0.091	0.313	0.317	0.500	0.155
	0.119	0.067				

MIN. DEPTH OF TALLEST SLICE (DMIN) = 1
NO. OF RADIUS CONTROL ZONES (NRCZ) = 1

RADIUS DECREMENT (RDEC) FOR ZONE 1 = 0
NO. OF CIRCLES (NCTR) FOR ZONE 1 = 5
ID NO. FOR FIRST CIRCLE (INFC) FOR ZONE 1 = 1
NO. OF BOTTOM LINES (NOL) FOR ZONE 1 = 1

LINE NO. (LINO)	BEG. NO. (NBP)	END NO. (NEP)
1	1	3

UNIT WEIGHT OF WATER (GW) = 62.4

SOIL NO.	COHESION	FRIC. ANGLE	UNIT WEIGHT
1	1400	32	109
2	500	30	107
3	0	30	113

USE PHREATIC SURFACE
USE GRID
NO. OF SLICES (NSLI) = 10
NO. OF ADD. CIRCLES (NAC) = 3
ANALYSIS BY SIMPLIFIED BISHOP METHOD (MTHD=2)
NUMBER OF FORCES (NFO) = 0
SOFT SOIL NUMBER (SSN) 0

NO. OF POINTS ON WATER TABLE (NPWT) = 7

1	X COORD.=-500	Y COORD.= 1075
2	X COORD.= 0	Y COORD.= 1075
3	X COORD.= 55	Y COORD.= 1080
4	X COORD.= 71	Y COORD.= 1085
5	X COORD.= 260	Y COORD.= 1085
6	X COORD.= 262	Y COORD.= 1089
7	X COORD. 500	Y COORD.= 1089

NO. OF SOILS WITH DIFFERENT WATER TABLE (NSDW) = 0
NO. OF SOILS WITH DIFFERENT PORE PRESSURE RATIO (NSDP) = 0

INPUT COORD. OF GRID POINTS 1, 2,AND 3

POINT 1 X COORD. = 40 Y COORD. = 1395
POINT 2 X COORD. = 40 Y COORD. = 1145
POINT 3 X COORD. = 240 Y COORD. = 1145

X INCREMENT (XINC) = 5 Y INCREMENT (YINC) = 5
NO. OF DIVISIONS BETWEEN POINTS 1 AND 2 (ND12) = 5
NO. OF DIVISIONS BETWEEN POINTS 2 AND 3 (ND23) = 4
ONLY A SUMMARY TABLE IS PRINTED (NPRT = 0)
SLICES WILL BE SUBDIVIDED

AUTOMATIC SEARCH WILL FOLLOW AFTER GRID

FACTORS OF SAFETY BASED ON GRID

IN THE FOLLOWING TABLE, WARNING INDICATES HOW MANY TIMES THE MAXIMUM RADIUS IS LIMITED BY THE END POINTS OF GROUND LINES:

CENTER X COORDINATE	CENTER Y COORDINATE	NO. OF CIRCLE TOTAL	CRITIC.	RADIUS	LOWEST F.S.	WARNING
40	1395	8	8	306.128	1.827	0
40	1345	8	8	258.349	1.828	0
40	1295	8	8	210.571	1.829	0
40	1245	5	1	180.000	5.539	0
40	1195	5	1	130.000	6.721	0
40	1145	5	1	80.000	9.263	0
90	1395	8	8	291.771	1.832	0
90	1345	8	8	243.993	1.833	0
90	1295	8	8	196.214	1.835	0
90	1245	8	8	148.436	1.839	0
90	1195	8	8	100.657	1.846	0
90	1145	8	8	52.879	1.865	0
140	1395	11	6	305.091	2.883	0
140	1345	8	8	229.636	1.839	0
140	1295	8	8	181.857	1.843	0
140	1245	8	8	134.079	1.850	0
140	1195	8	8	86.301	1.864	0
140	1145	8	8	38.522	1.914	0
190	1395	11	8	304.971	3.495	0
190	1345	11	3	252.749	3.367	0
190	1295	11	7	197.106	3.208	0
190	1245	8	8	119.722	1.864	0
190	1195	8	8	71.944	1.890	0
190	1145	8	8	24.165	2.030	0
240	1395	11	7	304.311	4.215	0
240	1345	11	7	254.647	4.143	0
240	1295	11	7	205.209	4.092	0
240	1245	11	3	148.428	4.104	0
240	1195	11	9	80.455	4.134	0
240	1145	8	8	9.809	2.591	0

GRID IS EXPANDED AS FOLLOWS SO MINIMUM FACTOR OF SAFETY FALLS WITHIN THE GRID

40	1445	8	8	353.906	1.827	0
90	1445	8	8	339.549	1.831	0
140	1445	11	6	354.039	3.065	0
190	1445	11	8	353.917	3.623	0
240	1445	11	2	355.723	4.306	1
40	1495	8	8	401.684	1.827	0
90	1495	11	8	405.295	2.707	0
140	1495	11	3	405.988	3.208	0
190	1495	11	8	403.153	3.760	0
240	1495	5	1	408.442	4.438	1
40	1545	8	8	449.463	1.827	0
90	1545	11	8	454.009	2.922	0
140	1545	11	3	454.573	3.362	0
190	1545	11	7	455.708	3.840	1
240	1545	5	1	448.135	4.619	1
40	1595	8	8	497.241	1.826	0
90	1595	11	7	505.203	3.080	0
140	1595	11	3	503.436	3.503	0
190	1595	11	2	504.471	3.979	1
240	1595	5	1	489.719	4.940	1
40	1645	11	4	557.907	2.811	0
90	1645	11	10	553.873	3.258	0

140	1645	11	8	555.951	3.589	0
190	1645	5	1	558.861	4.198	1
240	1645	5	1	532.752	5.337	1
-10	1645	8	8	559.377	1.824	0
-10	1595	8	8	511.598	1.824	0
-10	1545	7	7	464.671	1.827	0
-10	1495	7	7	416.776	1.827	0
-10	1445	7	7	368.880	1.826	0
-10	1395	5	1	330.000	10.738	0
-10	1345	5	1	280.000	15.339	0
-10	1295	5	1	230.000	24.919	0
-10	1245	5	1	180.000	46.028	0
-10	1195	5	1	130.000	58.940	0
-10	1145	5	1	80.000	73.559	0
-60	1645	6	6	574.500	1.824	0
-60	1595	3	1	530.000	28.205	0
-60	1545	3	1	480.000	65.812	0
-60	1495	2	1	430.000	190.667	0
-60	1445	2	1	380.000	249.659	0
-60	1395	2	1	330.000	367.780	0
-60	1345	4	1	280.000	693.819	0
-60	1295	1	1	230.000	2723.353	0
-60	1245	1	1	180.000	1000.000	0
-60	1195	1	1	130.000	1000.000	0
-60	1145	1	1	80.000	1000.000	0

LOWEST FACTOR OF SAFETY AT EACH GRID POINT IS TABULATED BELOW

COORDINATE	-60.000	-10.000	40.000	90.000	140.000	190.000	240.000
1645.000	1.824	1.824	2.811	3.258	3.589	4.198	5.337
1595.000	28.205	1.824	1.826	3.080	3.503	3.979	4.940
1545.000	65.812	1.827	1.827	2.922	3.362	3.840	4.619
1495.000	190.667	1.827	1.827	2.707	3.208	3.760	4.438
1445.000	249.659	1.826	1.827	1.831	3.065	3.623	4.306
1395.000	367.780	10.738	1.827	1.832	2.883	3.495	4.215
1345.000	693.819	15.339	1.828	1.833	1.839	3.367	4.143
1295.000	2723.353	24.919	1.829	1.835	1.843	3.208	4.092
1245.000	1000.000	46.028	5.539	1.839	1.850	1.864	4.104
1195.000	1000.000	58.940	6.721	1.846	1.864	1.890	4.134
1145.000	1000.000	73.559	9.263	1.865	1.914	2.030	2.591

MINIMUM FACTORS OF SAFETY OCCUR AT THE FOLLOWING 3 CENTERS:

FACTOR OF SAFETY = 1.824 AT (-60.000,1645.000)
FACTOR OF SAFETY = 1.824 AT (-10.000,1595.000)
FACTOR OF SAFETY 1.826 AT (-10.000,1445.000)

AUTOMATIC SEARCHES WILL BE MADE ONLY ON THE CENTER WITH THE SMALLEST F.S. MORE SEARCHES FROM OTHER CENTERS MAY BE NEEDED TO ENSURE THAT MINIMUM F.S. IS OBTAINED.

AT POINT (-10 1595) RADIUS 511.598 THE MINIMUM FACTOR OF SAFETY IS 1.824

FACTORS OF SAFETY BASED ON SEARCH

IN THE FOLLOWING TABLE, WARNING INDICATES HOW MANY TIMES THE MAXIMUM RADIUS IS LIMITED BY THE END POINTS OF GROUND LINES:

CENTER X COORDINATE	CENTER Y COORDINATE	NO. OF CIRCLE TOTAL	CRITIC.	RADIUS	LOWEST F.S.	WARNING
-10	1595	8	8	511.598	1.824	0
-5	1595	8	8	510.162	1.824	0
-15	1595	7	7	513.927	1.826	0
-20	1600	8	8	516.376	1.824	0
-10	1590	7	7	507.777	1.827	0
-8.75	1595	8	8	511.239	1.824	0
-11.25	1595	7	7	512.907	1.827	0
-10	1596.25	8	8	512.793	1.824	0
-10	1593.75	8	8	510.404	1.824	0
-10	1592.5	8	8	509.209	1.824	0
-8.75	1593.75	8	8	510.045	1.824	0
-11.25	1593.75	7	7	511.709	1.827	0

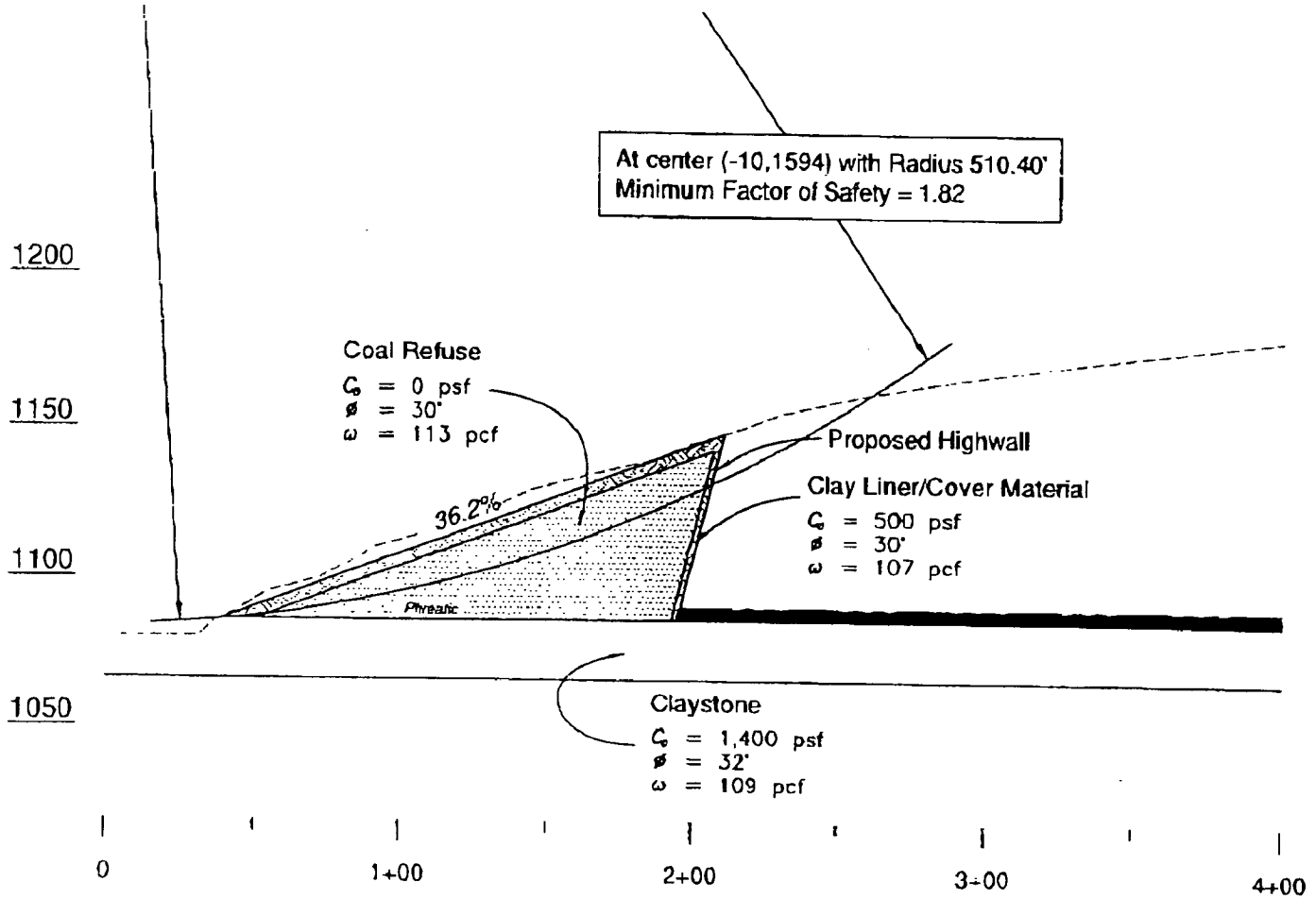
AT POINT (-10 1593.75) RADIUS 510.404

THE MINIMUM FACTOR OF SAFETY IS 1.824

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	SLICE HEIGHT	WATER HEIGHT	BOTTOM SINE	TOTAL WEIGHT	EFFECT. WEIGHT	RESIST. MOMENT	DRIVING MOMENT
1	3	5.983	0.189	0.000	.249	.128E+03	.128E+03	.365E+05	.163E+05
2	3	5.983	0.510	0.000	.261	.345E+03	.345E+03	.981E+05	.459E+05
3	3	5.983	0.753	0.000	.272	.509E+03	.509E+03	.144E+06	.707E+05
4	3	5.983	0.917	0.000	.284	.620E+03	.620E+03	.175E+06	.898E+05
5	3	5.983	1.001	0.000	.296	.677E+03	.677E+03	.190E+06	.102E+06
6	3	5.983	1.005	0.000	.308	.679E+03	.679E+03	.190E+06	.107E+06
7	3	5.983	0.927	0.000	.319	.627E+03	.627E+03	.175E+06	.102E+06
8	3	5.983	0.767	0.000	.331	.519E+03	.519E+03	.144E+06	.876E+05
9	3	5.983	0.524	0.000	.343	.354E+03	.354E+03	.981E+05	.620E+05
10	3	5.983	0.196	0.000	.354	.133E+03	.133E+03	.365E+05	.240E+05
							SUM	.129E+07	.707E+06

AT CENTER (-10.000 , 1593.750) WITH RADIUS 510.404 AND SEIS. COEFF. 0.00
FACTOR OF SAFETY BY NORMAL METHOD IS 1.822
FACTOR OF SAFETY BY SIMPLIFIED BISHOP METHOD IS 1.824



AMERICAN ENERGY CORPORATION

Highwall Backfill Stability Section

Scale: 1" = 60'

I HEREBY CERTIFY THAT THIS SLOPE STABILITY ANALYSIS HAS BEEN PREPARED TO MEET THE APPLICABLE REQUIREMENTS OF RULE 1501: 13-09-09 (A)(3)(b)OF THE ADMINISTATIVE CODE.

Donald M. Brafford 4/11/02

STATE OF OHIO
DONALD M. BRAFFORD
E-29449
REGISTERED
PROFESSIONAL ENGINEER

2/96

_____ New Submittal
__X__ Revised Submittal R-1159-4

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINES AND RECLAMATION

APPLICATION TO REVISE A COAL MINING PERMIT

Note: Refer to the Division's "General Guideline for Processing ARPs" and "Requirements for Specific Types of Common ARPs" for guidance on submitting and processing ARPs.

1. Applicant's Name American Energy Corporation

   Address 43521 Mayhugh Hill Road, Twp. Rd. 88

   City Beallsville State Ohio Zip 43716

   Telephone Number 740 - 926 - 9152

2. Permit Number D-1159

3. Section of mining and reclamation plan to be revised:

   Part 2, Page 13, Item C(1),
   Part 2, Page 14, Item E(1),
   Part 2, Page 15, Item F(1&2),
   Part 3, Page 19 Item A(7)(a) - Attachment 28

4. Describe in detail the proposed revision and submit any necessary drawings, plans, maps, etc.:

   THIS REVISION IS BEING SUBMITTED TO REVISE THE RESPONSE TO THE ABOVE REFERENCED ITEM TO "YES", AND SUBMIT THE NECESSARY INFORMATION TO COMPLY WITH ATTACHMENT 28 AND PARAGRAPH (H), 1501:13-4-05.

   SEE ATTACHED ADDENDA.

5. Describe in detail the reason for requesting the revision:

   THIS REVISION IS BEING SUBMITTED TO ALLOW FOR DISPOSAL OF COAL REFUSE WITHIN THE WASHINGTON #12 COAL MINING PIT.

6. Will this revision constitute a significant alternation from the mining and reclamation operation contemplated in the original permit? __X__ Yes, _____ No.
   (**Note:** refer to paragraph (E) (2) of 1501:13-04-06 of the Ohio Administrative Code to determine if a revision is deemed significant.)

   If "yes," complete the following items 7 through 9.

ADDENDUM TO A.R.P., ITEM 4., AMERICAN ENERGY CORPORATION

American Energy Corporation is proposing to utilize a portion of Permit D-1159 as a coal refuse disposal site. See attached map and cross sections for location and detail. After coal removal is completed, a portion of the pit ***and coal bench*** areas will be left open for coal refuse disposal, which will be generated by American Energy Corp.'s Century Mine (D-0425) located near Alledonia, Ohio. ***The pit and coal bench areas will be open from the time of coal removal for a period not exceeding six (6) months. During this time, any water that collects in the pit will be promptly pumped to a sediment pond for treatment, if necessary. Due to the volume of for waste generated from the D-0425 deep mine, the approved reclamation time table will be met.***

A 7 foot to 22.5' foot layer of insitu claystone exists below the #12 coal seam. The refuse will be disposed of in two foot lifts using rubbed tired vehicles and/or sheeps foot roller to meet compaction requirements of 90% of maximum dry density ***directly atop this insitu claystone material.*** In conjunction with the layering of coal refuse, a minimum of 2 feet of non-toxic ***low permeability*** material will be placed in layers against the final highwall, as the lifts are completed. After the refuse lifts are completed, ***1.5*** feet of non-toxic, ***low permeability material will be placed over the refuse and an additional 2 feet of cover will be applied over the low permeability material prior to placing 6 inches of topsoil on the area. This will result in a minimum 4 foot of cover over the coal refuse area.*** The placement of the cover material completely over the disposal site will minimize surface water, ground water, and oxygen contact with the coal refuse thereby eliminating the formation of acid or toxic leachate. This approach will result in a negligible impact on the environment.

The low permeability material will be identified in the field by a registered professional engineer. The low permeability material that will be used to cap the refuse will be stockpiled above the final highwall for placement after final grade for the top of the refuse is reached. sufficient low permeable material exists on the area to cap the refuse. The 1.5 foot cap for the 52.7 acre area will require 128,000 cubic yards of low permeability material. This material has an intermittent areal extent encompassing the entire refuse disposal area, contained in the variable clay strata lying directly above, 5 to 10 feet above, and 33 to 40 feet, respectively, above the #12 coal as indicated in drill logs for monitoring wells CG01-5A, CG01-3A, CG01-4A, and CG01-6B. The available cap material is listed below:

2.7 Ac. x 8' (average thickness) x 43,560 / 27 =	*34,848 cubic yards*
1.9 Ac. x 10' (average thickness) x 43,560 / 27 =	*30,653 cubic yards*
11.5 Ac. x 14.8' (average thickness) x 43,560 / 27 =	*274,589 cubic yards*
0.6 Ac. x 7' (average thickness) x 43,560 / 27 =	*6,776 cubic yards*
Total	***346,866 cubic yards***

See Attachment 28 for physical and chemical analysis of the liner/cover material.

ADDENDUM TO A.R.P., ITEM 4., AMERICAN ENERGY CORPORATION

The coal refuse material will be hauled to the site by trucks and placement will begin south east of test hole #1, and will continue easterly. Disposal will then start on the east side of the proposed #12 mining pit ***and coal bench*** located west of Permit D-0425, and will continue in a west, southwest direction. The open pits ***and coal bench*** will have the capacity to store approximately 2,514,970 cubic yards of refuse which amounts to approximately 2,937,457 tons. ***Spoil and clay generated during mining will be stockpiled above the proposed final highwall and utilized for cover material on the pending D-0425-2 refuse disposal area.***

As described above, the ***highwall*** will be lined before placement of refuse material. The placement of the refuse material will consist of layering the refuse in two foot lifts and compacting with rubber tired vehicles and/or sheepsfoot roller. These lifts will be repeated vertically until the final proposed grade (approximate original contour) has been achieved. The refuse will be covered with a ***1.5*** foot layer of non-toxic, low permeability material. ***Above the 1.5 foot low permeability material, a 2 foot thick cover material will be placed, followed by six (6) inches of moderately dry growth medium soil and topsoil***. Topsoiling and seeding will be completed in the next appropriate planting season following placement of the cover material.

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/22 & 23/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-3A	0	4	Br. clay
	4	24	Br. shale firm @ 6' w/clay bds.
	24	32	Gr. & red clay shale
	32	39	Limestone
	39	48	Gr. clay shale
	48	67	Gr. silty shale/1'limestone @ 63
	67	76	Br. sandstone w/shale bds.
	76	82½	Med. gr. shale
	82½	87	Coal WASHINGTON (No. 12)
	87	93	Clay shale
	93	140	Gr. silty shale w/siltstone bds.
	140	147	Limestone
	147	154	Gr. silty shale
	154	163	Gr. sandstone
	163	178	Gr. silty shale w/limestone bds
	178	188	Dr. gr. silty shale
	188	191½	Coal WAYNESBURG (No. 11)
	191½	199	Dr. clay shale
	199	207	Limestone
	207	223	Gr. silty shale
	223	233	Gr. sandstone
	233	239	Red gr. shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-3A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001

Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/22 & 23/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-3A	239	253	Gr. silty shale w/limestone bds
	253	263	Limestone w/shale bds.
	263	276	Gr. silty shale w/limestone bds.
	276	280	Dr. gr. shale
	280	281	Limestone

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-3A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001

Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/22/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-3B	0	4	Br. clay
	4	24	Br. shale firm @ 6' w/clay bds.
	24	32	Gr. & red clay shale
	32	39	Limestone
	39	48	Gr. clay shale
	48	67	Gr. silty shale w/1' limestone
	67	76	Br. sandstone w/shale bds.
	76	82½	Med. gr. shale
	82½	86½	Coal WASHINGTON (No. 12)
	86½	88	Clay shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-3B
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | **Project: Hydrogeologic Investigation**

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/26/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
GC-01-3C	0	4	Br. clay
	4	6	Br. shale
	6	7	Br. sandstone
	7	21	Br. shale w/clay bands
	21	25	Gr. shale clay

	AMERICAN ENERGY CORPORATION CENTURY MINE
William J. Siplivy, PE., Inc. 50 Munroe Falls Avenue Munroe Falls, Ohio 44262	***ROCK CORE LOG*** ***CG-01-3C*** ***COARSE COAL REFUSE FACILITY***
Checked by: WJS Date: 12 April 2001	Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/27,28,29/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-4A	0	1	Topsoil
	1	13	Br. clay
	13	20	Br. gr. sandstone
	20	26	Gr. shale
	26	27	Limestone
	27	30	Gr. silty shale
	30	40	Clay shale
	40	45	Gr. silty shale w/limestone bds.
	45	50	Trace of coal - clay
	50	52	Dr. shale
	52	56	Coal WASHINGTON (No. 12)
	56	61	Clay
	61	76	Clay shale
	76	79	Limestone
	79	87	Gr. shale
	87	95	Gr. sandstone to siltstone
	95	106	Gr. red silty shale to dr. gr.
	106	107	3" trace of coal @ 106' - clay
	107	108	Coal 12" WAYNESBURG "A"
	108	118	Gr. shale w/limestone bds.
	118	140	Gr. silty shale
	140	163	Gr. sandstone

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-4A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/27,28,29/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-4A	163	170	Gr. sandstone
	170	174	Gr. sandstone
	174	181	Gr. shale 6" coal @ 180½' (Waynesburg No. 11)
	181	182	Clay
	182	207	Limestone w/shale bds.
	207	233	Gr. silty shale w/limestone bds.
	233	242	Limestone w/shale bds.
	242	252	Shale w/limestone bds.
	252	256	Gr. sandstone
	256	259	Gr. shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-4A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/27/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-4B	0	1	Topsoil
	1	13	Br. clay
	13	20	Br. gr. sandstone
	20	26	Gr. shale/water @ 20'
	26	27	Limestone
	27	30	Gr. silty shale
	30	40	Clay shale
	40	45	Gr. silty shale w/limestone bds.
	45	50	Trace of coal - clay
	50	52	Dr. shale
	52	56	Coal WASHINGTON (No. 12)
	56	57	Clay

	AMERICAN ENERGY CORPORATION CENTURY MINE
William J. Siplivy, PE., Inc. 50 Munroe Falls Avenue Munroe Falls, Ohio 44262	***ROCK CORE LOG*** ***CG-01-4B*** ***COARSE COAL REFUSE FACILITY***
Checked by: WJS Date: 12 April 2001	Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ _____ Land Owner Century Mine

County _____ Date 3/27 & 29/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-4C	0	1	Topsoil
	1	13	Br. clay
	13	20	Br. gr. sandstone
	20	24	Gr. shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-4C
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

Diamond Drill Hole: CG-01-5A

Driller: Randy McKay, McKay & Gould Drilling, Inc.

Coordinates: N 695,518.10 E 2,412,309.91 (1927 State Plane)
Elevation: 1158.98 Feet MSL
Start: 12 March 2001
Finish: 20 March 2001
Engineer: W. J. Siplivy

Location: Ridge west of refuse area #2
Township: Wayne
Section: 3
County: Belmont
State: Ohio

Thickness	Depth	Description	Construction Use	Bottom Elevation	Acres	Volume (cubic yds.)
22.00	22.00	Non-coring, soil and weathered rock	General fill	1136.98		
1.70	23.70	Claystone, olive-gray, Fe-stained	Clay liner	1135.28		
3.30	27.00	Claystone, gray (1.7' lost)	Clay liner	1131.98		
1.30	28.30	Limestone, Middle Washington, tan-light gray	Riprap or road base	1130.68		
1.00	29.30	Shale, gray, calcareous	General fill	1129.68		
3.70	33.00	Limestone, Middle Washington, tan-light gray	Riprap or road base	1125.98		
3.10	36.10	Claystone, gray	Clay liner	1122.88		
0.50	36.60	Claystone, red	Clay liner	1122.38		
1.10	37.70	Claystone, greenish-gray	Clay liner	1121.28		
1.80	39.50	Claystone, greenish-gray w/limestone nods.	General fill	1119.48		
1.00	40.50	Shale, greenish-gray, sandy w/ls nods.	General fill	1118.48		
3.00	43.50	Sandstone, Lower Marietta, l. gray, calcareous	Riprap or road base	1115.48		
2.40	45.90	Shale, gray w/sandstone partings, x-bedded	General fill	1113.08		
4.60	50.50	Shale, gray	General fill	1108.48		
0.10	50.60	Limestone, tan-light gray	General fill	1108.38		
1.60	52.20	Claystone, gray w/occasional limestone nods.	General fill	1106.78		
2.70	54.90	Shale, gray w/sandstone partings, x-bedded	General fill	1104.08		
0.80	55.70	Shale, gray, silty	General fill	1103.28		
0.60	56.30	Claystone, gray	Clay liner	1102.68		
0.30	56.60	Claystone, gray & red	Clay liner	1102.38		
1.40	58.00	Claystone, gray	Clay liner	1100.98		
0.80	58.80	Shale, gray, silty	Clay liner	1100.18		
4.00	62.80	Claystone, gray w/occasional limestone nods.	General fill	1096.18		
5.90	68.70	Shale, gray w/sandstone partings	General fill	1090.28		
0.90	69.60	Shale, gray	General fill	1089.38		
5.90	75.50	Claystone, gray	Clay liner	1083.48		
0.55	76.05	Shale, black, carbonaceous w/pyrite	Dispose as refuse	1082.93		
3.70	**79.75**	**Washington (No. 12) Coalbed**	None	1079.23		
12.55	92.30	Claystone, gray (6.05' lost)	Clay liner	1066.68		
3.40	95.70	Claystone, gray w/abundant limestone nods.	General fill	1063.28		
3.80	99.50	Claystone, gray, silty	General fill	1059.48		
0.50	100.00	Shale, gray	General fill	1058.98		
5.40	105.40	Sandstone, Mannington, l. gray, calcareous	Riprap or road base	1053.58		
14.20	119.60	Claystone, gray, silty	General fill	1039.38		
3.95	123.55	Claystone, red	Clay liner	1035.43		
4.95	128.50	Claystone, gray (2.45')	Clay liner	1030.48		
0.75	129.25	Shale, black, carbonaceous	Dispose as refuse	1029.73		
0.25	**129.50**	**Coal**	None	1029.48		
1.65	131.15	Shale, dark gray	General fill	1027.83		
0.85	**132.00**	**WAYNESBURG "A" COALBED, w/shale**	None	1026.98		
0.50	132.50	Shale, black, carbonaceous	Dispose as refuse	1026.48		
7.20	139.70	Shale, gray	General fill	1019.28		
5.20	144.90	Claystone, gray w/limestone nodules	General fill	1014.08		
11.70	156.60	Shale, gray w/occasional limestone nodules	General fill	1002.38		
4.90	161.50	Claystone, gray w/limestone nodules	General fill	997.48		
2.75	164.25	Shale, gray	General fill	994.73		
7.35	171.60	Claystone, gray w/occasional limestone nods.	General fill	987.38		
0.45	172.05	Sandstone, Waynesburg, light gray	Riprap or road base	986.93		
5.45	177.50	Shale, gray w/abundant sandstone partings	General fill or road base	981.48		
1.60	179.10	Shale, dark gray w/sandstone partings	General fill or road base	979.88		
1.45	180.55	Shale, dark gray-black	Dispose as refuse	978.43		
0.10	180.65	Shale, black, carbonaceous	Dispose as refuse	978.33		
3.62	**184.27**	**WAYNESBURG (No. 11) COALBED**	None	974.71		
1.33	185.60	Claystone, gray	Clay liner	973.38		
7.55	193.15	Shale, gray	General fill	965.83		
0.10	**193.25**	**Coal, broken**	None	965.73		
0.30	193.55	Claystone, gray		965.43		

AEC 10468

Diamond Drill Hole: CG-01-5A (Continued)

Thickness	Depth	Description	
0.25	193.80	Limestone, tan-light gray	965.18
0.35	194.15	Claystone, gray	964.83
0.15	194.30	Shale, gray w/carbonaceous streaks	964.68
1.70	196.00	Shale, gray, calcareous	962.98
2.70	198.70	Limestone, tan, very hard	960.28
3.30	202.00	Shale, gray, calcareous	956.98
0.55	202.55	Limestone, tan, very hard	956.43
2.90	205.45	Claystone, gray w/limestone nodules	953.53
0.80	206.25	Limestone, tan, very hard	952.73
1.70	207.95	Claystone, greenish-gray w/limestone nodules	951.03
2.45	210.40	Limestone, Waynesburg, tan, nodular	948.58
6.60	217.00	Claystone, greenish-gray	941.98
1.65	218.65	Limestone, tan-light gray	940.33
1.00	219.65	Claystone, greenish-gray	939.33
0.15	219.80	Shale, gray w/carbonaceous streaks	939.18
0.25	220.05	Claystone, greenish-gray w/limestone nodules	938.93
0.85	220.90	Shale, gray w/carbonaceous streaks (Uniontown No. 10 coal horizon)	938.08
3.40	224.30	Claystone, greenish-gray	934.68
4.60	228.90	Shale, greenish-gray w/sandstone streaks	930.08
1.60	230.50	Shale, greenish-gray	928.48
0.70	231.20	Shale, gray, calcareous	927.78
1.25	232.45	Shale, olive-gray	926.53
0.90	233.35	Limestone, tan-light gray	925.63
2.85	236.20	Shale, gray, calcareous	922.78
1.15	237.35	Shale, greenish-gray	921.63
7.15	244.50	Shale, gray	914.48
0.65	245.15	Shale, greenish-gray	913.83
0.80	245.95	Limestone, tan-light gray	913.03
1.05	247.00	Claystone, gray	911.98
7.55	254.55	Shale, gray, calcareous, Fe-stained upper 4'	904.43
2.65	257.20	Limestone, Arnoldsburg, tan-light gray	901.78
1.70	258.90	Claystone, greenish-gray	900.08
2.50	261.40	Shale, gray, calcareous	897.58
1.60	263.00	Claystone, greenish-gray w/occasional limestone nods.	895.98
5.00	268.00	Sandstone, Morningview, light gray, Fe-stained	890.98
4.45	272.45	Shale, gray	886.53
2.40	274.85	Shale, gray, calcareous	884.13
2.60	277.45	Limestone, Benwood, tan-light gray	881.53
0.60	278.05	Shale, gray	880.93
2.25	280.30	Limestone, Benwood, tan-light gray, shaly	878.68
2.70	283.00	Claystone, green	875.98

End of Log

Respectfully submitted,

William J. Siplivy

William J. Siplivy, P.E., C.P.G.

AMERICAN INSTITUTE OF PROFESSIONAL GEOLOGISTS
CERTIFICATE NUMBER
4599
AIPG
WILLIAM J. SIPLIVY
CERTIFIED PROFESSIONAL GEOLOGIST

AEC 10469

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County Belmont Date 3/12,13,14,15,16,19,20/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-5A	0	2	Br. clay
	2	7	Br. sandstone w/mud seams
	7	22	Gr. br. shale w/mud seams
	22	27	Core - Retrieved 3'3" of 5'
	27	42	Core - Retrieved 14'5" of 15'
	22	27	Gr. clay shale/22-24' water
	27	38	Gr. dr. gr. & 1' red @ 36' of
			clay shale
	38	40	Siltstone w/limestone
	40	42	Gr. siltstone
	42	58½	Core - Retrieved 16'4"
	58½	65	Core - Retrieved 6'8"
	65	86	Core - Retrieved 13'
	42	51	Gr. silty shale w/sandstone bds.
	51	52	Clay shale
	52	56	Silty shale
	56	57	Clay shale
	57	59	Silty shale
	59	66	Clay shale w/silty bds.

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-5A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/12,13,14,15,16,19,20/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-5A	66	69	Silty shale
	69	75	Dr. silty shale w/clay bds.
	75	79	Coal WASHINGTON (No.12)
	79	86	Lost
	86	99½	Core
	86	92	Dr. gr. silty shale
	92	96	Gr. shale w/imbedded limestone
	96	99½	Gr. silty shale
	99½	109	Core
	109	126	Core
	126	142	Core
	142	159½	Core
	99½	108	Gr. siltstone
	108	110	Clay shale
	110	121	Gr. silty shale
	121	126	Red gr. clay shale - lost 2'
	126	131	Gr. & dr. gr. silty shale
	131	132	Coal 9" WAYNESBURG "A"
	132	142	Clay shale
	142	159½	Clay shale w/limestone bds.

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-5A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/12,13,14,15,16,19,20/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-5A	159½	163	Gr. silty shale
	163	168¼	Clay shale - lost 1'
	168¼	171	Clay shale
	171	178	Gr. silty shale
	178	180½	Dr. gr. silty shale
	180½	184	Coal 42" Waynesburg (No. 11)
	184	185½	Clay shale
	185½	188	Dr. gr. shale
	188	189	Dr. gr. shale drilled 6"
	189	193½	Dr. gr. shale w/trace of coal
	193½	208½	Limestone
	208½	218½	Limestone
	218½	229¼	Green gr. silty shale
	229¼	247	Core
	247	263	Core
	263	283	Core
	229¼	232½	Gr. silty shale
	232½	236½	Limestone
	236½	245	Gr. silty shale
	245	246	Limestone
	246	247	Clay shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-5A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/12,13,14,15,16,19,20/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-5A	247	250	Gr. silty shale
	250	257	Limestone
	257	263	Gr. silty shale
	263	268	Gr. sandy limestone
	268	271	Dr. gr. silty shale
	271	280	Limestone
	280	283	Gr. silty shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-5A
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/20/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-5B	0	1	Br. clay
	1	7	Br. sandstone
	7	27	Gr. br. shale clay
	27	33	Limestone
	33	38	Dr. gr. shale
	38	40	Gr. silty shale
	40	44	Gr. silty limestone
	44	58	Gr. silty shale
	58	64	Gr. silty shale w/limestone bds.
	64	77½	Br. gr. shale
	77½	81	Coal WASHINGTON (No. 12)
	81	82	Clay shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-5B
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2908

For _____ Land Owner Century Mine

County _____ Date 3/20/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-5C	0	3	Br. clay
	3	8	Br. sandstone
	8	12	Br. clay
	12	24	Red & br. shale
	24	25	Gr. clay shale

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-5C
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/30/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-6B	0	8	Br. silty shale
	8	19	Br. shale w/clay bands
	19	23	Gr. clay shale
	23	30	Limestone w/shale bands
	30	42	Gr. shale
	42	44	Gr. sandstone
	44	57	Gr. silty shale w/clay bds.
	57	64	Gr. fine sandstone
	64	72	Gr. clay shale
	72	74	Dr. shale
	74	78	Coal WASHINGTON (No. 12)
	78	79	Clay

	AMERICAN ENERGY CORPORATION CENTURY MINE
William J. Siplivy, PE., Inc. 50 Munroe Falls Avenue Munroe Falls, Ohio 44262	***ROCK CORE LOG*** ***CG-01-6B*** ***COARSE COAL REFUSE FACILITY***
Checked by: WJS Date: 12 April 2001	Project: Hydrogeologic Investigation

McKAY & GOULD DRILLING, INC.

267 Taggart Road
Darlington, PA 16115-9299
(724) 436-6823 OR 1-800-788-2906

For _____ Land Owner Century Mine

County _____ Date 3/30/01

Twp. _____ Driller RMc-19

Hole No.	From	To	Type of Formation
#CG-01-6C	0	8	Br. silty shale
	8	19	Br. shale w/clay bands
	19	23	Gr. clay shale
	23	30	Limestone w/shale bands
	30	42	Gr. shale
	42	44	Gr. sandstone

AMERICAN ENERGY CORPORATION
CENTURY MINE

William J. Siplivy, PE., Inc.
50 Munroe Falls Avenue
Munroe Falls, Ohio 44262

ROCK CORE LOG
CG-01-6C
COARSE COAL REFUSE FACILITY

Checked by: WJS | Date: 12 April 2001 | Project: Hydrogeologic Investigation

ADDENDUM TO ATTACHMENT 14B, A.R.P., PERMIT D-0425
AMERICAN ENERGY CORPORATION

The first continuous zone of saturation underlying the proposed refuse disposal area occurs in Zone C. Zone C is approximately ninety (90) feet in vertical distance, at its closest point, below the bottom of the proposed refuse disposal area. Zone C has a vertical extent of approximately forty-five (45) feet max., and a lateral extent equal to the extent of the 'Cassville' Shale, with the Waynesburg #11 Coal seam as a bedding plane.

Temporal fluctuations are entirely dependent upon rainfall as the recharge of groundwater is confined to the immediate ridgetop areas. Groundwater flow directions will not be affected by the proposed refuse disposal operation. Due to the existing rock structure and topography, recharge of groundwater is confined to the immediate ridgetop areas. Discharge areas within the boundaries of the refuse disposal area can be seen in spring discharge elevations between 1143 and 1140 (Zone A), spring discharge and well static water level between the elevations of 1097 and 1060 (Zone B), and spring discharge and well static water level between the elevations of ***1009*** and 950 (Zone C).

Zone A discharge ranges from a high of 1.5 gpm during "high flow" conditions to less than 1 gpm during "low flow" conditions.

Zone B discharge ranges from a high of 54 gpm during "high flow" conditions to <1 gpm during "low flow" conditions. Fluctuations in water levels in Zone B are illustrated by well DW-7A. The static water level in this well has ranged from a high of 6 feet (elevation 1076) to a low of 9 feet (elevation 1073).

Zone C discharge, based on flows from undeveloped springs, does not exceed <1 gpm. Static water levels at W-7 have ranged from a high of 22 feet (elevation 1040) to a low of 64 feet (elevation 998).

Zones A and B will be isolated from the refuse by 20 feet of non-toxic material which will be placed against the open highwall. Zone C will be isolated by its 90 feet in vertical distance between it and the bottom of the refuse area. Zone D is 238 feet below the proposed refuse disposal area. Zones C and D will not be affected by the proposed refuse disposal.

The uppermost aquifer system, and all zones of saturation above the uppermost aquifer system were determined by existing undeveloped spring elevations, and static water levels in existing wells utilizing a Fisher M-Scope static water level meter. The Generalized Section of Ohio, Division of Geological Survey, Table 1, as well as site specific information noted above, were utilized to define vertical extent of the separate zones of saturation.

See Permit D-1159 for Attachment 14B.

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 14B
(WELL/SPRING INVENTORY)

Applicant's Name AMERICAN ENERGY CORPORATION (D-1159)

Aquifer/Zone Identification	Aquifer/Zone Lithology	Aquifer/Zone Thickness Well/Spring	Aquifer/Zone Elev. (msl)	Aquifer/Zone Horizontal Extent	Aquifer/Zone Known Uses	Approx. Rate of Discharge/Usage of Aquifer/Zone (gpm or cfs)
A	SANDSTONE, SHALE	109'	1239' TO 1130'	UPPER RIDGE OUTCROP TO OUTCROP	S-23, S-24	DOMESTIC 3.4 GPM
B	SANDSTONE, SHALE, #12 COAL	37'	1097 TO 1060	MID-RIDGE OUTCROP TO OUTCROP	DW-7A, DS-10, S-1, 2, 3, 5, 20, 25, 26, 27	DOMESTIC, AGRICULTURAL, NONE 1 TO 34 GPM
C	SHALE, #11 COAL	59'	1009 TO 950	LOWER-RIDGE OUTCROP TO OUTCROP	W-7	DOMESTIC
D*	LIMESTONE, SANDSTONE, SHALE	80'	847 to 768	REGIONAL	NONE WITHIN REFUSE DISPOSAL AREA	NONE, 2.7 GPM

* SEE ADDENDA TO ATTACHMENT 14B WHICH PROVIDES A BASIS FOR THE EXISTENCE, AND QUANTITY OF ZONE D.(IN ORIGINAL PERMIT D-1159-1)

The consequences of the proposed refuse disposal on the contents of total suspended and dissolved solids, total iron, total manganese, acidity, and pH will be minimal. The proposed disposal area is designed to reduce infiltration by utilizing materials of acceptably low permeability to ***completely surround*** the ***waste.*** Compaction of the refuse further reduces permeability, which minimizes seepage of effluent into the refuse. Adverse impact to the hydrologic balance will be minimal.

Water from the mining area is controlled by a series of drainage ditches and sediment ponds to minimize quality and quantity changes in the vicinity of the site. The drainage control plan also minimizes the possibility of stream flow alteration for off-site areas. All sediment control structures will be cleaned out when 60% design capacity is reached. Any standing water will be pumped to another existing structure. Wide track dozers will then move sediment to a point where it is accessible for a Gradall machine to collect and load it into trucks which will transport it to an approved refuse disposal site.

The refuse proposed to be disposed of is composed mainly of roof and floor material. Naturally occurring on-site materials will be used to underlie, ***line the highwall***, and cover the refuse material. The ***highwall*** liner and cap cover material consists of clay/claystone as shown in the drill logs for monitoring wells CG01-5A, CG01-3A, CG01-4A, and CG01-6B. See attached logs.

Undeveloped springs S-23 and S-24 are developed in Zone A. Dug well DW-7A, developed spring DS-10, and undeveloped springs S-1, S-2, S-3, S-5, S-20, S-25, S-26, and S-27 are developed in Zone B. Drilled well W-7, and undeveloped springs S-10 and S-22 are developed in Zone C. None of the undeveloped springs, or developed spring DS-10 are in use. W-7 and DW-7A are domestic (W-7) and agricultural (DW-7A) supplies located 1200 feet and 1000 feet, respectively, east of the proposed refuse disposal area. See Addendum to Attachment 14B for a more detailed discussion of Zones A, B, and C.

Within the proposed refuse disposal area, aquifer Zones A & B will be temporarily disturbed by coal removal, and by ***highwall lining*** operations, but this will have no affect on existing developed ground water sources. Legitimately-used developed supplies are protected by their distance from the proposed disposal area. The southeast dip of the strata will also help to protect these zones from impact. Measures to prevent water from Zones A & B from entering the refuse disposal area are shown on cross section A - A' through G - G' ***(lining of the highwall, and capping with 1.5 feet of non-toxic, low permeability material).***

Impact to Zones A & B will be negligible. Zone A will be intercepted during coal removal, however, its recharge zone will not be disturbed, and it occurs within the elevation of refuse disposal. Zone B may show some diminution, but should recover following mining, refuse disposal, and reclamation. Zone C occurs at least 90 feet below the proposed bottom of refuse disposal, which will quite effectively provide the recommended minimum five foot isolation distance between the uppermost aquifer system underlying the site and the bottom of the refuse. Impacts to Zones C and D are not anticipated due to their respective locations, 90 feet and 238 feet below the proposed refuse disposal.

Zone A will be monitored quarterly at S-23, ***as well as monitoring wells CG01-3C, CG01-4C, and CG01-5C***. Zone B will be monitored quarterly at monitoring wells ***CG01-3B, CG01-4B, CG01-5B,***

and CG01-6B. Zone C will be monitored at wells ***CG01-3A, CG01-4A, CG01-5A, and CG01-6A*** Surface water will be monitored at site ***D-8A***, as well as discharge from sediment ponds 001, 009, and 010. ***A current sample of site D-8A does not exist at this time. Therefore, sampling at site D-8 has been submitted with this ARP to demonstrate current downstream quality and quantity.***

See Attachment 28 for chemical analysis of refuse material and sealant material.

Total sediment yield from the area disturbed by refuse disposal will not differ from the sediment yield from the area disturbed by coal removal. Sediment yield will increase during mining due to newly exposed surface.

The surface will be less permeable after construction of the clay cap seal which will lead to increases in peak flow in the immediate vicinity of the site. These changes will be minimal since the associated watershed is small. Chances of flooding and stream flow alteration for the small tributaries draining the site will not change significantly. The drainage control plan ***will*** also minimize the possibility of flooding and stream flow alteration. Stream flow will be maintained by discharge from the sediment ponds.

The proposed activity should have no impact on ground and surface water availability. Mining activities have been ongoing in this area for many years, with no quantity problems noted or reported. No refuse will be disposed of within 100 feet of a stream channel, or, within the buffer zone of a stream. ***The plan is to isolate the refuse material from contact with water. Placing the material on the pit floor above the insitu clay floor will be above the reestablished water. The highwall and cap liners will isolate waste from contact with ground water.***

The western portion of the proposed refuse disposal area does not overlie existing or future planned areas of underground mining. The eastern portion of the proposed refuse disposal area does overlie an existing abandoned portion of the #8 seam underground mine. The coalbed elevation here is approximately 724 feet. The interval between the mine and the coal refuse foundation is at least 360 feet. The mine was active in this location about 30 years ago. Based on field observations today, there is no indication of surface subsidence to either the abandoned refuse pile or surrounding area. This is due to mine extraction rate, stratigraphy and interval between the mine and refuse foundation. The mine was a room and pillar operation. The mine map shows the maximum extraction rate was about 50% in the production sections (butt panels), and 40% in the main development entries. The stratigraphy contains numerous rigid beds of sandstone and limestone. These beds are capable of bridging overburden loads over large areas supported by solid coal and large barrier pillars. Due to these factors, subsidence is not expected in the future over the old #8 mine workings.

9/88

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 14A
(HYDROLOGIC MEASUREMENTS AND ANALYSES)

APPLICANT AMERICAN ENERGY CORPORATION (REFUSE DISPOSAL)

1	Identification No. of Sampling Station from Hydrology Map	S-23	S-23	S-23			
2	Identification Number	01-07-503	01-10-722	02-02-849			
3	High (H)/Low (L) Intermediate (I) Designation (if applicable)	I	L	H			
4	Surface Elevation for Sampling Station (msl)	1125	1125	1125			
5	Depth of Well Below Land Surface (feet)	--	--	--			
6	Static Water Level of Well Below Land Surface (feet)	--	--	--			
7	Flow for Spring and Stream (gpm or cfs)	.34 GPM	.05 GPM	1.8 GPM			
8	Date Above Measurements Made	7-11-01	10-19-01	02-27-02			
9	Aquifer/Zone Identification For Well/Spring	A	A	A			
10	pH (Standard Units)	8.09	8.12	8.18			
11	Total Acidity (mg/l CaCO3)	6.20	13.40	3.20			
12	Total Alkalinity (mg/l CaCO3)	207.80	240.40	147.60			
13	Specific Conductivity (umhos/cm at 25° C)	667.00	756	485			
14	Total Dissolved Solids (mg/l)	---	---	---			
15	Total Manganese (mg/l)	<0.02	<0.02	0.04			
16	Total Sulfates (mg/l)	94.00	122.00	82.0			
17	Total Iron (mg/l)	0.04	0.33	1.20			
18	Total Suspended Solids (mg/l)	3	4	34.0			
19	Total Hardness (mg/l as CaCO3)	320.00	370.00	220.00			
20	Nitrates	---	---	---			
21	Date Sampled for Analysis	7-11-01	10-19-01	02-27-02			
22	Date Last Precipitation Event Occurred	7-8-01	10-16-01	02-27-02			

Laboratory Name INDUSTRIAL LAB ANALYSIS, INC.
Address 2240 WILLIAMSBURG DRIVE City GLEN DALE
State WEST VIRGINIA Zip 26038

NOTE: If information required by items 5, 6, and 9 is unobtainable, submit as an addendum to Attachment 14A a statement giving the reasons why the information is unobtainable.
NOTE: For each sample provide data for either item 13 or 14.

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 14A
(HYDROLOGIC MEASUREMENTS AND ANALYSES)

APPLICANT AMERICAN ENERGY CORPORATION (REFUSE DISPOSAL)

1	Identification No. of Sampling Station from Hydrology Map	D-8	D-8	D-8			
2	Identification Number	01-07-505	01-10-682	02-02-829			
3	High (H)/Low (L) Intermediate (I) Designation (if applicable)	I	L	H			
4	Surface Elevation for Sampling Station (msl)	925	925	925			
5	Depth of Well Below Land Surface (feet)	--	--	--			
6	Static Water Level of Well Below Land Surface (feet)	--	--	--			
7	Flow for Spring and Stream (gpm or cfs)	.01 CFS	.002 CFS	.02 CFS			
8	Date Above Measurements Made	7-7-01	10-19-01	2-27-02			
9	Aquifer/Zone Identification For Well/Spring	--	--	--			
10	pH (Standard Units)	7.93	7.70	8.10			
11	Total Acidity (mg/l CaCO3)	4.20	7.00	4.60			
12	Total Alkalinity (mg/l CaCO3)	102.00	67.80	102.00			
13	Specific Conductivity (umhos/cm at 25° C)	847.00	1192.00	959			
14	Total Dissolved Solids (mg/l)	---	---	---			
15	Total Manganese (mg/l)	0.07	0.22	0.32			
16	Total Sulfates (mg/l)	283.00	429.00	332.0			
17	Total Iron (mg/l)	0.10	0.53	0.33			
18	Total Suspended Solids (mg/l)	3	15	<2			
19	Total Hardness (mg/l as CaCO3)	326.00	300.00	360.0			
20	Nitrates	---	---	---			
21	Date Sampled for Analysis	7-7-01	10-19-01	02-27-02			
22	Date Last Precipitation Event Occurred	7-5-01	10-16-01	02-27-02			

Laboratory Name INDUSTRIAL LAB ANALYSIS, INC.
Address 2240 WILLIAMSBURG DRIVE City GLEN DALE
State WEST VIRGINIA Zip 26038

NOTE: If information required by items 5, 6, and 9 is unobtainable, submit as an addendum to Attachment 14A a statement giving the reasons why the information is unobtainable.
NOTE: For each sample provide data for either item 13 or 14.

(304) 647-9094
FAX: (304) 647-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

01-May-01

By: Andrew L. Watson II
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-01	Date & Time Sampled:	03-30-01 0825
Analysis Number:	104012	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.5	S.U.	03-30-01 0825	QES (DR)	150.1	[2]	
pH, Lab	7.45	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	960	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	1.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	470	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	320	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.11	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	100	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0012	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	0.11	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	<0.0010	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	190	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-01
Analysis Number: 104012

01-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	24	mg/l.	04-09-01 1300	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.05	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	250	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0060	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	<0.01	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	1500	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

27-Apr-01
Page 1 of 2

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-02	Date & Time Sampled:	03-30-01 0800
Analysis Number:	104013	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.9	S.U.	03-30-01 0800	QES (DR)	150.1	[2]	
pH, Lab	7.99	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	550	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	<1.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	200	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	160	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.09	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	26	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0024	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	0.16	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0013	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	96	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-02
Analysis Number: 104013

27-Apr-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	47	mg/l.	04-09-01 1300	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.07	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	160	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0056	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	<0.01	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	900	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

01-May-01

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-3A	Date & Time Sampled:	03-30-01 0930
Analysis Number:	104014	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.9	S.U.	03-30-01 0930	QES (DR)	150.1	[2]	
pH, Lab	7.98	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	270	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	<1.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	57	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	210	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.12	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	14	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0031	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	0.19	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0019	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	80	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-3A
Analysis Number: 104014

01-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	1.6	mg/l.	04-09-01 1300	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-26-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.04	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	53	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	<0.0001	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	<0.01	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	460	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

27-Apr-01

By: Andrew R. Kobe II
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-3B	Date & Time Sampled:	03-30-01 0940
Analysis Number:	104016	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.5	S.U.	03-30-01 0940	QES (DR)	150.1	[2]	
pH, Lab	7.96	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	340	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	4.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	57	mg/l.	04-06-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	250	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.07	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	19	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l
Total Selenium	0.0036	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	0.30	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0017	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	110	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-3B
Analysis Number: 104015

27-Apr-01
Page 2 of 2

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	1.5	mg/l.	04-09-01 1300	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	0.03	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.10	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	51	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0070	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.01	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	610	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

01-May-01

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-3C	Date & Time Sampled:	03-30-01 0950
Analysis Number:	104016	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.4	S.U.	03-30-01 0950	QES (DR)	150.1	[2]	
pH, Lab	7.34	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	170	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	4.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	33	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	120	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.19	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	6.8	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0012	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	0.10	mg/l	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	<0.001	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	67	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-3C
Analysis Number: 104016

01-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	<0.5	mg/l.	04-09-01 1300	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.04	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	9.7	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0046	mg/l.	04-16-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.02	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	280	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

LABORATORY ANALYSES
MAY 3 1 2001

SHIPPING ADDRESS:
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

02-May-01
Page 1 of 2

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-4A	Date & Time Sampled:	03-30-01 1020
Analysis Number:	104017	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	9.9	S.U.	03-30-01 1020	QES (DR)	150.1	[2]	
pH, Lab	9.66	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	1400	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	120	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	220	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	300	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	23	mg/l.	04-20-01 1146	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	7.1	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0022	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	22	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0019	mg/l.	04-07-01 1030	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-06-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	28	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-4A
Analysis Number: 104017

02-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	7.3	mg/l.	05-01-01 1400	WB	4500 ClB	[1]	0.50 mg/l.
Total Chromium	0.06	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.31	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	330	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0007	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.08	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	830	µmhos	04-05-01 1415	RW	120.1	[2]	1.5 µmhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

INV

MAY 3 1 2001
LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

02-May-01
Page 1 of 2

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-4B	Date & Time Sampled:	03-30-01 1030
Analysis Number:	104018	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	8.5	S.U.	03-30-01 1030	QES (DR)	150.1	[2]	
pH, Lab	8.52	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	600	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	22	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	240	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	160	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	1.9	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	4.9	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0044	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	4.6	mg/l.	04-06-01 1800	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0025	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	24	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9809

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-4B
Analysis Number: 104018

02-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	4.4	mg/l.	05-01-01 1400	WB	4500 ClB	[1]	0.60 mg/l.
Total Chromium	0.03	mg/l.	04-26-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.02	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	280	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0012	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.02	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	850	µmhos	04-05-01 1415	RW	120.1	[2]	1.5 µmhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD#2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

MAY 31 2001

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

02-May-01
Page 1 of 2

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-4C	Date & Time Sampled:	03-30-01 1040
Analysis Number:	104019	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.7	S.U.	03-30-01 1040	QES (DR)	150.1	[2]	
pH, Lab	7.16	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	170	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	44	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	46	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	120	mg/l.	04-08-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	1.0	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	8.5	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0014	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	1.2	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	<0.001	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	45	mg/l.	04-05-01 1645	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
1) Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

IRA-LET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-4C
Analysis Number: 104019

02-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	1.5	mg/l.	05-01-01 1400	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.07	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	20	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0003	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.03	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	270	µmhos	04-05-01 1415	RW	120.1	[2]	1.5 µmhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

27-Apr-01

By: Andrew R. Watson II
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-5A	Date & Time Sampled:	03-30-01 0800
Analysis Number:	104009	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	9.3	S.U.	03-30-01 0800	QES (DR)	150.1	[2]	
pH, Lab	8.85	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	1600	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	200	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	180	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	270	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	19	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	8.3	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0021	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	250	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0024	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	30	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

FROM : WJSIPLIVY,PE INC. FAX NO. : 330-686-8911 Mar. 08 2002 10:18AM P9

(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9509

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-5A
Analysis Number: 104009

27-Apr-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	6.0	mg/l.	04-09-01 1300	WB	4500 ClB	[1]	0.50 mg/l.
Total Chromium	0.11	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.24	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	390	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0001	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.10	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	610	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

FROM : WISIPLIUY,FE INC. FAX NO. : 330-686-8911 Mar. 08 2002 10:19AM P10

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

27-Apr-01

By: Andrew R. Weber II
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-5B	Date & Time Sampled:	03-30-01 0805
Analysis Number:	104010	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.6	S.U.	03-30-01 0805	QES (DR)	150.1	[2]	
pH, Lab	7.73	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	770	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	<1.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	230	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	360	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.59	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	6.2	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0030	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	1.0	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0040	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	37	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

FROM : WISIPLIVY,PE INC. FAX NO. : 330-686-8911 Mar. 08 2002 10:29AM P2

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-5B
Analysis Number: 104010

27-Apr-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	13	mg/l.	04-09-01 1300	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.16	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	380	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0001	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.05	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	1200	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

FROM : WISIPLIUY,PE INC. FAX NO. : 330-686-8911 Mar. 08 2002 10:30AM P3

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

27-Apr-01

By: Andrew R. Weber II
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-5C	Date & Time Sampled:	03-30-01 0815
Analysis Number:	104011	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	7.4	S.U.	03-30-01 0815	QES (DR)	150.1	[2]	
pH, Lab	7.28	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	120	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	<1.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	24	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	77	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	<0.05	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	8.8	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0017	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	<0.1	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0013	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	39	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

FROM : WISIPLIVY,PE INC. FAX NO. : 330-686-8911 Mar. 08 2002 10:30AM P4

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-5C
Analysis Number: 104011

27-Apr-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	<0.5	mg/l.	04-09-01 1300	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	<0.02	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	720	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0010	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	<0.01	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	140	umhos	04-05-01 1415	RW	120.1	[2]	1.5 umhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

FROM : WISIPLIUY,PE INC. FAX NO. : 330-686-8911 Mar. 08 2002 10:31AM P5

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

15-May-01

By: Andrew B. Wolfe
TraDet, Inc.

Company:	Century Mine	Sampled By:	QES (DR)
Source:	CG-01-6A	Date & Time Sampled:	03-30-01 1145
Analysis Number:	104087	Date & Time Received:	04-06-01 0900

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	8.1	S.U.	03-30-01 1145	QES (DR)	150.1	[2]	
pH, Lab	8.23	S.U.	05-01-01 1600	WB	150.1	[2]	
Total Dissolved Solids	790	mg/l.	04-24-01 0930	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	<1.0	mg/l.	04-24-01 0930	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	370	mg/l.	05-01-01 0945	BL	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	170	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.39	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	10.4	mg/l.	04-11-01 1815	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0021	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	0.66	mg/l.	04-26-01 1620	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0017	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	67	mg/l.	04-26-01 1600	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9809

Company: Century Mine
Source: CG-01-6A
Analysis Number: 104087

15-May-01

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	13	mg/l.	05-01-01 1400	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-25-01 1515	RW	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-30-01 1600	AC	239.1	[2]	0.05 mg/l.
Total Manganese	0.02	mg/l.	04-17-01 1430	RW	243.1	[2]	0.02 mg/l.
Total Sodium	240	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0007	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.06	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	1100	µmhos/cm	04-05-01 1415	RW	120.1	[2]	1.5 µmhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P.O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

LABORATORY ANALYSES

Century Mine
P.O. Box 5
Alledonia, OH 43902
Attn: Mr. Bill Siplivy

02-May-01
Page 1 of 2

By: _____
TraDet, Inc.

Company:	Ohio Valley Coal Company	Sampled By:	QES (DR)
Source:	CW-01-6B	Date & Time Sampled:	03-30-01 1310
Analysis Number:	104020	Date & Time Received:	04-03-01 1000

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
pH, Field	8.3	S.U.	03-30-01 1310	QES (DR)	150.1	[2]	
pH, Lab	8.10	S.U.	04-06-01 1400	WB	150.1	[2]	
Total Dissolved Solids	460	mg/l.	04-04-01 1000	WB	160.1	[2]	10 mg/l.
Total Suspended Solids	8.0	mg/l.	04-04-01 1000	WB	160.2	[2]	1.0 mg/l.
Total Sulfate (as SO4)	100	mg/l.	04-05-01 1430	RW	375.4	[2]	1.5 mg/l.
Total Alkalinity (as CACO3)	260	mg/l.	04-06-01 1330	WB	310.1	[2]	1.2 mg/l.
Total Iron	0.56	mg/l.	04-20-01 1145	RW	236.1	[2]	0.05 mg/l.
Total Magnesium	11	mg/l.	04-05-01 1700	AC	242.1	[2]	0.02 mg/l.
Total Selenium	0.0031	mg/l.	04-07-01 1300	AC	3114B	[1]	0.001 mg/l.
Total Aluminum	1.1	mg/l.	04-06-01 1600	AC	202.1	[2]	0.10 mg/l.
Total Arsenic	0.0011	mg/l.	04-07-01 1530	AC	206.3	[2]	0.001 mg/l.
Total Barium	<0.5	mg/l.	04-08-01 1215	AC	200.7	[2]	0.5 mg/l.
Total Calcium	42	mg/l.	04-05-01 1845	AC	215.1	[2]	0.02 mg/l.

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-8097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

Company: Ohio Valley Coal Company - Century Mine
Source: CW-01-6B
Analysis Number: 104020

02-May-01
Page 2 of 2

PARAMETER	CONCENTRATION		DATE & TIME ANALYZED	ANALYST	METHOD		MDL
Chloride	10	mg/l.	05-01-01 1400	WB	4500 CIB	[1]	0.50 mg/l.
Total Chromium	<0.02	mg/l.	04-25-01 1515	AC	218.1	[2]	0.02 mg/l.
Total Lead	<0.05	mg/l.	04-13-01 1300	SK	239.1	[2]	0.05 mg/l.
Total Manganese	0.03	mg/l.	04-17-01 1430	SK	243.1	[2]	0.02 mg/l.
Total Sodium	170	mg/l.	04-11-01 1710	AC	273.1	[2]	0.02 mg/l.
Mercury	0.0002	mg/l.	04-19-01 1345	AC	245.1	[2]	0.0001 mg/l.
Total Zinc	0.02	mg/l.	04-11-01 1600	AC	289.1	[2]	0.01 mg/l.
Specific Conductance	740	µmhos	04-05-01 1415	RW	120.1	[2]	1.5 µmhos

MDL: Method Detection Limit
[1] Standard Methods, 18th Edition [2] US EPA [3] ASTM [4] EPA SW846

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT

ATTACHMENT 28
(COAL WASTE DISPOSAL PLAN)

Applicant's Name AMERICAN ENERGY CORPORATION

1. The coal mine waste to be disposed of on the coal mining operation is from a: (check appropriate response)

   _____ Wash plant facility
   __X__ Tipple facility
   _____ Other (e.g. large pre-existing gob pile)

2. Submit an Attachment 12 for the material to include at a minimum: pH, percent of total or pyritic sulfur, neutralization potential, potential acidity, and calcium carbonate deficiency. **See Attachment 12**

3. State the size fractions and percentages of the size fractions of the waste material. **See Attachment 12.**

4. Submit as an addendum a stability analysis to address how placement of the waste material will not cause instability within the backfilled area. Include all necessary calculations and analyses. **See Attached Stability Analysis.**

5. State the estimated amount of refuse material in tons to be disposed of on the proposed permit area: 2,514,970

6. State the percent moisture and density of the refuse material, if the coal waste is from a wash plant.

   N/A

7. Describe how infiltration of water into the disposal area will be minimized.

In areas proposed to be utilized for refuse disposal, the highwall face will be reclaimed by placing a *2* **foot thickness of non-toxic low permeability material, in 2 foot compacted lifts, between the highwall and the refuse. The entire pit floor and coal bench** *is underlain by a 20 foot+- thick insitu low permeability claystone material. The refuse will be placed directly on this material.* **The entire disposal area surface will be covered with** *1.5* **feet of non-toxic low permeability material and sloped to drain.** *Above the 1.5 foot cover material, an additional 2 foot cover and six inches of a moderately dry growth medium soil and topsoil will be placed. By developing the reclamation cover in this manner, water infiltration and leachate formation will be minimized by the use of low permeability materials.* **Based on the small amount of anticipated infiltration after reclamation, the proposed disposal area should have a minimal impact on the area ground water conditions.**

04/94

OHIO DEPARTMENT [illegible]URAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 12
(DRILLING REPORT - SURFACE MINE)

This data obtained from public information for permit D-0360 as a representative #8 coal seam refuse analysis. Permit D-0360 is less 3 miles northeast of Permit D-1159.

Applicant's Name American Energy Corporation

(Check one: X core drilled _____ rotary air, _____ other (describe)_____)

Test Hole # _

State Plane Coordinates X _____

Y _____

Lithologic Unit (1)	* Thickness Feet	pH	CaCo3 Deficiency (1000 Tons)	Neutralization Potential (1000 Tons)	Potential Acidity	Total Sulfur %	Physical Properties (2)			
Topsoil										
Subsoil							Compactible	Erodible	Color	Grain Size
Roof Rock	266.20-276.20	9.38	-314	355	40.6	1.30				
Floor Rock	358.70-368.70	9.23	-167	269	102	3.26				
Roof Rock	339.10-349.10	9.26	-179	241	61.9	1.96				
Floor Rock	284.30-294.30	9.37	21.0	44.9	65.9	2.11				
Roof Rock	236.30-246.30	9.34	-160	204	44.1	1.41				
Floor Rock	353.00-363.00	9.39	-75.8	167	91.2	2.92				
Roof Rock	332.40-342.40	9.34	-173	210	36.6	1.17				
Floor Rock	308.70-318.70	9.38	-282	319	37.1	1.19				
Floor Rock	251.30-261.30	8.96	-44.8	107	62.2	1.99				
Floor Rock	328.60-338.60	9.03	-54.0	178	124	3.96				
Floor Rock	328.10-338.10	9.18	-140	199	59.0	1.89				
Roof Rock	311.40-321.40	9.37	-256	296	40.0	1.28				
Floor Rock	299-309	9.27	-119	214	95.0	3.04				
Roof Rock	281.10-291.10	9.48	-247	286	38.7	1.24				

_____ Total Thickness _____ Surface elevation of test hole

Coal Seam Information

NAME	NUMBER	TOTAL SULFUR %	PYRITE/MARCASITE SULFUR %

(1) If subsurface water was encountered, identify the stratum in which it was encountered by an asterisk (*).
(2) Describe any observable physical properties of such stratum (e.g. color, grain size, compactiblity, erodiblity, etc.)

* The thickness column refers to depth ranges. Roof rock consists of the immediate ten feet above the roof coal. Floor rock is the immediate ten feet below the Pittsburgh No. 8 coalbed.

AEC 10511

American Energy Corporation
Century Mine

Stability Analysis of Coal Refuse as Highwall Backfill

The stability of the coal refuse backfill has been calculated using the Rotational Equilibrium Analysis of Multilayered Embankments (REAME) computer program developed by Dr. Yang H. Huang, Sc.D. of the University of Kentucky. The REAME program is a personal computer adaptation based on a variety of slope stability analysis procedures. The simplified Bishop method of slope evaluation was used in this analysis.

The strata underlying the #12 coal seam was determined to be gray claystone. The material that will be used as a liner material under and around the coal refuse will be a mixture of brown and gray clay. Conservative strength values for the soils were taken from page 36 of *Stability Analysis of Earth Slopes* by Dr. Yang H. Huang, Sc.D. The following coefficients were used for the claystone: cohesion = 1400 psf, phi angle = 32° and a unit weight of 109 pcf. The clay liner material was assumed to be weaker with a cohesion of 500 psf, a phi angle of 30° and a unit weight of 107 pcf. The values used for the coal refuse were: cohesion = 0 psf, phi angle = 32.1° and unit weight = 100 psf.

A phreatic surface was included in the REAM run even though the installed or natural seal will prevent water from reaching the top of the coal underclay. The phreatic surface was assumed to run along the top of the #12 coal seam and then down along the top of the claystone. The parameters above and a seismic coefficient of 0.05 were utilized to check the stability of the highwall backfill under a "worst case" condition. A minimum safety factor of 1.76 was determined by the REAME program. Please refer to the attached output sheets and drawings for more information.

Donald M. Brafford, P.E.
3-11-02

STATE OF OHIO
DONALD M.
BRAFFORD
E-29449
REGISTERED
PROFESSIONAL ENGINEER

REAME (ROTATIONAL EQUILIBRIUM ANALYSIS OF MULTILAYERED EMBANKMENTS)
THIS 2000 VERSION (REAME2k) IS LICENSED BY CIVIL ENGINEERING SOFTWARE CENTER TO:
Jack A. Hamilton & Associates, Inc.

INPUT FILE NAME -C:\Reamedat\02-001-5.DAT

TITLE - American Energy Corp. - Century Highwall Backfill Stability Analysis

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1

NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 0

TWO-DIMENSIONAL ANALYSIS (THREED = 0)

CASE NO. 1 SEISMIC COEFFICIENT (SEIC) =0.050

NO. OF BOUNDARY LINES (NBL) = 4

NO. OF POINTS ON BOUNDARY LINE 1 = 3

1	X COORD.=-500	Y COORD.= 1066
2	X COORD.= 0	Y COORD.= 1066
3	X COORD.= 500	Y COORD.= 1066

NO. OF POINTS ON BOUNDARY LINE 2 = 6

1	X COORD.= 39	Y COORD.= 1086
2	X COORD.= 51	Y COORD.= 1086
3	X COORD.= 193	Y COORD.= 1086
4	X COORD.= 195	Y COORD.= 1086
5	X COORD.= 197	Y COORD.= 1086
6	X COORD.= 211	Y COORD.= 1148

NO. OF POINTS ON BOUNDARY LINE 3 = 4

1	X COORD.= 39	Y COORD.= 1086
2	X COORD.= 51	Y COORD.= 1086
3	X COORD.= 207	Y COORD.= 1143
4	X COORD.= 211	Y COORD.= 1148

NO. OF POINTS ON BOUNDARY LINE 4 = 9

1	X COORD.=-500	Y COORD.= 1080
2	X COORD.= 0	Y COORD.= 1080
3	X COORD.= 31	Y COORD.= 1080
4	X COORD.= 39	Y COORD.= 1086
5	X COORD.= 211	Y COORD.= 1148
6	X COORD.= 230	Y COORD.= 1155
7	X COORD.= 281	Y COORD.= 1165
8	X COORD.= 358	Y COORD.= 1175
9	X COORD.= 500	Y COORD.= 1180

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000	0.000				
2	0.000	0.000	0.000	0.000	4.429	
3	0.000	0.365	1.250			
4	0.000	0.000	0.750	0.360	0.368	0.196
	0.130	0.035				

MIN. DEPTH OF TALLEST SLICE (DMIN) = 1

AEC 10513

NO. OF RADIUS CONTROL ZONES (NRCZ) = 1

RADIUS DECREMENT (RDEC) FOR ZONE 1 = 0
NO. OF CIRCLES (NCIR) FOR ZONE 1 = 5
ID NO. FOR FIRST CIRCLE (INFC) FOR ZONE 1 = 1
NO. OF BOTTOM LINES (NOL) FOR ZONE 1 = 1

LINE NO. (LINO)	BEG. NO. (NBP)	END NO. (NEP)
1	1	3

UNIT WEIGHT OF WATER (GW) = 62.4

SOIL NO.	COHESION	FRIC. ANGLE	UNIT WEIGHT
1	1400	30.0	109
2	0	32.1	100
3	500	30.0	107

USE PHREATIC SURFACE
USE GRID
NO. OF SLICES (NSLI) = 10
NO. OF ADD. CIRCLES (NAC) = 3
ANALYSIS BY SIMPLIFIED BISHOP METHOD (MTHD=2)
NUMBER OF FORCES (NFO)= 0
SOFT SOIL NUMBER (SSN)= 0

NO. OF POINTS ON WATER TABLE (NPWT) = 9

1	X COORD.=-500	Y COORD.= 1080
2	X COORD.= 0	Y COORD.= 1080
3	X COORD.= 31	Y COORD.= 1080
4	X COORD.= 39	Y COORD.= 1086
5	X COORD.= 51	Y COORD.= 1086
6	X COORD.= 193	Y COORD.= 1086
7	X COORD.= 195	Y COORD.= 1086
8	X COORD.= 197	Y COORD.= 1090
9	X COORD.= 500	Y COORD.= 1090

NO. OF SOILS WITH DIFFERENT WATER TABLE (NSDW) = 0
NO. OF SOILS WITH DIFFERENT PORE PRESSURE RATIO (NSDP) = 0

INPUT COORD. OF GRID POINTS 1,2,AND 3

POINT 1 X COORD. =-30 Y COORD. = 1390
POINT 2 X COORD. =-30 Y COORD. = 1140
POINT 3 X COORD. = 170 Y COORD. = 1140

X INCREMENT (XINC) = 16 Y INCREMENT (YINC) = 16
NO. OF DIVISIONS BETWEEN POINTS 1 AND 2 (ND12) = 5
NO. OF DIVISIONS BETWEEN POINTS 2 AND 3 (ND23) = 4
ONLY A SUMMARY TABLE IS PRINTED (NPRT = 0)
SLICES WILL BE SUBDIVIDED

AUTOMATIC SEARCH WILL FOLLOW AFTER GRID

FACTORS OF SAFETY BASED ON GRID

IN THE FOLLOWING TABLE, WARNING INDICATES HOW MANY TIMES THE MAXIMUM RADIUS IS LIMITED BY THE END POINTS OF GROUND LINES:

AEC 10514

CENTER X COORDINATE	CENTER Y COORDINATE	NO. OF CIRCLE TOTAL	CRITIC.	RADIUS	LOWEST F.S.	WARNING
-30	1390	11	4	315.231	3.715	0
-30	1340	7	1	274.000	7.769	0
-30	1290	6	3	218.400	9.766	0
-30	1240	4	2	171.200	14.872	0
-30	1190	1	1	124.000	1000.000	0
-30	1140	1	1	74.000	1000.000	0
20	1390	11	9	303.480	1.880	0
20	1340	11	10	253.975	2.112	0
20	1290	11	11	204.767	2.630	0
20	1240	8	1	174.000	3.924	0
20	1190	5	1	124.000	4.660	0
20	1140	7	1	74.000	6.199	0
70	1390	11	6	302.164	2.307	0
70	1340	8	5	237.550	2.025	0
70	1290	11	4	198.440	1.767	0
70	1240	17	14	152.200	1.811	0
70	1190	11	8	103.829	1.913	0
70	1140	11	4	53.773	2.195	0
120	1390	11	8	301.082	2.598	0
120	1340	11	8	252.119	2.502	0
120	1290	11	8	203.156	2.425	0
120	1240	8	5	128.726	1.940	0
120	1190	11	10	86.459	1.964	0
120	1140	8	5	33.466	2.516	0
170	1390	11	6	303.635	2.959	0
170	1340	11	7	250.146	2.927	0
170	1290	11	7	201.026	2.879	0
170	1240	11	7	151.936	2.883	0
170	1190	11	4	81.649	2.997	0
170	1140	8	5	19.902	3.396	0

LOWEST FACTOR OF SAFETY AT EACH GRID POINT IS TABULATED BELOW

COORDINATE	-30.000	20.000	70.000	120.000	170.000
1390.000	3.715	1.880	2.307	2.598	2.959
1340.000	7.769	2.112	2.025	2.502	2.927
1290.000	9.766	2.630	1.767	2.425	2.879
1240.000	14.872	3.924	1.811	1.940	2.883
1190.000	1000.000	4.660	1.913	1.964	2.997
1140.000	1000.000	6.199	2.195	2.516	3.396

MINIMUM FACTORS OF SAFETY OCCUR AT THE FOLLOWING 2 CENTERS

FACTOR OF SAFETY = 1.880 AT (20.000,1390.000)
FACTOR OF SAFETY = 1.767 AT (70.000,1290.000)

AUTOMATIC SEARCHES WILL BE MADE ONLY ON THE CENTER WITH THE SMALLEST F.S. MORE SEARCHES FROM OTHER CENTERS MAY BE NEEDED TO ENSURE THAT MINIMUM F.S. IS OBTAINED.

AT POINT (70 1290) RADIUS 198.440, THE MINIMUM FACTOR OF SAFETY IS 1.767

FACTORS OF SAFETY BASED ON SEARCH

AEC 10515

IN THE FOLLOWING TABLE, WARNING INDICATES HOW MANY TIMES THE MAXIMUM RADIUS IS LIMITED BY THE END POINTS OF GROUND LINES:

CENTER X COORDINATE	CENTER Y COORDINATE	NO. OF CIRCLE TOTAL	CRITIC.	RADIUS	LOWEST F.S.	WARNING
70	1290	11	4	198.440	1.767	0
86	1290	8	5	185.580	2.003	0
54	1290	11	8	203.554	1.769	0
70	1306	11	9	211.694	1.778	0
70	1274	11	7	187.174	1.764	0
70	1258	11	7	171.648	1.782	0
86	1274	11	9	177.400	1.787	0
54	1274	11	4	186.264	1.813	0
74	1274	11	8	184.346	1.768	0
66	1274	11	7	187.852	1.764	0
70	1278	11	7	191.056	1.760	0
70	1282	11	8	192.831	1.762	0
74	1278	11	8	188.215	1.764	0
66	1278	11	7	191.734	1.760	0

AT POINT (70 1278) RADIUS 191.056

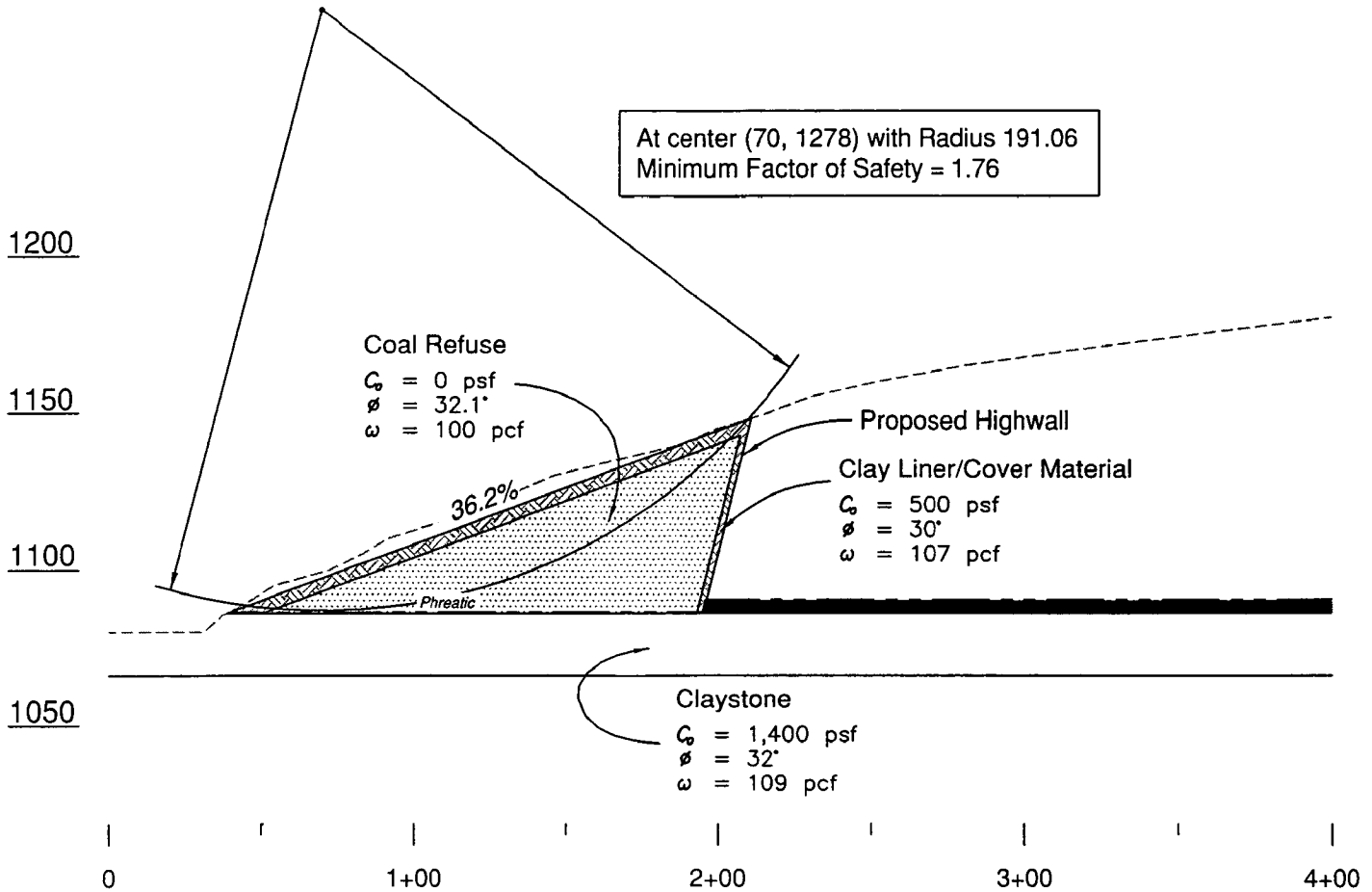
THE MINIMUM FACTOR OF SAFETY IS 1.760

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	SLICE HEIGHT	WATER HEIGHT	BOTTOM SINE	TOTAL WEIGHT	EFFECT. WEIGHT	RESIST. MOMENT	DRIVING MOMENT
1	3	9.298	2.210	0.000	-.102	.220E+04	.220E+04	.114E+07	-.221E+05
2	2	7.066	5.821	0.000	-.059	.433E+04	.433E+04	.519E+06	-.828E+04
3	2	16.364	10.378	0.000	.002	.175E+05	.175E+05	.209E+07	.169E+06
4	2	16.364	15.539	0.000	.088	.259E+05	.259E+05	.308E+07	.671E+06
5	2	16.364	19.280	0.000	.173	.320E+05	.320E+05	.375E+07	.135E+07
6	2	16.364	21.550	0.000	.259	.357E+05	.357E+05	.408E+07	.208E+07
7	2	16.364	22.260	0.000	.345	.369E+05	.369E+05	.407E+07	.274E+07
8	2	16.364	21.270	0.000	.430	.352E+05	.352E+05	.372E+07	.318E+07
9	2	16.364	18.364	0.000	.516	.305E+05	.305E+05	.303E+07	.324E+07
10	2	16.364	13.212	0.000	.602	.220E+05	.220E+05	.203E+07	.269E+07
11	2	11.001	6.802	0.000	.673	.776E+04	.776E+04	.656E+06	.105E+07
12	3	5.363	1.842	0.000	.716	.106E+04	.106E+04	.811E+06	.152E+06
							SUM	.290E+08	.173E+08

AT CENTER (70.000 , 1278.000) WITH RADIUS 191.056 AND SEIS. COEFF. 0.05
FACTOR OF SAFETY BY NORMAL METHOD IS 1.676
FACTOR OF SAFETY BY SIMPLIFIED BISHOP METHOD IS 1.760

AEC 10516



AMERICAN ENERGY CORPORATION

Highwall Backfill Stability Section

Scale: 1" = 60'

I HEREBY CERTIFY THAT THIS SLOPE STABILITY ANALYSIS HAS BEEN PREPARED TO MEET THE APPLICABLE REQUIREMENTS OF RULE 1501: 13-09-09 OF THE ADMINISTATIVE CODE.

Donald M Brafford

3-11-02

STATE OF OHIO
DONALD M. BRAFFORD
E-29449
REGISTERED
PROFESSIONAL ENGINEER

AEC 10517

8. Specifically describe how the disposal plan will comply with paragraph (J) of rule 1501:13-9-14 of the Administrative Code.

See response to Attachment 28, Page 1, Item 7.

9. Does the disposal plan propose to neutralize wash plant waste with spoil material? _____ Yes, __X__ No. If "yes," submit as an addendum an acid/base account of the refuse and spoil materials.

10. Does the disposal plan propose to seal the disposal area? __X__ Yes, _____ No. If "yes," submit an Attachment 12 for the sealant material which includes pH, percent of total or pyritic sulfur, neutralization potential, potential acidity, calcium carbonate deficiency, and lithology.

See Sealant Material Attachment 12.

11. If a sealant material is to be used, submit a permeability analysis of the material to be used as a sealant. Also, address below how the sealant material will be compacted and the anticipated permeability coefficient to be achieved following compaction.

Cover materials termed "clay/silty clay" on Attachment 12 will be comprised of soils found in Test Pits *1 and 4*. Re-working of the soil will continue until a uniform, in-place weight is achieved. Over compaction of the soil will be avoided because some settlement of the refuse is expected. Unit weights can be provided by compacting to 95% Standard Proctor Density. Placement of these soils will be accomplished using either truck haulage or tractor scraper haulage. The soils will be spread by bulldozer *with uniformity to be achieved* by a light to medium weight sheepsfoot type roller. *Sealing will involve lining of the highwall, insitu claystone material beneath, and capping with the clay/silty clay material described above. See Addendum to A.R.P., Item 4.*

12. Show the location of the coal mine waste storage and disposal areas and the location of cross sections on the application map. **See A.R.P. Application Map**

13. Describe how the disposal plan will meet requirements of paragraph (J)(3) of rule 1501:13-9-04 of the Administrative Code.

During active refuse disposal, all water impacted by the refuse material will be passed through sediment Ponds 001, 009, or 010 for treatment, if necessary, prior to discharge. When disposal operations are completed, refuse material will be buried under at least *1.5* feet of non-toxic material, and sloped to drain.

04/94

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

Date: October 27, 1998

ATTACHMENT 12
(DRILLING REPORT - SURFACE MINE)

Applicant's Name American Energy Corporation Property: _____

(Check one: __ core drilled, X rotary air, __ other (describe) ___)

Test Hole # #12 Coal Underclay / claystone
State Plane Coordinates X: _____
Y: _____

Lithologic Unit (1)	Thickness	pH	$CaCO_3$ Deficiency (1000 Tons)	Neutralization Potential (1000 Tons)	Potential Acidity	Total Sulfur %	Physical Properties(2)			
Topsoil										
Subsoil							Compactible	Erodible	Color	Grain Size
Grey Claystone	3' 8"	9.37	-25.00	66.25	41.25	1.32	Moderately	Slightly	Gray	Fine
Grey Claystone	30'	8.90	-36.56	36.88	0.31	0.01	Moderately	Slightly	Gray	Fine

_____ Total thickness _____ Surface elevation of test hole

Coal Seam Information

Name	Number	Total Sulfur %	Pyrite/Marcasite Sulfur %

(1) If subsurface water was encountered, identify the stratum in which it was encountered by an asterick (*)
(2) Describe any observable physical properties of each stratum (e.g. color, grain size, compactibility, erodibility, etc.).

AEC 10519

Moisture-Density Curve No. 2

Project Perkins Run Refuse Disposal

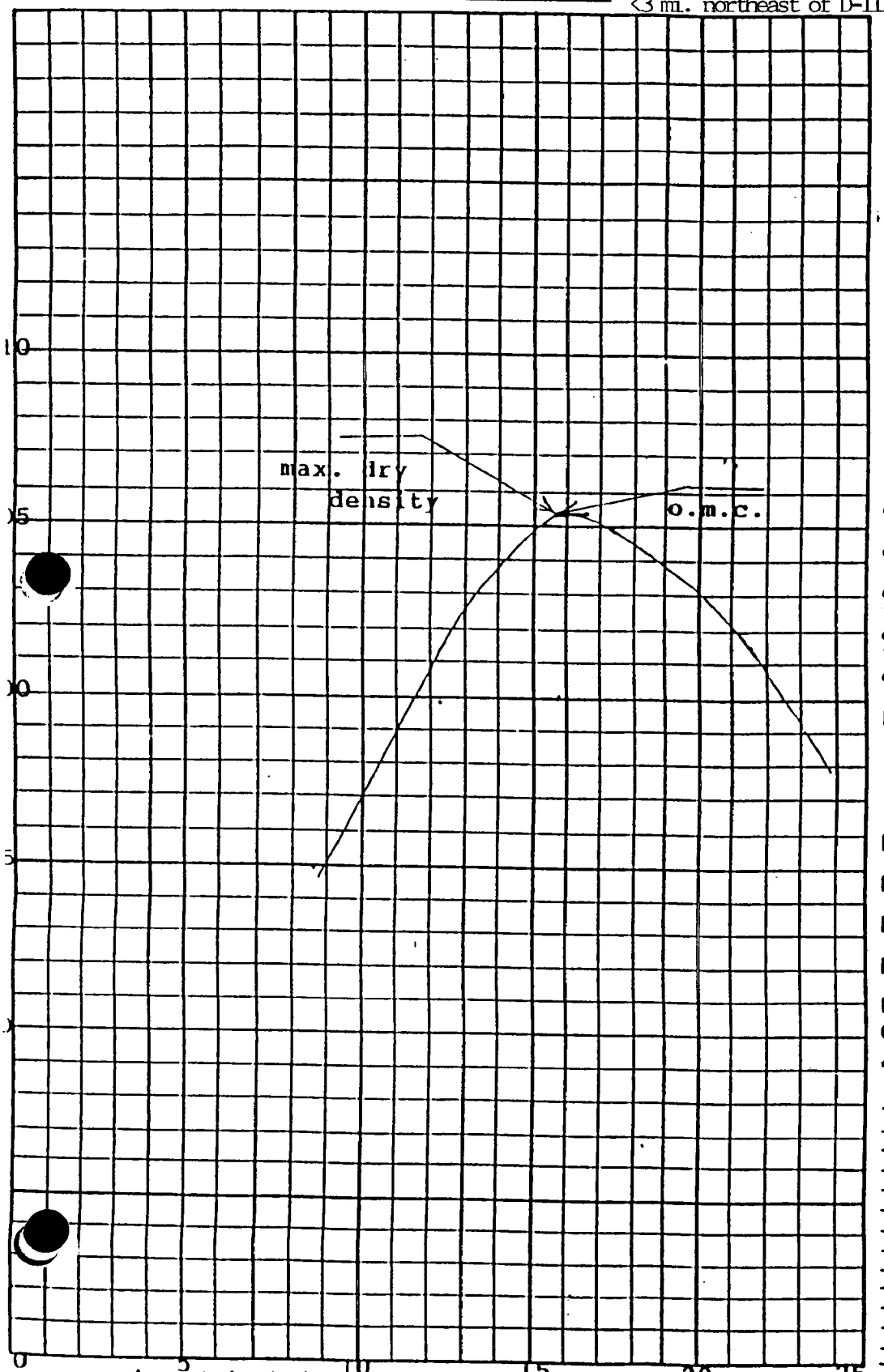
Date 4-20-98

GREEN AND ASSOCIATES
Design • Engineering • Surveying
156 Woodrow Avenue • Suite 3
St. Clairsville, Ohio 43950
Phone (740) 695-9977

Soil Description Very moist, grayish brown sand some clayey silt

Source East Knob Borrow Area **TP-13**

This data obtained from public information for D-0360 as a representative permeability of the #12 coal underclay. D-0360 is <3 mi. northeast of D-1159.



Job # 98-131

Sample # 2, S39,100 W70,400

Specific Gravity:

AASHTO Test

ASTM Test D-698

Method A

Hammer Wt. 5½ Lbs.

Hammer Drop 12"

No. Blows/Layer 25

No. Layers 3

Mold Size 4" Dia.

Grain Size Distribution

% Aggregate

% Coarse Sand

% Fine Sand

% Silt

% Clay

Note:
Agg. = Above #10 sieve
C.S. = bet. #10 & #40 sieve
F.S. = bet. #40 & #200 sieve

L.L. 38.7

P.L. 27.2

P.I. 11.5

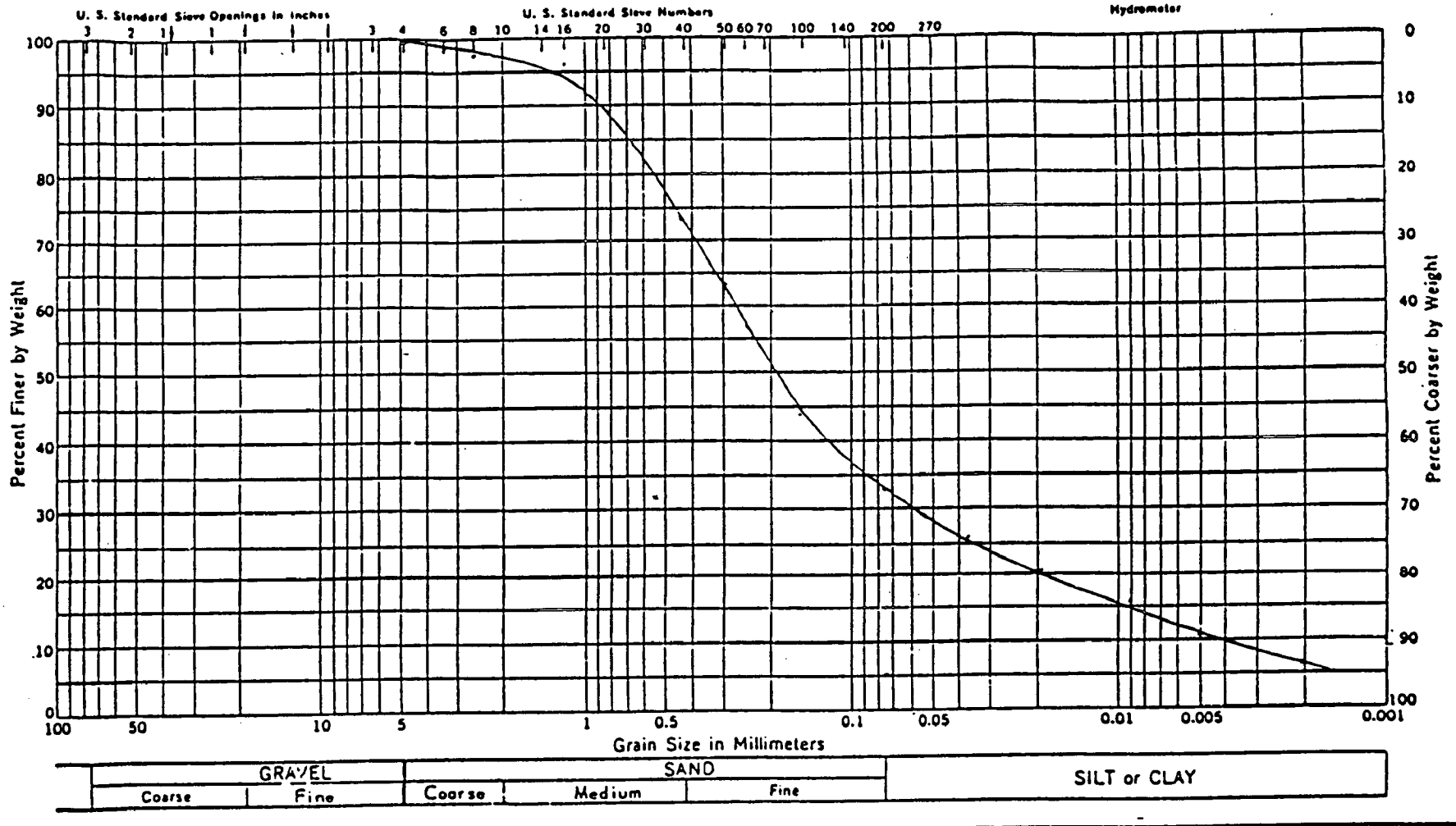
Nat. W_C 21.8%

Max. Dry Density 105.4 p.c.f.

Optimum Moisture 15.8%

*Sieve	% Passing

As a mutual protection to clients, public, and ourselves, all reports are submitted as the confidential property of clients, and authorization for



HOLE NO.	SAMPLE NO.	DEPTH	M.C		CLASSIFICATION
			21.8%		Very moist, grayish brown sand
					some clayey silt " SP - ML "
					Coeff.of perm. $k=1.1x10^{-7}$ cm/sec
					@94.7% of ASTM D-698, Max. dry
					density=105.4pcf @15.8% moisture
					Sample #2, East knob borrow area
					S39,100 W70,400
					LL= 38.7, PL=27.2, PI= 11.5

Project: Perkins Run Refuse Disposal

Job No: 98-131

Laboratory Soil Testing

April, 1998

TP-13

This data obtained from public information for D-0360 as a representative permeability of the #12 coal underclay. D-0360 is less than 3 miles northeast of D-1159.

WILLIAM J. SIPLIVY, P.E., C.P.G.

Geotechnical Engineer

8 March 2002

Ms. Ellen Greer
Jack A. Hamilton & Associates, Inc.
Consulting Engineers and Surveyors
342 High Street
Flushing, Ohio 43977

Re: CENTURY MINE COARSE COAL REFUSE DISPOSAL

Dear Ms. Greer:

In response to your interest in the underclay of the Washington No. 12 coalbed, my experience has been it is suitable for use as a low permeability liner and cap material in landfill applications.

This is based on recent lab testing and liner installation for another coal company's coarse coal refuse disposal facility, several miles east of the Century mine, in Belmont County. A permeability of less than E-07 is normally achieved there when the moisture content is 0 to 4 percent wet of optimum, at a minimum compactive effort of 95 percent Standard Proctor.

Please feel free to call if there are further questions.

Sincerely,

William J. Siplivy, P.E., Inc.

William J. Siplivy

William J. Siplivy, P.E., C.P.G.

cc: Ryan Desko – Century mine

4667 Turnberry Trail • Stow, OH 44224 • 330-678-0027 • wjsiplivy@aol.com

14. Submit a cross section showing the elevation, final profile, saturated zones (existing and proposed), and reclaimed surface profile of the disposal area.

See Cross Sections A - A' through G - G'.

15. Identify surface and ground water monitoring sites which will specifically determine hydrologic impact which may proximately occur as a result of the disposal plan. If monitoring wells are to be constructed as part of this plan, submit information as to well construction, development, and design.

Surface water site D-8A, and sediment Ponds 001, 009, and 010, and ground water sites *as listed in the Addendum to Part 2, Page 14, Item E(1)* will be monitored quarterly for quality and quantity to determine hydrologic impact as a result of the proposed disposal plan.

16. Ensure that Part II, item E of the permit application addresses the probable hydrologic consequences of the disposal area on the hydrologic balance of the area. Specifically address changes in ground water and surface water quality in detail.

See Addendum to Part 2, Page 14, Item E

17. Submit a detailed assessment plan for the disposal area and ensure that Part II, items F(1) and F(2) of the permit application identify surface and ground water supplies which may be adversely affected by the disposal area and acceptable alternative sources.

See Addendum to Part 2, Page 14, Item E, and Addendum to Part 2, Page 18, Item F.

18. If the material to be disposed is slurry, then submit data characterizing soil materials to be utilized in construction, if applicable.

N/A, No slurry disposal, coarse refuse only.

19. Describe in detail the monitoring plan and analytical procedures to be followed for this disposal plan.

Ground and surface water sites *as referenced and listed* **in item 15. above will be monitored quarterly for quality and quantity. See A.R.P. Application Map for location of these sites. Pond monitoring will be conducted as required by NPDES/Stormwater General Permit OHM000001, Facility No.3GM00018. Analytical procedures as identified by the U.S. EPA, Methods for Chemical Waste Analysis of Water and Waste, will be utilized for all water quality analysis.**

20. Identify the parameter limits and frequencies to be met as set by the OEPA by the disposal area, if different from the NPDES/NSPS requirements.

NPDES/Stormwater General Permit No. OHM000001, Facility No. 3GM00018 parameter limits and frequency requirements for monitoring at Ponds 001, 009, and 010 will be observed.

21. If required per the modified MOA, submit an OEPA Application for Permit to Install or Plan Approval (Form 4309) as an addendum to this attachment.

N/A

ADDENDUM TO ATTACHMENT 28, PAGE 3, ITEM 17.,
AMERICAN ENERGY CORPORATION

Legitimately-used ground water supplies DW-7A and W-7 will not experience contamination, diminution, or interruption As a result of the proposed refuse disposal. Their distance from the proposed refuse disposal area, as well as dip of the strata will protect these sources. Monitoring of sediment ponds, and treatment if necessary, will protect surface water in the vicinity of the proposed disposal. See approved permit D-1159 and D-1159-1 responses Part 2, Items F(1) and F(2).

Rights of present ground water users will be respected and protected by measures as described in the sealing plan. Based on the measures to be undertaken to minimize the impact of the refuse disposal area on surface and ground water, ***American Energy Corporation*** does not anticipate that the rights of present users will be affected. However, if users rights are infringed upon, an alternate source will be provided. If the quality and quantity of water available for domestic use is diminished, alternate water sources within the underlying aquifer could be tapped by drilling and casing to a greater depth, depending on the quality and quantity required.

February 25, 2002

American Energy Corporation
43521 Mayhugh Hill Road
Beallsville, Ohio 43716

Gentlemen:

The Division of Mineral Resources Management completed our review of your recent application to Revise a Permit (ARP) R-1159-4 in which you propose to allow coal waste disposal to the permitted mining and/or reclamation plan. The following revisions are required before we can further consider your request.

ARP Review:

1. Revise item 3 of the ARP to include all sections of the plan being revised by this ARP.

2. Page 2, item 8: Submit the required proof-of-publication.

3. Indicate the correct page number on the addendum to part 3, item E. (Page 14 instead of page 18)

4. The addendum to item 4 indicates in the second paragraph that the refuse will be covered with 4 feet of non-toxic compacted material. The fifth paragraph indicates that the refuse will be covered with 4 feet of non-toxic, low permeability material. Item 7 on the Att. 28 indicates that the top six inches of the 4 feet of non-toxic material will consist of soil and topsoil. Revise these responses for consistency as the soils/top soils are not low permeability materials and should not be compacted.

5. Revise the last statement of the item 4 addendum as the safety factor for these disposal areas is not approaching infinity as evidenced by the analysis results provided.

6. According to the item 4 addendum, portions of the pit areas will be left open for coal refuse disposal. Revise this discussion to describe the duration that the pit areas will be left open, measures to keep the pit areas from collecting water, and measures to be taken to ensure that the approved reclamation timetables are met.

7. Describe the plan for identifying, segregating and stockpiling the clay material to be uses to "seal" the refuse. In addition provide a demonstration that sufficient low permeability material exists on this area to place four feet below and above the refuse and twenty feet of low permeability material against the highwall.

8. Describe in detail where the spoil generated during mining, displaced by the 1,790,000 cubic yards of refuse added to the backfill, will be disposed.

Hydrology Review:

1. Addendum to ARP item 4: In the fourth paragraph, you indicate that placement of wastes will begin in the west end of the pit, southeast of test hole #1. Based on the location of test hole #1, this description does not appear accurate. Revise/clarify as necessary.

2. Addendum to Page 18 (Page14), E:

   a) In the next to last sentence of the next to last paragraph, you imply that the drainage control plan will not minimize the possibility of streamflow alteration and flooding. Revise.

   b) It does not appear that any wetland mitigation areas will be located on the area proposed for refuse disposal. However, clearly show or describe the locations of wetland mitigation for wetlands delineated on the original and adjacent area permits.

   c) Discuss the hydrologic impact of refuse disposal in relation to existing or future underground mining beneath the disposal areas.

3. Addendum to ARP item 4; Addendum to Page 18 (Page 14), E; Attachment 28, item 7; and/or Attachment 28, item 15:

   a) Low permeability material, with a target of 1×10^{-7} cm/sec, must completely surround the refuse, if sealing is the option chosen. Revise all narratives and plans to show and discuss a liner (on all sides) and a cap (on top) that is of a thickness and permeability sufficient to effectively seal the coal refuse.

   b) Quarterly Monitoring: Well W-7 is too far away to monitor impacts to Zone C due to the refuse disposal. In addition, you indicate in the response to Attachment 28, item 17, that this site will not be impacted by the proposed refuse disposal; therefore it does not represent a good monitoring location

for Zone C. No downdip monitoring of Zone A is proposed. D-8 and is too far downstream of the proposed disposal and is not shown on the ARP map. (Show this site on the ARP map.) Establish surface water and ground water sites that are closer to the proposed disposal area, in both updip and downdip positions. Monitoring wells should be installed if existing sites are too distant. Consider using the monitoring wells that have already been installed for the future refuse disposal project at this site. Submit a one-time water sample for all monitoring sites that have not been previously sampled. Show all monitoring sites on the ARP map.

c) Demonstrate that sufficient material exists to line, seal, cover, and isolate the refuse material.

d) The plan is to isolate the refuse material from contact with water. Therefore, demonstrate that placing the material four feet above the pit floor will be above any reestablished water table.

4. Attachment 28:

a) Item 2, Attachment 12: The analysis of the refuse material shows a relatively good material, with pH values of 6.18 and 7.57 S.U. and calcium carbonate deficiencies of –41.30 and –384.00 tons per 1000 tons. Indicate how representative this analysis is of the overall refuse, and what this says about the methods needed to sealing the material.

b) Item 10: Item 11 indicates that the "clay/silty clay" found in test pits 1, 2, 3, 4, 5, 6, and 8 will be used for sealant; however, only red clay in two test pits was analyzed for the parameters required by this item. Clarify, and/or provide analyses for all of the material that will be used as sealant.

c) Item 11: Note that only two options are given for disposing refuse material: neutralization or sealing. Since the refuse will not be neutralized, sealing is required. Sealing must involve surrounding the refuse with low permeability material (target 1×10^{-7} cm/sec). Revise plans and discussions to address completely sealing the refuse material.

d) Items 16 and 17: Correctly reference the page numbers of the addenda. Also, on the addendum to item 17, correctly identify the name of the applicant.

Engineer Review:

1. The ARP mentions that the clayey soils to be used for the cover material can achieve low permeability on the order of 1x10-8 cm/sec. However, the compaction required is 98% of Standard Proctor at moisture content 2% above optimum. Since the compaction of the material is not specified, the actual

permeability of the cover material is not known and is likely to be much less than 1x10-8 cm/sec. Therefore, rephrase the language of the ARP to state that water infiltration and leachate formation will be minimized because of the use of low permeability materials, not eliminated or limited to one inch per year as the ARP states. The ARP states the cover material will be compacted. Is this being specified as part of the design?

2. The refuse disposal is not contained entirely in pits. The cross-sections indicate the disposal is on the coal bench, not in a pit. Revise language regarding pits and remove the statement that the factor of safety for slope stability approaches infinity.

3. Demonstrate refuse strength characteristics has a cohesion component. The refused gradation indicates a granular material without a clay size fraction. As such, cohesion should be zero. Even if the claystones are incorporated from the roof and floor cuttings, are they homogeneously mixed with the refuse to achieve a consistent material in which cohesion can be counted on? Provide references for coal refuse friction angle as well.

4. A few areas in the proposed disposal area have original contours approaching 2:1 slopes. If the planned final contours are this steep, revise slope stability cross-section to the worst case scenario – which may be the longest, steepest condition.

ARP Map Review:

1. Show the location of the test pits on the ARP map.

2. ARP Map: Clearly show the stream buffer zones, so that disposal outside of buffer zones is easily discerned.

Please submit the required revisions within thirty (30) days of this letter to avoid delays in our review of your proposal. Should you require additional time, please do not hesitate to contact me. Failure to submit the required revisions in a timely manner may result in your proposal being returned without further action.

Sincerely,

R. Scott Stiteler
Permitting, Hydrology & Bonding Section

Cc: Jack A. Hamilton & Associates, Inc.
John Puterbaugh
Jeff Emmons
Scott McDiffitt
Mike Dillman

Ohio Department of Natural Resources

BOB TAFT, GOVERNOR | SAMUEL W. SPECK, DIRECTOR

Division of Mineral Resources Management
Michael L. Sponsler • Chief
1855 Fountain Square Court-Bldg. H-2
Columbus, Ohio 43224-1383
Phone (614) 265-6633 Fax: (614) 265-7999

February 25, 2002

American Energy Corporation
43521 Mayhugh Hill Road
Beallsville, Ohio 43716

Gentlemen:

The Division of Mineral Resources Management completed our review of your recent application to Revise a Permit (ARP) R-1159-4 in which you propose to allow coal waste disposal to the permitted mining and/or reclamation plan. The following revisions are required before we can further consider your request.

ARP Review:

1. Revise item 3 of the ARP to include all sections of the plan being revised by this ARP.

2. Page 2, item 8: Submit the required proof-of-publication.

3. Indicate the correct page number on the addendum to part 3, item E. (Page 14 instead of page 18)

4. The addendum to item 4 indicates in the second paragraph that the refuse will be covered with 4 feet of non-toxic compacted material. The fifth paragraph indicates that the refuse will be covered with 4 feet of non-toxic, low permeability material. Item 7 on the Att. 28 indicates that the top six inches of the 4 feet of non-toxic material will consist of soil and topsoil. Revise these responses for consistency as the soils/top soils are not low permeability materials and should not be compacted.

5. Revise the last statement of the item 4 addendum as the safety factor for these disposal areas is not approaching infinity as evidenced by the analysis results provided.

6. According to the item 4 addendum, portions of the pit areas will be left open for coal refuse disposal. Revise this discussion to describe the duration that the pit areas will be left open, measures to keep the pit areas from collecting water, and measures to be taken to ensure that the approved reclamation timetables are met.

7. Describe the plan for identifying, segregating and stockpiling the clay material to be uses to "seal" the refuse. In addition provide a demonstration that sufficient low permeability material exists on this area to place four feet below and above the refuse and twenty feet of low permeability material against the highwall.

8. Describe in detail where the spoil generated during mining, displaced by the 1,790,000 cubic yards of refuse added to the backfill, will be disposed.

Hydrology Review:

1. Addendum to ARP item 4: In the fourth paragraph, you indicate that placement of wastes will begin in the west end of the pit, southeast of test hole #1. Based on the location of test hole #1, this description does not appear accurate. Revise/clarify as necessary.

2. Addendum to Page 18 (Page14), E:

   a) In the next to last sentence of the next to last paragraph, you imply that the drainage control plan will not minimize the possibility of streamflow alteration and flooding. Revise.

   b) It does not appear that any wetland mitigation areas will be located on the area proposed for refuse disposal. However, clearly show or describe the locations of wetland mitigation for wetlands delineated on the original and adjacent area permits.

   c) Discuss the hydrologic impact of refuse disposal in relation to existing or future underground mining beneath the disposal areas.

3. Addendum to ARP item 4; Addendum to Page 18 (Page 14), E; Attachment 28, item 7; and/or Attachment 28, item 15:

   a) Low permeability material, with a target of 1×10^{-7} cm/sec, must completely surround the refuse, if sealing is the option chosen. Revise all narratives and plans to show and discuss a liner (on all sides) and a cap (on top) that is of a thickness and permeability sufficient to effectively seal the coal refuse.

   b) Quarterly Monitoring: Well W-7 is too far away to monitor impacts to Zone C due to the refuse disposal. In addition, you indicate in the response to Attachment 28, item 17, that this site will not be impacted by the proposed refuse disposal; therefore it does not represent a good monitoring location

for Zone C. No downdip monitoring of Zone A is proposed. D-8 and is too far downstream of the proposed disposal and is not shown on the ARP map. (Show this site on the ARP map.) Establish surface water and ground water sites that are closer to the proposed disposal area, in both updip and downdip positions. Monitoring wells should be installed if existing sites are too distant. Consider using the monitoring wells that have already been installed for the future refuse disposal project at this site. Submit a one-time water sample for all monitoring sites that have not been previously sampled. Show all monitoring sites on the ARP map.

c) Demonstrate that sufficient material exists to line, seal, cover, and isolate the refuse material.

d) The plan is to isolate the refuse material from contact with water. Therefore, demonstrate that placing the material four feet above the pit floor will be above any reestablished water table.

4. Attachment 28:

a) Item 2, Attachment 12: The analysis of the refuse material shows a relatively good material, with pH values of 6.18 and 7.57 S.U. and calcium carbonate deficiencies of –41.30 and –384.00 tons per 1000 tons. Indicate how representative this analysis is of the overall refuse, and what this says about the methods needed to sealing the material.

b) Item 10: Item 11 indicates that the "clay/silty clay" found in test pits 1, 2, 3, 4, 5, 6, and 8 will be used for sealant; however, only red clay in two test pits was analyzed for the parameters required by this item. Clarify, and/or provide analyses for all of the material that will be used as sealant.

c) Item 11: Note that only two options are given for disposing refuse material: neutralization or sealing. Since the refuse will not be neutralized, sealing is required. Sealing must involve surrounding the refuse with low permeability material (target 1×10^{-7} cm/sec). Revise plans and discussions to address completely sealing the refuse material.

d) Items 16 and 17: Correctly reference the page numbers of the addenda. Also, on the addendum to item 17, correctly identify the name of the applicant.

Engineer Review:

1. The ARP mentions that the clayey soils to be used for the cover material can achieve low permeability on the order of 1x10-8 cm/sec. However, the compaction required is 98% of Standard Proctor at moisture content 2% above optimum. Since the compaction of the material is not specified, the actual

permeability of the cover material is not known and is likely to be much less than 1x10-8 cm/sec. Therefore, rephrase the language of the ARP to state that water infiltration and leachate formation will be minimized because of the use of low permeability materials, not eliminated or limited to one inch per year as the ARP states. The ARP states the cover material will be compacted. Is this being specified as part of the design?

2. The refuse disposal is not contained entirely in pits. The cross-sections indicate the disposal is on the coal bench, not in a pit. Revise language regarding pits and remove the statement that the factor of safety for slope stability approaches infinity.

3. Demonstrate refuse strength characteristics has a cohesion component. The refused gradation indicates a granular material without a clay size fraction. As such, cohesion should be zero. Even if the claystones are incorporated from the roof and floor cuttings, are they homogeneously mixed with the refuse to achieve a consistent material in which cohesion can be counted on? Provide references for coal refuse friction angle as well.

4. A few areas in the proposed disposal area have original contours approaching 2:1 slopes. If the planned final contours are this steep, revise slope stability cross-section to the worst case scenario – which may be the longest, steepest condition.

ARP Map Review:

1. Show the location of the test pits on the ARP map.

2. ARP Map: Clearly show the stream buffer zones, so that disposal outside of buffer zones is easily discerned.

Please submit the required revisions within thirty (30) days of this letter to avoid delays in our review of your proposal. Should you require additional time, please do not hesitate to contact me. Failure to submit the required revisions in a timely manner may result in your proposal being returned without further action.

Sincerely,

R. Scott Stiteler

R. Scott Stiteler
Permitting, Hydrology & Bonding Section

Cc: Jack A. Hamilton & Associates, Inc.
John Puterbaugh
Jeff Emmons
Scott McDiffitt
Mike Dillman

Ohio Department of Natural Resources

BOB TAFT, GOVERNOR | SAMUEL W. SPECK, DIRECTOR

Ohio Department of Mineral Resources Management
Michael L. Sponsler, Chief
1855 Fountain Square Court-Bldg. H-3
Columbus, Ohio 43224-1383
Phone: (614) 265-6633 Fax: (614) 265-7999

Date: 01/22/2002

To: Appropriate Governmental Agencies

From: Treva Knasel, Application Manager

Re: Coal Mine Permit Revision, Permit or Application Number: R-1159-4

Applicant: AMERICAN ENERGY CORP
43521 Mayhugh Hill Rd.
Twp. Rd. 88
Beallsville, OH 43716

Telephone: (740) 926-9152

Date Deemed Complete: 01/14/2002

APPLICATION LOCATION:

COUNTY	TOWNSHIP	SECTION	LOTS	T	R	Quad
BELMONT	WAYNE	3		6	5	HUNTER
BELMONT	WAYNE	4		6	5	HUNTER

SUMMARY OF REVISION REQUESTED:
Coal Waste Treatment, Storage or Disposal

Application Filed at Location:

Belmont County Recorder's Office
Belmont County Courthouse
Main St.
St. Clairsville, OH 43950

The Division of Mineral Resources Management has received an application from the above named applicant to make a significant revision to their approved coal mining permit. The applicant is required by Ohio law to file a complete copy of the application for a permit revision at the office and address shown above. The complete application for a permit revision must remain on file for public review for a period of thirty (30) days following the last date of publication of their public notice.

Written comments concerning this application will be accepted by the Chief of the Division of Mineral Resources Management for a period of thirty (30) days following receipt of this notification. Written comments should be submitted to the Division of Mineral Resources Management, Permitting Section, 1855 Fountain Square, Building H-3, Columbus, Ohio 43224. Please be sure to include with any written comments the applicant's name and the respective application number listed above.

District Office: CAMBRIDGE

A7 Rev: 07/01/2001

Distribution List:

Division of Wildlife
Environmental Section
1840 Belcher Dr., Bldg. G-2
Columbus, OH 43224-1300

Office of Surface Mining
Eastland Professional Plaza
4480 Refugee Road, Suite 201
Columbus, OH 43232

U.S. Fish & Wildlife
Ecological Service
6950-H Americana Parkway
Reynoldsburg, OH 43068

MSHA
50985 National Road
St. Clairsville, OH 43950

USDA Forest Service
Attn: Minerals Programs Manager
Route #1, Box 132
Marietta, OH 45750

Mark Mann
Ohio EPA, Division of Surface Water
Lazarus Government Center
P.O. Box 1049
Columbus, OH 43216-1049

Ric Queen
Ohio EPA, Division of Surface Water
Lazarus Government Center
P.O. Box 1049
Columbus, OH 43216-1049

Scott Sutliff
Ohio EPA, Division of Drinking & Groundwater
Lazarus Government Center
P.O. Box 1049
Columbus, OH 43216-1049

Butch Grieszmer
Division of Natural Areas & Preserves
1889 Fountain Square Ct., Bldg. F-1
Columbus, OH 43224-1388

Jack A. Hamilton & Associates, Inc.
P.O. Box 471
342 High Street
Flushing, OH 43977

Al Rogalla, Chief, Regulatory Branch
U.S. Army Corps of Engineers, Pittsburgh District
William S. Moorhead Federal Bldg.
1000 Liberty Avenue
Pittsburgh, PA 15222-4186

Michael D. Gheen, Chief, Regulatory Branch
U.S. Army Corps of Engineers, Huntington District
502 Eighth Street
Huntington, WV 25701-2070

Bruce Goff
Ohio EPA, Southeast District Office
2195 Front Street
Logan, OH 43138

Belmont County Commissioners
Courthouse
Main Street
St. Clairsville, OH 43950

Belmont County Planning Commission
Courthouse
Main Street
St. Clairsville, OH 43950

Mark T. Davis, P.E.
ODOT, District 11
Roadway Services Engineer
2201 Reiser Ave., SW
New Philadelphia, OH 44663

James R. Graham, P.E.
ODOT, District 11
Highway Mgt. Dept.
2201 Reiser Ave., SW
New Philadelphia, OH 44663

Wayne Township Trustees
c/o Betty Lucas, Clerk
55709 County Hwy. 92
Beallsville, OH 43716

2/96

__X__ New Submittal
_____ Revised Submittal R- _____

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINES AND RECLAMATION

APPLICATION TO REVISE A COAL MINING PERMIT

Note: Refer to the Division's "General Guideline for Processing ARPs" and "Requirements for Specific Types of Common ARPs" for guidance on submitting and processing ARPs.

1. Applicant's Name American Energy Corporation

   Address 43521 Mayhugh Hill Road, Twp. Rd. 88

   City Beallsville State Ohio Zip 43716

   Telephone Number 740 - 926 - 9152

2. Permit Number D-1159

3. Section of mining and reclamation plan to be revised:

   PART 3, PAGE 19 ITEM A(7)(a)

4. Describe in detail the proposed revision and submit any necessary drawings, plans, maps, etc.:

   THIS REVISION IS BEING SUBMITTED TO REVISE THE RESPONSE TO THE ABOVE REFERENCED ITEM TO "YES", AND SUBMIT THE NECESSARY INFORMATION TO COMPLY WITH ATTACHMENT 28 AND PARAGRAPH (H), 1501:13-4-05.

   SEE ATTACHED ADDENDA.

5. Describe in detail the reason for requesting the revision:

   THIS REVISION IS BEING SUBMITTED TO ALLOW FOR DISPOSAL OF COAL REFUSE WITHIN THE WASHINGTON #12 COAL MINING PIT.

6. Will this revision constitute a significant alternation from the mining and reclamation operation contemplated in the original permit? __X__ Yes, ____ No.
   (**Note:** refer to paragraph (E) (2) of 1501:13-04-06 of the Ohio Administrative Code to determine if a revision is deemed significant.)

   If "yes," complete the following items 7 through 9.

AEC 10536

7. In the space below give the name and address of the newspaper in which the public notice is to be published.

   The Times Leader
   Legal Notice Department
   200 South 4th Street
   Martins Ferry, OH 43935

8. In the space below give the text of the public notice that is to be published. (Include the information required by paragraph (A)(1) of 1501:13-05-01 of the Ohio Administrative Code.)

   See Addendum to A.R.P., Item 8.

9. In the space below give the name and address of the public office where this application is to be filed for public viewing.

   Belmont County Courthouse
   Recorder's Office
   Main Street
   St.Clairsville, Ohio 43950

I, the undersigned, a responsible official of the applicant, do hereby verify the information contained in this revision request is true and correct to the best of my information and belief.

Robert D. Moore
Print Name

11-21-01
Date

Signature

President
Title

Sworn before me and subscribed in my presence this 21st day of November, 2001

NOTARIAL SEAL STATE OF OHIO

BARBARA L. RUSH
NOTARY PUBLIC, STATE OF OHIO
MY COMMISSION EXPIRES 9-01-04

Barbara L. Rush
Notary Public

FOR DIVISION USE ONLY

This request is hereby _____.

Chief, Division of Mines and Reclamation

Date

Addendum to A.R.P., Item 8.
American Energy Corporation

Public Notice

American Energy Corporation, 43521 Mayhugh Hill Road, Beallsville, Ohio 43716, has submitted an application to revise a coal mining permit #R-1159- To the Ohio Department of Natural Resources, Division of Mineral Resources Management. The permit area is located in Belmont County, Wayne Township, Sections 3 & 4, on the property of American Energy Corporation. The portion of the permit area to be affected by this revision encompasses 54.8 acres and is located on the Hunter7 ½ minute U.S.G.S. quadrangle map, approximately 3.4 miles north of the Village of Beallsville, Ohio. The application proposes to dispose of coal refuse within the Washington #12 coal mining pit.

The application is on file for public viewing at the Recorder's Office, Belmont County Courthouse, Main Street, St.Clairsville, Ohio 43950 and shall remain so for at least 30 days following the last date of publication of this notice. Written comments or requests for an informal conference may be filed with the Division of Mineral Resources Management, 1855 Fountain Square Court, Bldg. H-3, Columbus, Ohio 43224, within thirty days after the last date of publication of this notice.

ADDENDUM TO A.R.P., ITEM 4., AMERICAN ENERGY CORPORATION

American Energy Corporation is proposing to utilize a portion of Permit D-1159 as a coal refuse disposal site. See attached map and cross sections for location and detail. After coal removal is completed, a portion of the pit areas will be left open for coal refuse disposal, which will be generated by American Energy Corp.'s Century Mine (D-0425) located near Alledonia, Ohio.

Before disposal begins, non-toxic material will be placed on the pit floor to an elevation at least four feet above the top of the #12 coal seam. The refuse will be disposed of in two foot lifts using rubbed tired vehicles and/or sheepsfoot roller to meet compaction requirements of 90% of maximum dry density. In conjunction with the layering of coal refuse, a minimum of 20 feet of non-toxic material will be placed against the final highwall, being constructed as the lifts are completed. After the refuse lifts are completed, four feet of non-toxic compacted material will be placed over the refuse. The placement of the cover material completely over the disposal site will minimize surface water, ground water, and oxygen contact with the coal refuse thereby eliminating the formation of acid or toxic leachate. This approach will result in a negligible impact on the environment.

Based on the attached permeability tests, a permeability of 1×10^{-8} can be achieved. See Attachment 28 for physical and chemical analysis of the liner/cover material.

The coal refuse material will be hauled to the site by trucks and placement will begin at the west end of the #12 mining pit located south east of test hole #1, and will continue easterly. Disposal will then start on the east side of the proposed #12 mining pit located west of Permit D-0425, and will continue in a west, southwest direction. The open pits will have the capacity to store 1,790,000 cubic yards of refuse which amounts to approximately 2,092,700 tons.

As described above, the pit will be lined before placement of refuse material. The placement of the refuse material will consist of layering the refuse in two foot lifts and compacting with rubber tired vehicles and/or sheepsfoot roller. These lifts will be repeated vertically until the final proposed grade (approximate original contour) has been achieved. The refuse will be covered with a four foot layer of non-toxic, low permeability material. Topsoiling and seeding will be completed in the next appropriate planting season following placement of the cover material.

Since the refuse disposal are is contained entirely within a pit, a safety factor approaching infinity can be assumed.

ADDENDUM TO ATTACHMENT 14B, A.R.P., PERMIT D-0425
AMERICAN ENERGY CORPORATION

The first continuous zone of saturation underlying the proposed refuse disposal area occurs in Zone C. Zone C is approximately ninety (90) feet in vertical distance, at its closest point, below the bottom of the proposed refuse disposal area. Zone C has a vertical extent of approximately forty-five (45) feet max., and a lateral extent equal to the extent of the 'Cassville' Shale, with the Waynesburg #11 Coal seam as a bedding plane.

Temporal fluctuations are entirely dependent upon rainfall as the recharge of groundwater is confined to the immediate ridgetop areas. Groundwater flow directions will not be affected by the proposed refuse disposal operation. Due to the existing rock structure and topography, recharge of groundwater is confined to the immediate ridgetop areas. Discharge areas within the boundaries of the refuse disposal area can be seen in spring discharge elevations between 1143 and 1140 (Zone A), spring discharge and well static water level between the elevations of 1097 and 1060 (Zone B), and spring discharge and well static water level between the elevations of 995 and 950 (Zone C).

Zone A discharge ranges from a high of 1.5 gpm during "high flow" conditions to less than 1 gpm during "low flow" conditions.

Zone B discharge ranges from a high of 54 gpm during "high flow" conditions to <1 gpm during "low flow" conditions. Fluctuations in water levels in Zone B are illustrated by well DW-7A. The static water level in this well has ranged from a high of 6 feet (elevation 1076) to a low of 9 feet (elevation 1073).

Zone C discharge, based on flows from undeveloped springs, does not exceed <1 gpm. Static water levels at W-7 have ranged from a high of 22 feet (elevation 1040) to a low of 64 feet (elevation 998).

Zones A and B will be isolated from the refuse by 20 feet of non-toxic material which will be placed against the open highwall. Zone C will be isolated by its 90 feet in vertical distance between it and the bottom of the refuse area. Zone D is 238 feet below the proposed refuse disposal area. Zones C and D will not be affected by the proposed refuse disposal.

The uppermost aquifer system, and all zones of saturation above the uppermost aquifer system were determined by existing undeveloped spring elevations, and static water levels in existing wells utilizing a Fisher M-Scope static water level meter. The Generalized Section of Ohio, Division of Geological Survey, Table 1, as well as site specific information noted above, were utilized to define vertical extent of the separate zones of saturation.

See Permit D-1159 for Attachment 14B.

ADDENDUM TO PART 2, PAGE 18, ITEM E
AMERICAN ENERGY CORPORATION

The consequences of the proposed refuse disposal on the contents of total suspended and dissolved solids, total iron, total manganese, acidity, and pH will be minimal. The proposed disposal area is designed to reduce infiltration by utilizing materials of acceptably low permeability to underlie and cover the site. Compaction of the underlying area further reduces permeability, which minimizes seepage of effluent into surrounding strata. Adverse impact to the hydrologic balance will be minimal.

Water from the mining area is controlled by a series of drainage ditches and sediment ponds to minimize quality and quantity changes in the vicinity of the site. The drainage control plan also minimizes the possibility of stream flow alteration for off-site areas. All sediment control structures will be cleaned out when 60% design capacity is reached. Any standing water will be pumped to another existing structure. Wide track dozers will then move sediment to a point where it is accessible for a Gradall machine to collect and load it into trucks which will transport it to an approved refuse disposal site.

The refuse proposed to be disposed of is composed mainly of roof and floor material. Naturally occurring on-site materials will be used to underlie and cover the refuse material. This liner/cover material consists of clay/silty clay as shown in Test Pits 1, 2, 3, 4, 6, and 8. See attached test pit logs.

Undeveloped springs S-23 and S-24 are developed in Zone A. Dug well DW-7A, developed spring DS-10, and undeveloped springs S-1, S-2, S-3, S-5, S-20, S-25, S-26, and S-27 are developed in Zone B. Drilled well W-7, and undeveloped springs S-10 and S-22 are developed in Zone C. None of the undeveloped springs, or developed spring DS-10 are in use. W-7 and DW-7A are domestic (W-7) and agricultural (DW-7A) supplies located 1200 feet and 1000 feet, respectively, east of the proposed refuse disposal area. See Addendum to Attachment 14B for a more detailed discussion of Zones A, B, and C.

Within the proposed refuse disposal area, aquifer Zones A & B will be temporarily disturbed as coal removal, followed by pit floor and highwall lining commences, but this will have no affect on existing developed ground water sources. Legitimately-used developed supplies are protected by their distance from the proposed disposal area. The southeast dip of the strata will also help to protect these zones from impact. Measures to prevent water from Zones A & B from entering the refuse disposal area are shown on cross section A - A' through G - G' (lining of pit floor and highwall, covering with four feet of non-toxic, low permeability material).

Impact to Zones A & B will be negligible. Zone A will be intercepted during coal removal, however, its recharge zone will not be disturbed, and it occurs above the elevation of refuse disposal. Zone B may show some diminution, but should recover following mining, refuse disposal, and reclamation. Zone C occurs at least 90 feet below the proposed bottom of refuse disposal, which will quite effectively provide the recommended minimum five foot isolation distance between the

uppermost aquifer system underlying the site and the bottom of the refuse. Impacts to Zones C and D are not anticipated due to their respective locations, 90 feet and 238 feet below the proposed refuse disposal.

Zone A will be monitored quarterly at S-23. Zone B will be monitored quarterly at S-1 and DS-10. Zone C is currently being monitored quarterly for quality and quantity at W-7, per ODNR requirements. Surface water will be monitored at site D-8, as well as discharge from sediment ponds 001, 009, and 010.

See Attachment 28 for chemical analysis of refuse material and sealant material.

Total sediment yield from the area disturbed by refuse disposal will not differ from the sediment yield from the area disturbed by coal removal. Sediment yield will increase during mining due to newly exposed surface.

The surface will be less permeable during the initial construction of the highwall and pit floor liner which will lead to increases in peak flow in the immediate vicinity of the site. These changes will be minimal since the associated watershed is small. Chances of flooding and stream flow alteration for the small tributaries draining the site will not change significantly. The drainage control plan will not also minimize the possibility of flooding and stream flow alteration. Stream flow will be maintained by discharge from the sediment ponds.

The proposed activity should have no impact on ground and surface water availability. Mining activities have been ongoing in this area for many years, with no quantity problems noted or reported. No refuse will be disposed of within 100 feet of a stream channel, or, within the buffer zone of a stream.

TEST PIT LOGS
COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
WAYNE TOWNSHIP, BELMONT COUNTY, OHIO
23 AUGUST 2001

TP-1

Thickness (ft.)	Description
1.2	Silt loam, brown, rooted
0.7	Silty clay loam, brown
5.3	Clay, red (sampled for geotechnical tests)
7.2	Total pit depth (dry)

TP-2

Thickness (ft.)	Description
1.0	Silt loam, brown, rooted (at tree line)
2.8	Silty clay, brown
0.4	Clay w/weathered sandstone, brown
4.2	Total pit depth (dry, pit stopped in sandstone)

TP-3

Thickness (ft.)	Description
4.9	Clay, brown, saturated
4.4	Coal fines (old pond?), saturated
0.8	Clay, gray
10.1	Total pit depth (wet)

TP-4

Thickness (ft.)	Description
0.7	Silt loam, brown, rooted
1.3	Silty clay, brown
0.8	Clay w/limestone boulders
1.0	Clay, brown
4.2	Clay, red (sampled for geotechnical tests)
8.0	Total pit depth (dry)

TP-5

Thickness (ft.)	Description
3.2	Shaly limestone, brownish-gray (stripped)
3.2	Total pit depth (dry)

TP-6

Thickness (ft.)	Description
5.4	Clay, brown (saturated)
3.2	Clay, gray (seepage at top)
0.7	Clay, brown (saturated)
9.3	Total pit depth (wet)

TP-7

Thickness (ft.)	Description
0.8	Silt loam, brown, rooted
0.7	Clay, brown
1.0	Sandstone, brownish-gray
2.5	Total pit depth (dry, pit stopped in sandstone)

TP-8

Thickness (ft.)	Description
0.4	Silt loam, brown, rooted
2.8	Silty clay, brown
0.6	Clay, brown w/weathered sandstone
3.8	Total pit depth (dry, pit stopped in sandstone)

AMERICAN INSTITUTE OF PROFESSIONAL GEOLOGISTS
CERTIFICATE NUMBER
4599
AIPG
WILLIAM J. SIPLIVY
CERTIFIED PROFESSIONAL GEOLOGIST

Respectfully submitted:

William J. Siplivy

William J. Siplivy, P.E, C.P.G.

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINERAL RESOURCES MANAGEMENT

ATTACHMENT 28
(COAL WASTE DISPOSAL PLAN)

Applicant's Name AMERICAN ENERGY CORPORATION

1. The coal mine waste to be disposed of on the coal mining operation is from a: (check appropriate response)

   _____ Wash plant facility
   __X__ Tipple facility
   _____ Other (e.g. large pre-existing gob pile)

2. Submit an Attachment 12 for the material to include at a minimum: pH, percent of total or pyritic sulfur, neutralization potential, potential acidity, and calcium carbonate deficiency. **See Attachment 12**

3. State the size fractions and percentages of the size fractions of the waste material. **See Attachment 12.**

4. Submit as an addendum a stability analysis to address how placement of the waste material will not cause instability within the backfilled area. Include all necessary calculations and analyses. **See Attached Stability Analysis.**

5. State the estimated amount of refuse material in tons to be disposed of on the proposed permit area: 2,092,700

6. State the percent moisture and density of the refuse material, if the coal waste is from a wash plant.

   N/A

7. Describe how infiltration of water into the disposal area will be minimized.

In areas proposed to be utilized for refuse disposal, the highwall face will be reclaimed by placing a 20 foot thickness of non-toxic material, in 2 foot compacted lifts, between the highwall and the refuse. The entire pit floor will be covered with a non-toxic, low permeability material from the floor to an elevation 4 feet (min.) Above top of coal elevation. The entire disposal area surface will be covered with 4 feet of non-toxic material and sloped to drain. The upper six inches of the cover will consist of a moderately dry growth medium soil and topsoil. The cover material has been shown to exhibit a compacted permeability on the order of 10^{-8} cm/sec, and by developing the reclamation cover in this manner, the infiltration into the disposal area will be limited to approximately one (1) inch per year. Based on the small amount of anticipated infiltration after reclamation, the proposed disposal should have a minimal impact on the area ground water conditions.

04/94

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 12
(DRILLING-REPORT - SURFACE MINE)

Applicant's Name American Energy Corporation

(Check one: ___ core drilled ___ rotary air, X other (describe) Grab)

Test Hole # REFUSE MATERIAL

State Plane Coordinates X ___

Y ___

Lithologic Unit (1)	Thickness	pH	CaCo Deficiency (1000 tons)	Neutralization Potential (1000 tons)	Potential Acidity	Total or Pyritic Sulfur %	Physical Properties (2)			
Topsoil										
Subsoil							Compactible	Erodible	Color	Grain Size
Claystone	1.85	6.18	-41.30	117.00	75.60	2.42	Very	Very	Gray	F
Claystone, ~~Limestone,~~ & Shale	3.86	7.57	-384.00	438.00	54.40	1.74	V. S. M	V. S. M	Gray	F

___ Total Thickness ___ Surface Elevation of test hole

Coal Seam Information

NAME	NUMBER	TOTAL SULFUR %	PYRITE/MARCASITE SULFUR %
Roof Material	(Over #8 coal seam)	2.42%	2.18%
Floor Material	(Below #8 coal seam)	1.74%	1.49%

(1) If subsurface water was encountered, identify the stratum in which it was encountered by an asterick (*)
(2) Describe any observable physical properties of each stratum (e.g. color, grain size, compactibility, erodibility, etc.)

AEC 10545

04/94

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ATTACHMENT 12
(DRILLING-REPORT - SURFACE MINE)

Applicant's Name American Energy Corporation

(Check one: ___ core drilled ___ rotary air, X other (describe) Grab)

Test Hole # REFUSE MATERIAL SIZE FRACTIONS

State Plane Coordinates X _____

Y _____

Lithologic Unit (1)	Thickness	pH	CaCo Deficiency (1000 tons)	Neutralization Potential (1000 tons)	Potential Acidity	Total or Pyritic Sulfur %	Physical Properties (2)			
Topsoil										
Subsoil							Compactible	Erodible	Color	Grain Size
SIZE FRACTION	DISTRIBUTION									
Plus 2 inch SQ	40.31%									
2 x 1 inch SQ	26.77%									
1 x 1/2 inch SQ	23.17%									
½ in. SQ x 8 mesh	7.64%									
Minus 8 mesh	2.11%									
Cumulative	100%									

(Dry Basis)

_____ Total Thickness _____ Surface Elevation of test hole

Coal Seam Information

NAME	NUMBER	TOTAL SULFUR %	PYRITE/MARCASITE SULFUR %

(1) If subsurface water was encountered, identify the stratum in which it was encountered by an asterick (*)
(2) Describe any observable physical properties of each stratum (e.g. color, grain size, compactibility, erodibility, etc.)

AEC 10546

American Energy Corporation
Century Mine

Stability Analysis of Coal Refuse as Highwall Backfill

The stability of the coal refuse backfill has been calculated using the Rotational Equilibrium Analysis of Multilayered Embankments (REAME) computer program developed by Dr. Yang H. Huang, Sc.D. of the University of Kentucky. The REAME program is a personal computer adaptation based on a variety of slope stability analysis procedures. The simplified Bishop method of slope evaluation was used in this analysis.

The strata underlying the #12 coal seam was determined to be gray claystone. The material that will be used as a liner material under and around the coal refuse will be a mixture of brown and gray clay. Conservative strength values for the soils were taken from page 36 of *Stability Analysis of Earth Slopes* by Dr. Yang H. Huang, Sc.D. The following coefficients were used for the claystone: cohesion = 1400 psf, phi angle = 32° and a unit weight of 109 pcf. The clay liner material was assumed to be weaker with a cohesion of 500 psf, a phi angle of 30° and a unit weight of 107 pcf. The values used for the coal refuse were: cohesion = 10 psf, phi angle = 32° and unit weight = 100 psf.

The phreatic surface was assumed to run along the top of the #12 coal seam and then down along the top of the claystone. The parameters above and a seismic coefficient of 0.05 were utilized to check the stability of the highwall backfill under a "worst case" condition. A minimum safety factor of 1.52 was determined by the REAME program. Please refer to the attached output sheets and drawings for more information.

Donald M. Brafford, P.E.

STATE OF OHIO
DONALD M.
BRAFFORD
E-29449
REGISTERED
PROFESSIONAL ENGINEER

REAME (ROTATIONAL EQUILIBRIUM ANALYSIS OF MULTILAYERED EMBANKMENTS)
THIS 2000 VERSION (REAME2k) IS LICENSED BY CIVIL ENGINEERING SOFTWARE CENTER
TO: Jack A. Hamilton & Associates, Inc.

INPUT FILE NAME -C:\Reamedat\625SCRHW.DAT

TITLE -Century Mine - Highwall Backfill Stability

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1

NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 0

TWO-DIMENSIONAL ANALYSIS (THREED = 0)

CASE NO. 1 SEISMIC COEFFICIENT (SEIC) =0.050

NO. OF BOUNDARY LINES (NBL) = 4

NO. OF POINTS ON BOUNDARY LINE 1 = 3
1 X COORD.=-100 Y COORD.= 1065
2 X COORD.= 0 Y COORD.= 1065
3 X COORD.= 500 Y COORD.= 1065

NO. OF POINTS ON BOUNDARY LINE 2 = 4
1 X COORD.= 71 Y COORD.= 1085
2 X COORD.= 260 Y COORD.= 1085
3 X COORD.= 262 Y COORD.= 1089
4 X COORD.= 276 Y COORD.= 1150

NO. OF POINTS ON BOUNDARY LINE 3 = 5
1 X COORD.= 71 Y COORD.= 1085
2 X COORD.= 97 Y COORD.= 1089
3 X COORD.= 240 Y COORD.= 1089
4 X COORD.= 253 Y COORD.= 1138
5 X COORD.= 276 Y COORD.= 1150

NO. OF POINTS ON BOUNDARY LINE 4 = 9
1 X COORD.=-100 Y COORD.= 1075
2 X COORD.= 0 Y COORD.= 1075
3 X COORD.= 55 Y COORD.= 1080
4 X COORD.= 71 Y COORD.= 1085
5 X COORD.= 276 Y COORD.= 1150
6 X COORD.= 286 Y COORD.= 1155
7 X COORD.= 383 Y COORD.= 1170
8 X COORD.= 425 Y COORD.= 1175
9 X COORD.= 500 Y COORD.= 1180

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000	0.000				
2	0.000	2.000	4.357			
3	0.154	0.000	3.769	0.522		
4	0.000	0.091	0.313	0.317	0.500	0.155
	0.119	0.067				

AEC 10548

MIN. DEPTH OF TALLEST SLICE (DMIN) = 1
NO. OF RADIUS CONTROL ZONES (NRCZ) = 1

RADIUS DECREMENT (RDEC) FOR ZONE 1 = 0
NO. OF CIRCLES (NCIR) FOR ZONE 1 = 5
ID NO. FOR FIRST CIRCLE (INFC) FOR ZONE 1 = 1
NO. OF BOTTOM LINES (NOL) FOR ZONE 1 = 1

LINE NO. (LINO)	BEG. NO. (NBP)	END NO. (NEP)
1	1	3

UNIT WEIGHT OF WATER (GW) = 62.4

SOIL NO.	COHESION	FRIC. ANGLE	UNIT WEIGHT
1	1400	32	109
2	500	30	107
3	10	32	100

USE PHREATIC SURFACE
USE GRID
NO. OF SLICES (NSLI) = 10
NO. OF ADD. CIRCLES (NAC) = 3
ANALYSIS BY SIMPLIFIED BISHOP METHOD (MTHD=2)
NUMBER OF FORCES (NFO)= 0
SOFT SOIL NUMBER (SSN)= 0

NO. OF POINTS ON WATER TABLE (NPWT) = 7

1	X COORD.=-100	Y COORD.= 1075
2	X COORD.= 0	Y COORD.= 1075
3	X COORD.= 55	Y COORD.= 1080
4	X COORD.= 71	Y COORD.= 1085
5	X COORD.= 260	Y COORD.= 1085
6	X COORD.= 262	Y COORD.= 1089
7	X COORD.= 500	Y COORD.= 1089

NO. OF SOILS WITH DIFFERENT WATER TABLE (NSDW) = 0
NO. OF SOILS WITH DIFFERENT PORE PRESSURE RATIO (NSDP) = 0

INPUT COORD. OF GRID POINTS 1, 2,AND 3

POINT 1 X COORD. = 40 Y COORD. = 1395
POINT 2 X COORD. = 40 Y COORD. = 1145
POINT 3 X COORD. = 240 Y COORD. = 1145

X INCREMENT (XINC) = 5 Y INCREMENT (YINC) = 5
NO. OF DIVISIONS BETWEEN POINTS 1 AND 2 (ND12) = 5
NO. OF DIVISIONS BETWEEN POINTS 2 AND 3 (ND23) = 4
ONLY A SUMMARY TABLE IS PRINTED (NPRT = 0)
SLICES WILL BE SUBDIVIDED

AUTOMATIC SEARCH WILL FOLLOW AFTER GRID

FACTORS OF SAFETY BASED ON GRID

IN THE FOLLOWING TABLE, WARNING INDICATES HOW MANY TIMES THE MAXIMUM RADIUS IS LIMITED BY THE END POINTS OF GROUND LINES.

AEC 10549

CENTER X COORDINATE	CENTER Y COORDINATE	NO. OF CIRCLE TOTAL	CRITIC.	RADIUS	LOWEST F.S.	WARNING
40	1395	8	5	309.897	1.786	0
40	1345	8	6	260.628	1.821	0
40	1295	8	7	211.593	1.900	0
40	1245	5	1	180.000	4.853	0
40	1195	5	1	130.000	5.730	0
40	1145	5	1	80.000	7.499	0
90	1395	8	5	297.807	1.771	0
90	1345	8	5	249.678	1.780	0
90	1295	8	5	201.549	1.791	0
90	1245	8	5	153.419	1.809	0
90	1195	8	5	105.290	1.839	0
90	1145	8	6	55.734	1.902	0
140	1395	11	6	305.091	2.525	0
140	1345	8	6	234.937	1.782	0
140	1295	8	6	186.925	1.796	0
140	1245	8	6	138.913	1.818	0
140	1195	8	7	88.600	1.853	0
140	1145	8	7	40.705	1.954	0
190	1395	11	8	304.971	2.910	0
190	1345	11	3	252.749	2.831	0
190	1295	11	3	203.685	2.734	0
190	1245	8	7	122.895	1.826	0
190	1195	8	7	75.000	1.879	0
190	1145	8	8	24.165	2.033	0
240	1395	11	7	304.311	3.374	0
240	1345	11	7	254.647	3.329	0
240	1295	11	7	205.209	3.298	0
240	1245	11	8	152.375	3.329	0
240	1195	11	4	84.266	3.438	0
240	1145	8	8	9.809	2.560	0

GRID IS EXPANDED AS FOLLOWS SO MINIMUM FACTOR OF SAFETY FALLS WITHIN THE GRID

40	1445	14	5	358.026	1.777	0
90	1445	8	5	345.936	1.764	0
140	1445	11	9	354.039	2.658	0
190	1445	11	8	353.917	2.999	0
240	1445	11	2	355.723	3.426	1
40	1495	8	5	406.155	1.770	0
90	1495	11	8	405.295	2.449	0
140	1495	11	3	405.988	2.744	0
190	1495	11	8	403.153	3.092	0
240	1495	5	1	408.442	3.487	1

LOWEST FACTOR OF SAFETY AT EACH GRID POINT IS TABULATED BELOW

COORDINATE	40.000	90.000	140.000	190.000	240.000
1495.000	1.770	2.449	2.744	3.092	3.487
1445.000	1.777	1.764	2.658	2.999	3.426
1395.000	1.786	1.771	2.525	2.910	3.374
1345.000	1.821	1.780	1.782	2.831	3.329
1295.000	1.900	1.791	1.796	2.734	3.298
1245.000	4.853	1.809	1.818	1.826	3.329
1195.000	5.730	1.839	1.853	1.879	3.438
1145.000	7.499	1.902	1.954	2.033	2.560

AEC 10550

MINIMUM FACTORS OF SAFETY OCCUR AT THE FOLLOWING 2 CENTERS:

FACTOR OF SAFETY = 1.770 AT (40.000,1495.000)
FACTOR OF SAFETY = 1.764 AT (90.000,1445.000)

AUTOMATIC SEARCH WILL BE MADE ONLY ON THE CENTER WITH THE SMALLEST F.S. MORE SEARCHES FROM OTHER CENTERS MAY BE NEEDED TO ENSURE THAT MINIMUM F.S. IS OBTAINED.

AT POINT (90 1445) RADIUS 345.936 THE MINIMUM FACTOR OF SAFETY IS 1.764

FACTORS OF SAFETY BASED ON SEARCH

IN THE FOLLOWING TABLE, WARNING INDICATES HOW MANY TIMES THE MAXIMUM RADIUS IS LIMITED BY THE END POINTS OF GROUND LINES.

CENTER X COORDINATE	CENTER Y COORDINATE	NO. OF CIRCLE TOTAL	CRITIC.	RADIUS	LOWEST F.S.	WARNING
90	1445	8	5	345.936	1.764	0
95	1445	8	5	344.727	1.764	0
100	1445	8	6	341.238	1.769	0
95	1450	8	5	349.540	1.763	0
95	1455	8	6	352.125	1.769	0
100	1450	8	6	346.040	1.769	0
90	1450	8	5	350.749	1.763	0
96.25	1450	8	6	347.003	1.769	0
93.75	1450	8	5	349.843	1.763	0
95	1451.25	8	5	350.744	1.763	0
95	1452.5	8	6	349.725	1.769	0
96.25	1451.25	8	6	348.203	1.769	0
93.75	1451.25	8	5	351.046	1.763	0

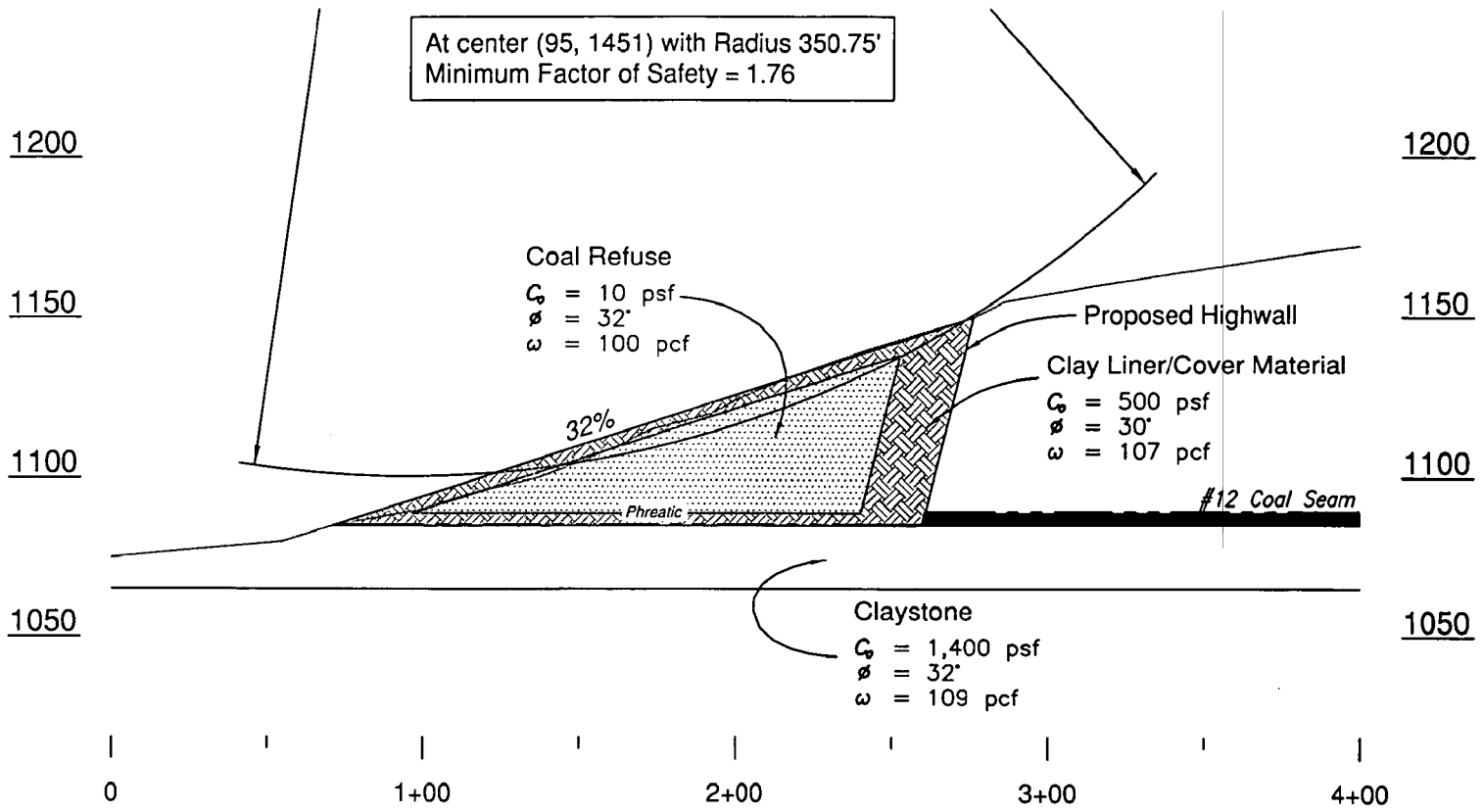
AT POINT (95, 1451.25) RADIUS 350.744 THE MINIMUM FACTOR OF SAFETY IS 1.763

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	SLICE HEIGHT	WATER HEIGHT	BOTTOM SINE	TOTAL WEIGHT	EFFECT. WEIGHT	RESIST. MOMENT	DRIVING MOMENT
1	3	14.948	1.678	0.000	.103	.251E+04	.251E+04	.597E+06	.134E+06
2	3	14.948	4.548	0.000	.145	.680E+04	.680E+04	.152E+07	.464E+06
3	3	14.948	6.759	0.000	.188	.101E+05	.101E+05	.221E+07	.839E+06
4	3	14.948	8.297	0.000	.231	.124E+05	.124E+05	.267E+07	.121E+07
5	3	14.948	9.144	0.000	.273	.137E+05	.137E+05	.290E+07	.154E+07
6	3	14.948	9.274	0.000	.316	.139E+05	.139E+05	.289E+07	.176E+07
7	3	14.948	8.658	0.000	.359	.129E+05	.129E+05	.265E+07	.184E+07
8	3	14.948	7.258	0.000	.401	.108E+05	.108E+05	.219E+07	.170E+07
9	3	14.948	5.028	0.000	.444	.752E+04	.752E+04	.150E+07	.129E+07
10	3	14.948	1.912	0.000	.486	.286E+04	.286E+04	.592E+06	.531E+06
							SUM	.197E+08	.113E+08

AT CENTER (95.000 , 1451.250) WITH RADIUS 350.744 AND SEIS. COEFF. 0.05
FACTOR OF SAFETY BY SIMPLIFIED BISHOP METHOD IS 1.763

AEC 10551



AMERICAN ENERGY CORPORATION

Highwall Backfill Stability Section

Scale: 1" = 60'

I HEREBY CERTIFY THAT THIS SLOPE STABILITY ANALYSIS HAS BEEN PREPARED TO MEET THE APPLICABLE REQUIREMENTS OF RULE 1501: 13-09-09 OF THE ADMINISTATIVE CODE.

STATE OF OHIO
DONALD M. BRAFFORD
E-29449
REGISTERED
PROFESSIONAL ENGINEER

AEC 10552

8. Specifically describe how the disposal plan will comply with paragraph (J) of rule 1501:13-9-14 of the Administrative Code.

See response to Attachment 28, Page 1, Item 7.

9. Does the disposal plan propose to neutralize wash plant waste with spoil material? _____ Yes, __X__ No. If "yes," submit as an addendum an acid/base account of the refuse and spoil materials.

10. Does the disposal plan propose to seal the disposal area? __X__ Yes, _____ No. If "yes," submit an Attachment 12 for the sealant material which includes pH, percent of total or pyritic sulfur, neutralization potential, potential acidity, calcium carbonate deficiency, and lithology.

See Sealant Material Attachment 12.

11. If a sealant material is to be used, submit a permeability analysis of the material to be used as a sealant. Also, address below how the sealant material will be compacted and the anticipated permeability coefficient to be achieved following compaction.

Cover materials termed "clay/silty clay" on Attachment 12 will be comprised of soils found in Test Pits 1, 2, 3, 4, 6, and 8. Lab permeability test yielded a value on the order of 1×10^{-8}. Re-working of the soil will continue until a uniform, in-place weight is achieved. Over compaction of the soil will be avoided because some settlement of the refuse is expected. Unit weights can be provided by compacting to 95% Standard Proctor Density. Placement of these soils will be accomplished using either truck haulage or tractor scraper haulage. The soils will be spread by bulldozer and uniformly compacted by a light to medium weight sheepsfoot type roller.

12. Show the location of the coal mine waste storage and disposal areas and the location of cross sections on the application map. **See A.R.P. Application Map**

13. Describe how the disposal plan will meet requirements of paragraph (J)(3) of rule 1501:13-9-04 of the Administrative Code.

During active refuse disposal, all water impacted by the refuse material will be passed through sediment Ponds 001, 009, or 010 for treatment, if necessary, prior to discharge. When disposal operations are completed, refuse material will be buried under at least 4 feet of non-toxic material, and sloped to drain.

TRA-DET INC.
P. O. BOX 2019
WHEELING, WV 26003-0219
(304) 547-9094
FAX: (304) 547-9097

SHIPPING ADDRESS
RD #2, BOX 227A
BATTLE RUN ROAD
TRIADELPHIA, WV 26059-9609

STRATA ANALYSIS
SAMPLES RECEIVED 22 OCTOBER, 2001

SAMPLE NO. INTERVAL DESCRIPTION	TOTAL MOISTURE %	pH S.U.	NEUTRALIZATION POTENTIAL TONS/1000 TONS AS CACO3	TOTAL SULFUR %	PYRITIC SULFUR %	POTENTIAL ACIDITY TONS/1000 TONS AS CACO3 (TOTAL SULFUR)	POTENTIAL ACIDITY TONS/1000 TONS AS CACO3 (PYRITIC SULFUR)	CACO3 DEFICIENCY TONS/1000 TONS AS CACO3 (TOTAL SULFUR)	CACO3 DEFICIENCY TONS/1000 TONS AS CACO3 (PYRITIC SULFUR)
C-110623 TP-4 REDDISH BROWN SILTY CLAY	15.39	4.93	1.84	0.05	0.10	1.56	3.13	-0.28	1.29
C-110624 TP-1 REDDISH BROWN CLAY	19.78	7.00	8.38	0.08	0.24	2.50	7.50	-5.88	-0.88

PRESTON R. MOCZEK 11/19/01

NOTE:
Sulfur analysis is based on high temperature combustion that causes the Sulfur bearing compounds to breakdown, converting the Sulfur to Sulfur Dioxide for subsequent Infrared absorption and detection. With inorganic materials such as soils, the combustion and sulfur release process may not go to completion; resulting in Total Sulfur concentrations being less than the sum of the forms of Sulfur. In such cases it is suggested to place more reliance on the Forms of Sulfur Analysis.

Permeability Test Report

ASTM D 5084 - Method C

Boring: TP-2

Press Tube: No

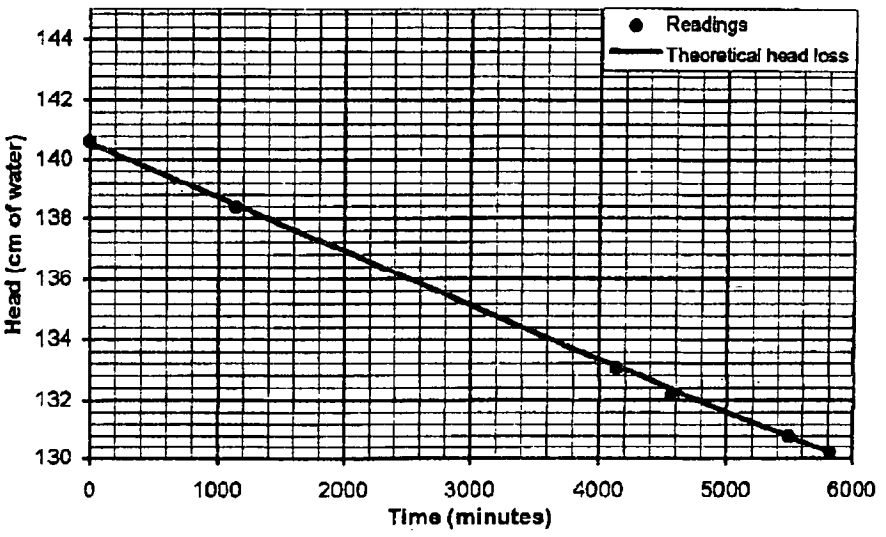
Sample: Bag Sample (Brown)

Depth:

Liquid Limit	40
Plasticity Index	19
Specific Gravity	2.7

Permeant Liquid
De-aired, deionized water

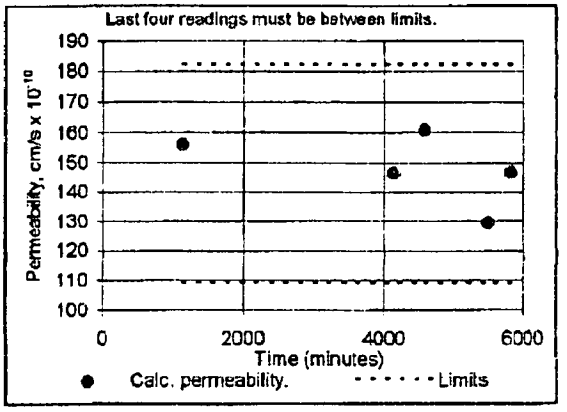
Temp. (°C)
21.0



	Diameter (cm)	Area, A (cm^2)	Length, L (cm)	Moisture (%)	Dry Density (pcf)	Saturation (%)
Initial	7.148	40.12	7.668	25.2	98.3	95.3
Final	7.148	40.12	7.668	26.4	98.3	99.9

Chamber Pressure (psi)	Backpressure (psi)		Consolidation Stress (psi)		Hydraulic Gradient (-)		
	Inflow	Outflow	Max.	Min.	Max.	Min.	Avg.
60.0	58.0	56.0	4.0	2.0	18.3	17.0	17.7

Date	Time	Buret Readings Inflow	Buret Readings Outflow	Flow Ratio	Head, h (cm)	$k_{20°C}$ (cm/sec)
9/28/01	12:36	1.9	16.1	-----	140.6	-----
9/29/01	7:45	2.7	15.3	1.00	138.4	1.6E-08
10/1/01	9:35	4.6	13.4	1.00	133.0	1.5E-08
10/1/01	16:55	4.9	13.1	1.00	132.2	1.6E-08
10/2/01	8:13	5.4	12.6	1.00	130.8	1.3E-08
10/2/01	13:40	5.6	12.4	1.00	130.2	1.5E-08



$$k_{20°C} = R_T \frac{aL}{2At} \ln\left(\frac{h_1}{h_2}\right) = 1.5E\text{-}08 \text{ cm/sec}$$

a - Area of burets (0.71 cm^2)
t - Elapsed time between readings
R_T - Temperature correction factor = (0.980)

Remarks:
Sample was remolded to 98% of standard moisture density curve maximum dry density @ 2% wet of optimum moisture content.

DLZ

Client: William J. Siplivy, P.E., CPG
Project: Century Mine
Job No: 0121-4543.00

Permeability Test Report

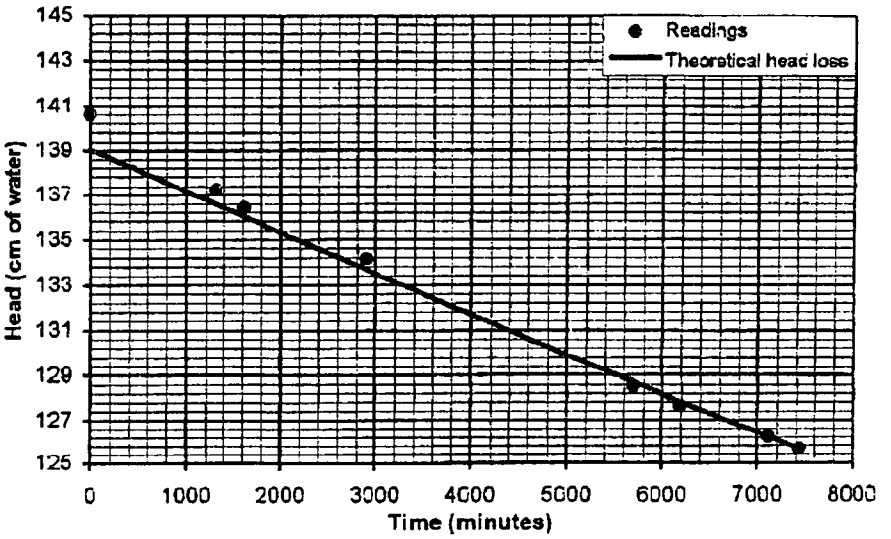
ASTM D 5084 - Method C

Boring:	TP-1
Press Tube:	No
Sample:	Bag Sample (Red Clay)
Depth:	

Liquid Limit	39
Plasticity Index	17
Specific Gravity	2.7

Permeant Liquid
De-aired, deionized water

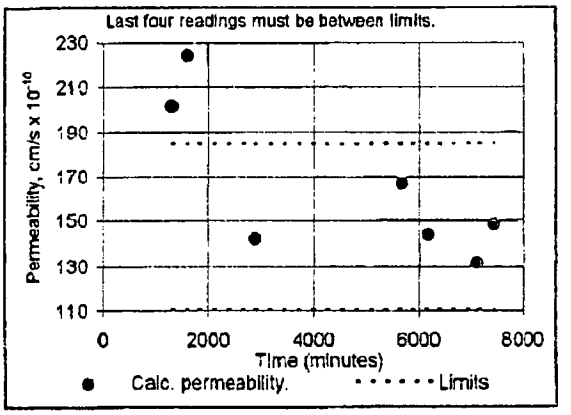
Temp. (°C)
21.0



	Diameter (cm)	Area, A (cm^2)	Length, L (cm)	Moisture (%)	Dry Density (pcf)	Saturation (%)
Initial	7.163	40.30	7.564	24.2	99.3	93.9
Final	7.163	40.30	7.564	25.8	99.3	100.0

Chamber Pressure (psi)	Backpressure (psi)		Consolidation Stress (psi)		Hydraulic Gradient (-)		
	Inflow	Outflow	Max.	Min.	Max.	Min.	Avg.
60.0	58.0	56.0	4.0	2.0	18.6	16.6	17.6

Date	Time	Buret Readings Inflow	Buret Readings Outflow	Flow Ratio	Head, h (cm)	$k_{20°C}$ (cm/sec)
9/27/01	9:40	3.2	18.8	-----	140.6	-----
9/28/01	7:36	4.4	17.6	1.00	137.3	2.0E-08
9/28/01	12:36	4.7	17.3	1.00	136.4	2.2E-08
9/29/01	9:55	5.5	16.5	1.00	134.1	1.4E-08
10/1/01	8:35	7.5	14.5	1.00	128.5	1.7E-08
10/1/01	16:55	7.8	14.2	1.00	127.7	1.4E-08
10/2/01	8:12	8.3	13.7	1.00	126.3	1.3E-08
10/2/01	13:40	8.5	13.5	1.00	125.7	1.5E-08



$$k_{20°C} = R_T \frac{aL}{2At} \ln\left(\frac{h_1}{h_2}\right) = \mathbf{1.5E\text{-}08} \quad \mathbf{cm/sec}$$

a - Area of burets (0.71 cm^2)
t - Elapsed time between readings
R_T - Temperature correction factor = (0.980)

Remarks:
Sample was remolded to 98% of standard moisture density curve maximum dry density @ 2% wet of optimum moisture content.

DLZ

Client: William J. Slplivy, P.E., CPG
Project: Century Mine
Job No: 0121-4543.00

14. Submit a cross section showing the elevation, final profile, saturated zones (existing and proposed), and reclaimed surface profile of the disposal area.

See Cross Sections A - A' through G - G'.

15. Identify surface and ground water monitoring sites which will specifically determine hydrologic impact which may proximately occur as a result of the disposal plan. If monitoring wells are to be constructed as part of this plan, submit information as to well construction, development, and design.

Surface water site D-8, and sediment Ponds 001, 009, and 010, and ground water sites S-1, DS-10, and S-23 will be monitored quarterly for quality and quantity to determine hydrologic impact as a result of the proposed disposal plan.

16. Ensure that Part II, item E of the permit application addresses the probable hydrologic consequences of the disposal area on the hydrologic balance of the area. Specifically address changes in ground water and surface water quality in detail.

See Addendum to Part 2, Page 18, Item E

17. Submit a detailed assessment plan for the disposal area and ensure that Part II, items F(1) and F(2) of the permit application identify surface and ground water supplies which may be adversely affected by the disposal area and acceptable alternative sources.

See Addendum to Part 2, Page 18, Item E, and Addendum to Part 2, Page 18, Item F.

18. If the material to be disposed is slurry, then submit data characterizing soil materials to be utilized in construction, if applicable.

N/A, No slurry disposal, coarse refuse only.

ADDENDUM TO ATTACHMENT 28, PAGE 3, ITEM 17.,
AMERICAN ENERGY CORPORATION

Legitimately-used ground water supplies DW-7A and W-7 will not experience contamination, diminution, or interruption as a result of the proposed refuse disposal. Their distance from the proposed refuse disposal area, as well as dip of the strata will protect these sources. Monitoring of sediment ponds, and treatment if necessary, will protect surface water in the vicinity of the proposed disposal. See approved permit D-1159 and D-1159-1 responses Part 2, Items F(1) and F(2).

Rights of present ground water users will be respected and protected by measures as described in the sealing plan. Based on the measures to be undertaken to minimize the impact of the refuse disposal area on surface and ground water, Bennoc, Inc. does not anticipate that the rights of present users will be affected. However, if users rights are infringed upon, an alternate source will be provided. If the quality and quantity of water available for domestic use is diminished, alternate water sources within the underlying aquifer could be tapped by drilling and casing to a greater depth, depending on the quality and quantity required.

19. Describe in detail the monitoring plan and analytical procedures to be followed for this disposal plan.

Ground and surface water sites as listed in item 15. above will be monitored quarterly for quality and quantity. See A.R.P. Application Map for location of these sites. Pond monitoring will be conducted as required by NPDES/Stormwater General Permit OHM000001, Facility No.3GM00018. Analytical procedures as identified by the U.S. EPA, Methods for Chemical Waste Analysis of Water and Waste, will be utilized for all water quality analysis.

20. Identify the parameter limits and frequencies to be met as set by the OEPA by the disposal area, if different from the NPDES/NSPS requirements.

NPDES/Stormwater General Permit No. OHM000001, Facility No. 3GM00018 parameter limits and frequency requirements for monitoring at Ponds 001, 009, and 010 will be observed.

21. If required per the modified MOA, submit an OEPA Application for Permit to Install or Plan Approval (Form 4309) as an addendum to this attachment.

N/A

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-3A

Collar Elevation (feet, msl): 1163.04
Location: N 694,963.93 E 2,413,390.24
Date Started: 22 March 2001
Date Completed: 23 March 2001
Water Depth: 209.68 feet
Water Elevation: 953.36 feet, msl

Well Materials List

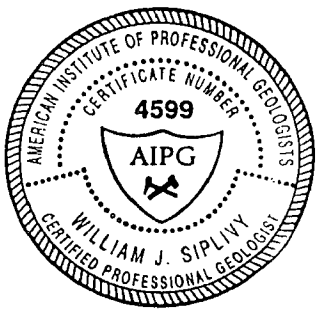
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 47 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 5 bags
11. Installation method: Gravity

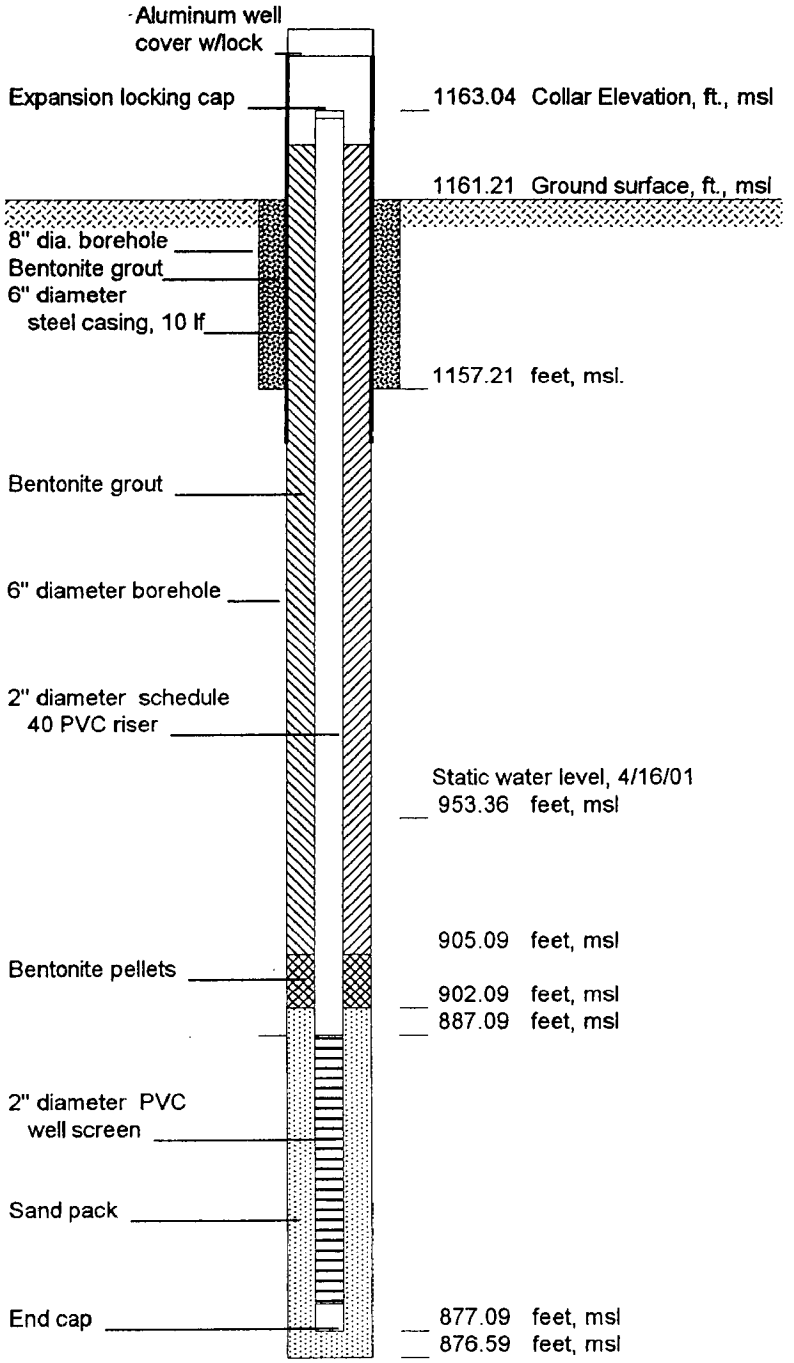
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-3A.WK4

WJS

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-3B

Collar Elevation (feet, msl): 1163.22
Location: N 694,960.31 E 2,413,398.70
Date Started: 23 March 2001
Date Completed: 23 March 2001
Water Depth: 85.04 feet
Water Elevation: 1078.18 feet, msl

Well Materials List

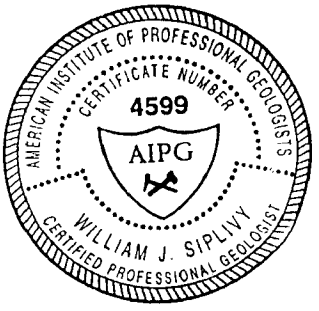
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 15 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

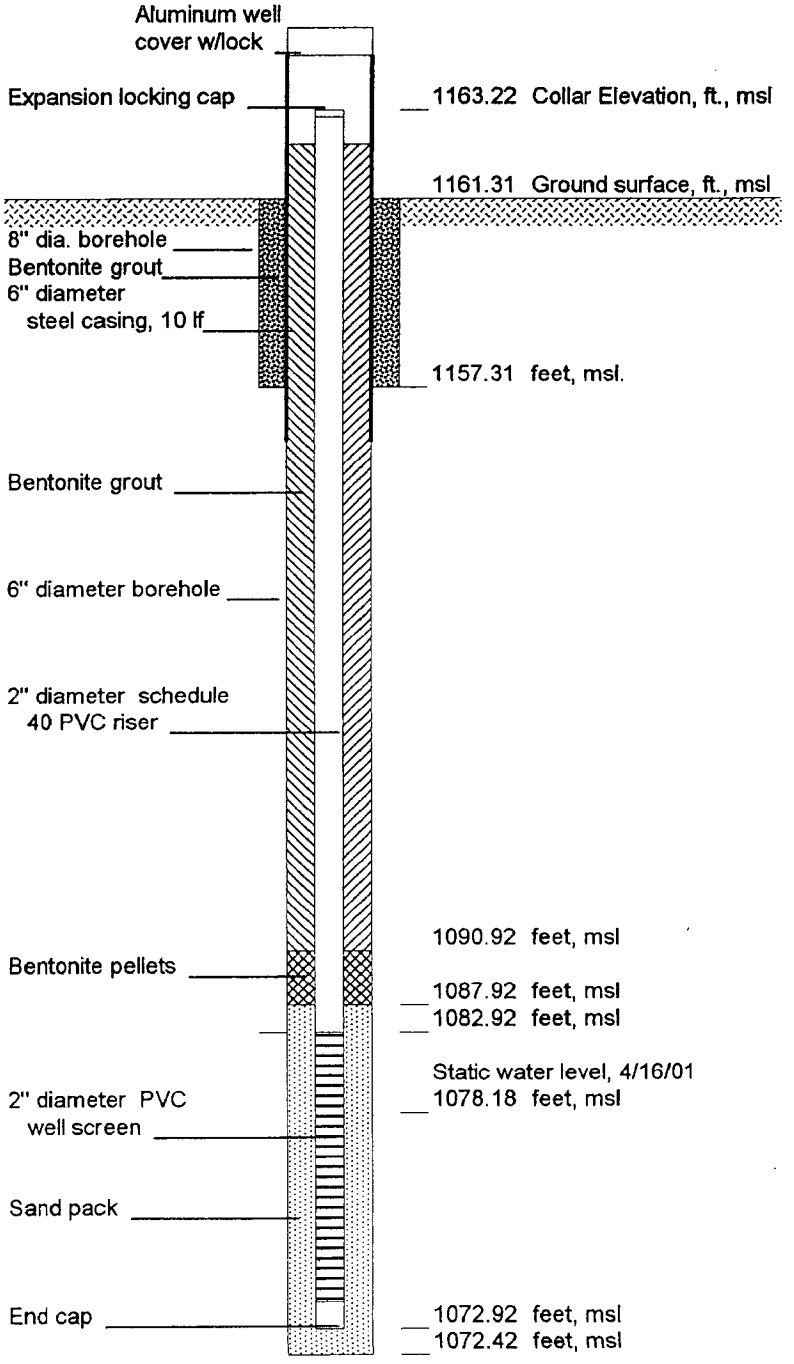
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-3B.WK4

WJS

AEC 10561

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-3C

Collar Elevation (feet, msl): 1162.35
Location: N 694,958.80 E 2,413,381.85
Date Started: 26 March 2001
Date Completed: 26 March 2001
Water Depth: 20.15 feet
Water Elevation: 1142.2 feet, msl

Well Materials List

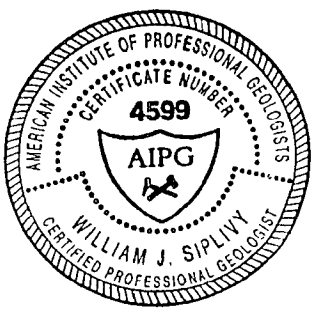
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 2 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

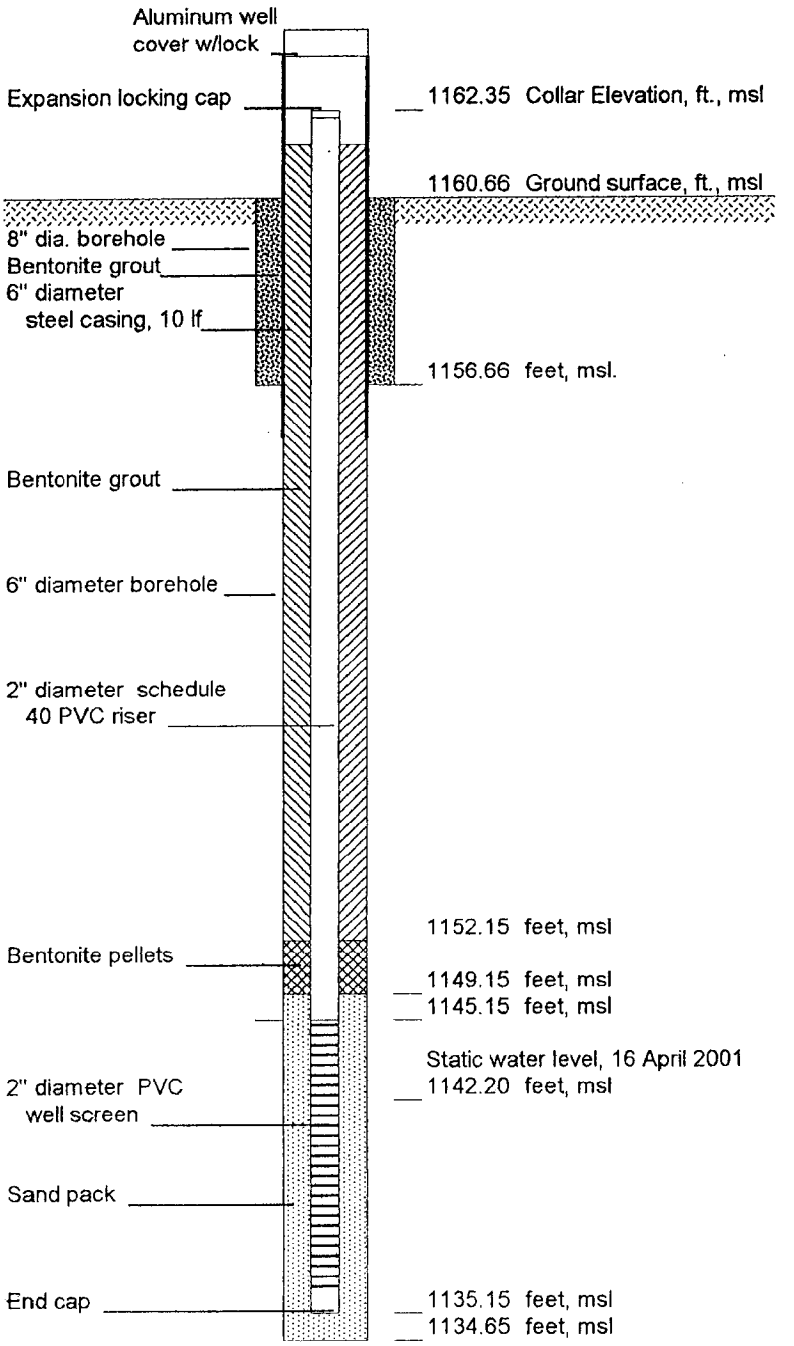
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-3C.WK4

WJS

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-4A

Collar Elevation (feet, msl): 1154.06
Location: N 696,720.93 E 2,412,001.29
Date Started: 27 March 2001
Date Completed: 29 March 2001
Water Depth: 145.05 feet
Water Elevation: 1009.01 feet, msl

Well Materials List

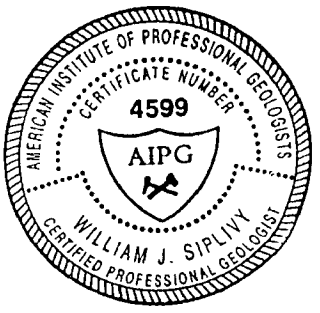
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 50 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

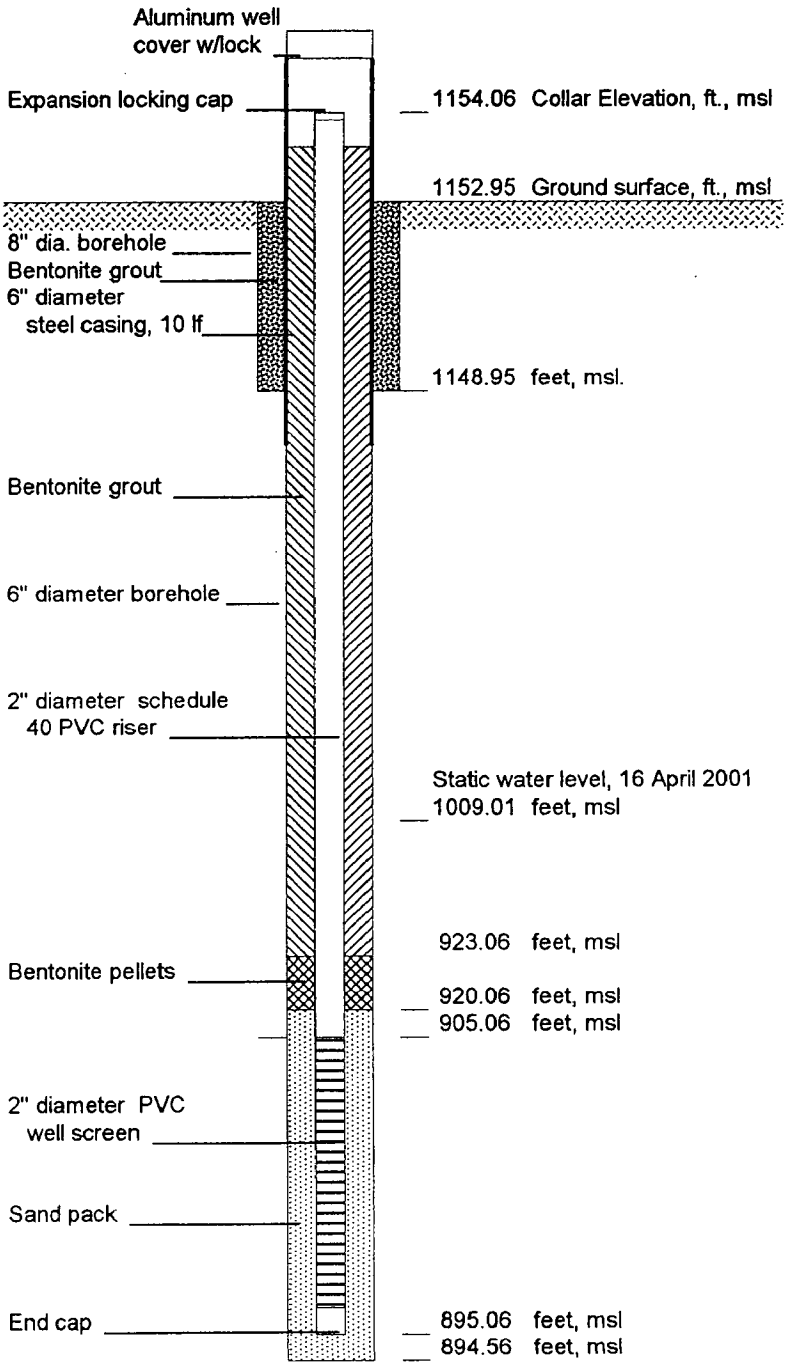
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-4A.WK4

WJS

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-4B

Collar Elevation (feet, msl): 1153.58
Location: N 696,716.79 E 2,412,008.57
Date Started: 27 March 2001
Date Completed: 27 March 2001
Water Depth: 56.82 feet
Water Elevation: 1096.76 feet, msl

Well Materials List

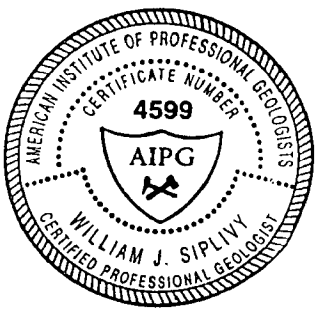
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 9 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

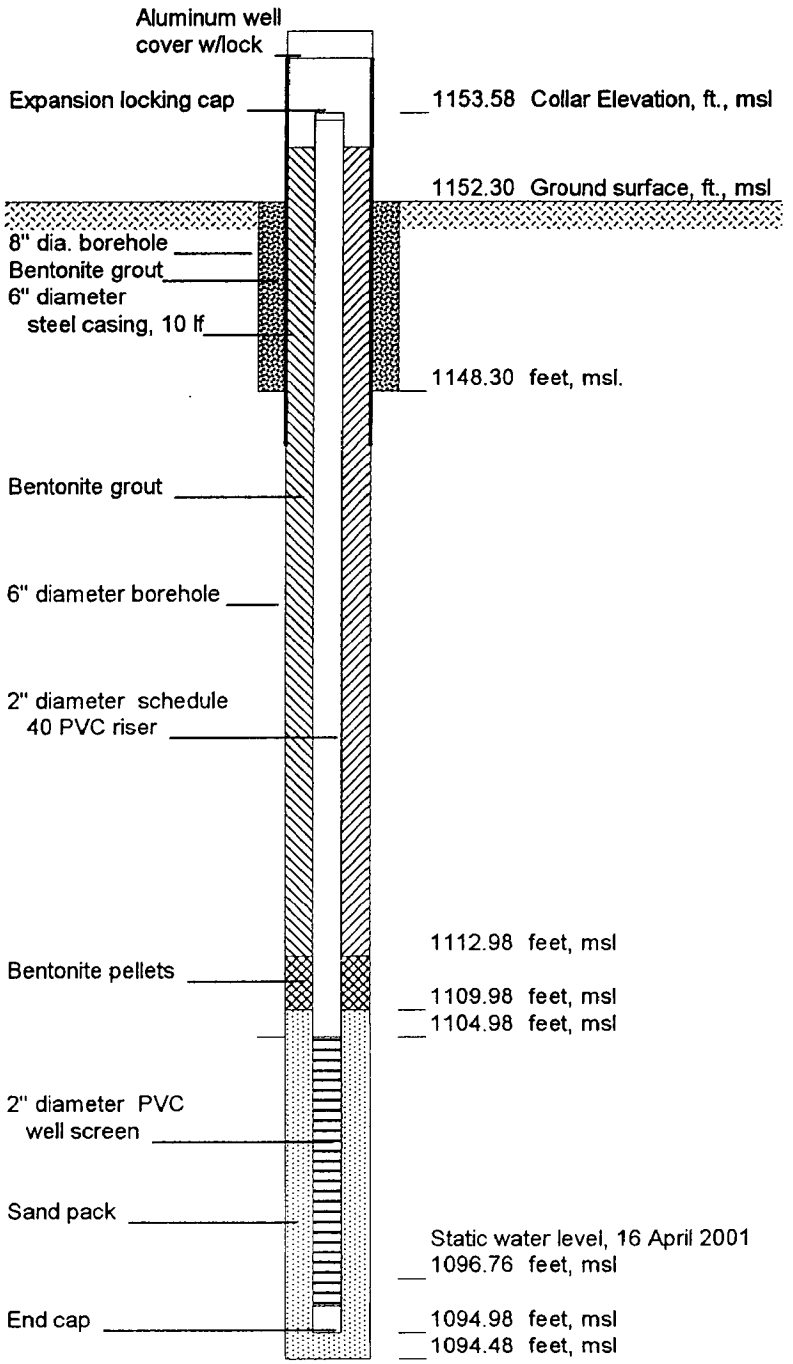
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-4B.WK4

WJS

AEC 10564

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-4C

Collar Elevation (feet, msl): 1153.26
Location: N 696,713.01 E 2,412,015.57
Date Started: 27 March 2001
Date Completed: 29 March 2001
Water Depth: 5.65 feet
Water Elevation: 1147.61 feet, msl

Well Materials List

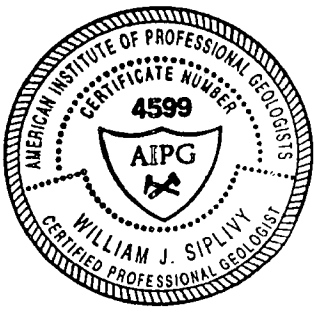
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 4 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

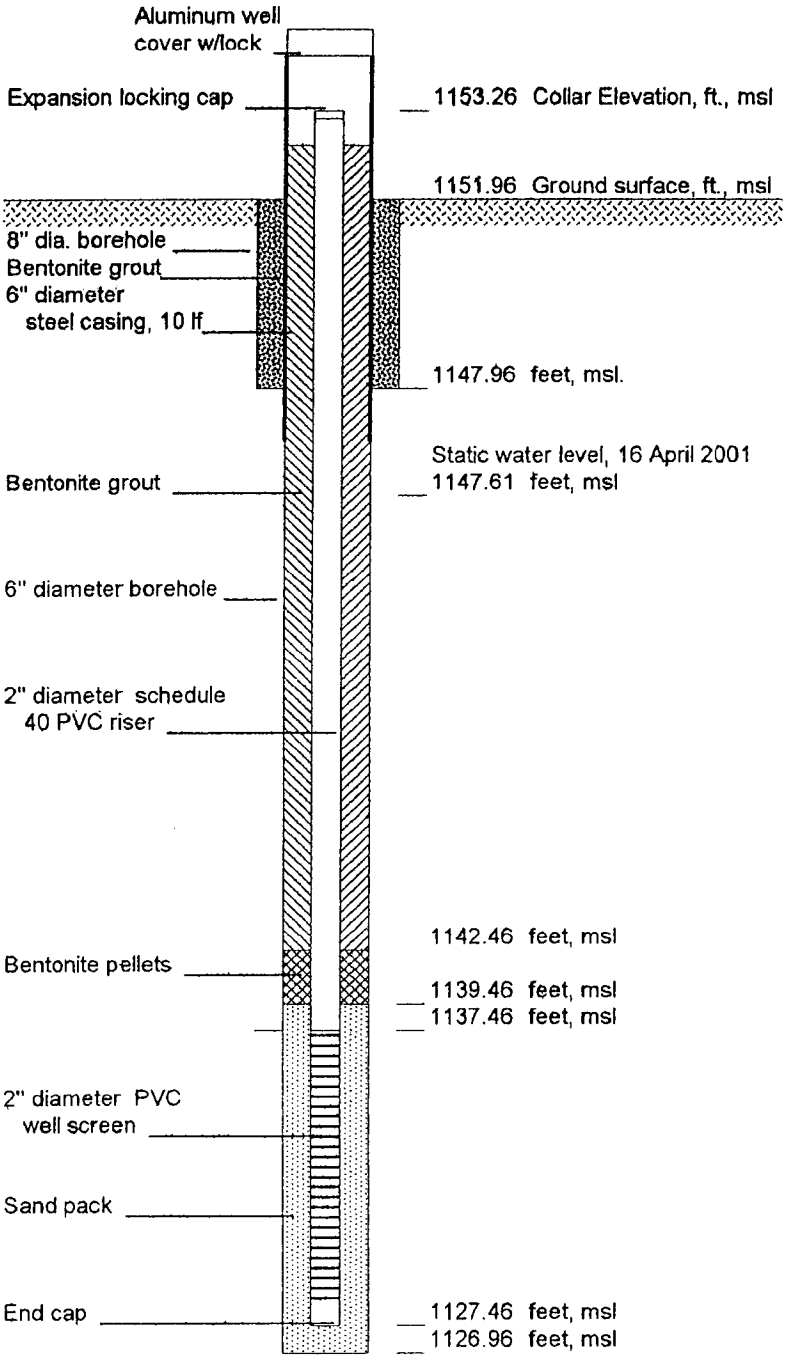
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-4C.WK4

WJS

AEC 10565

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-5A

Collar Elevation (feet, msl): 1161.07
Location: N 695,518.10 E 2,412,309.91
Date Started: 12 March 2001
Date Completed: 20 March 2001
Water Depth: 203.12 feet
Water Elevation: 957.95 feet, msl

Well Materials List

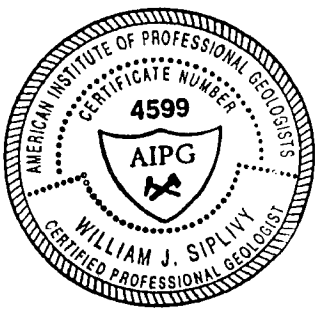
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 56 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 4 bags
11. Installation method: Gravity

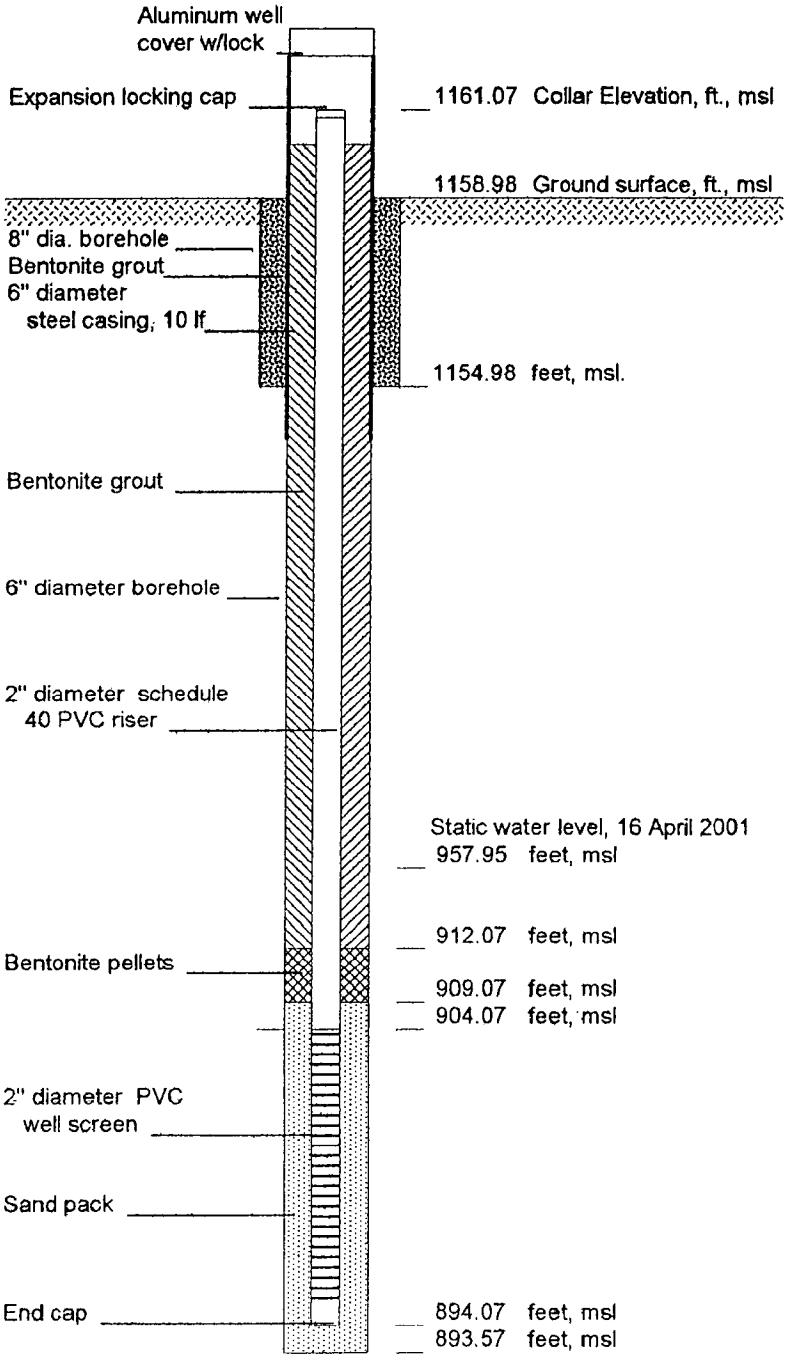
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy w/rain, high 30's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-5A.WK4

WJS

AEC 10566

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-5B

Collar Elevation (feet, msl): 1160.16
Location: N 695,537.87 E 2,412,307.73
Date Started: 20 March 2001
Date Completed: 20 March 2001
Water Depth: 77.06 feet
Water Elevation: 1083.1 feet, msl

Well Materials List

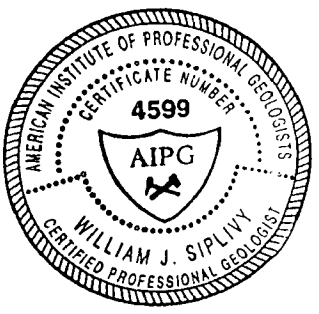
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 14 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

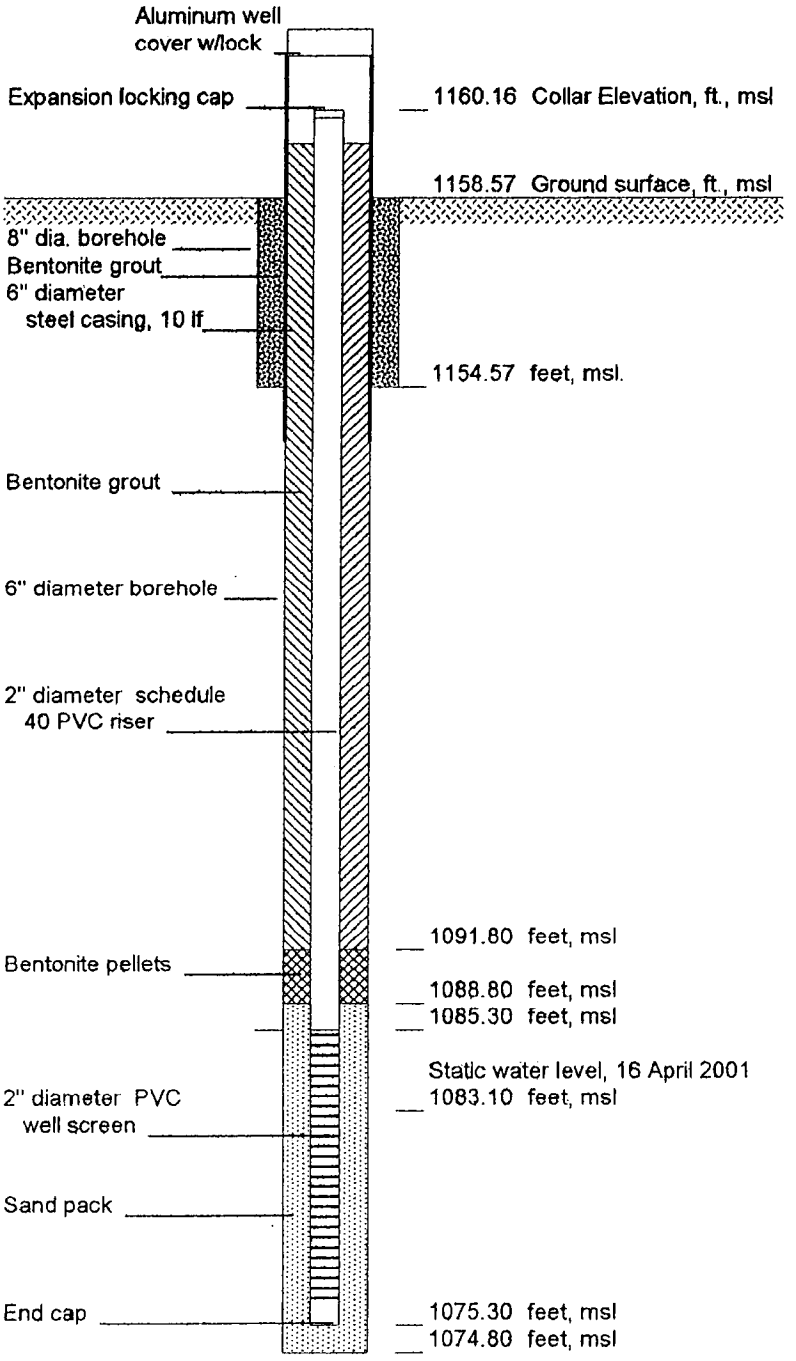
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-5B.WK4

WJS

AEC 10567

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 3, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-5C

Collar Elevation (feet, msl): 1160.86
Location: N 695,528.14 E 2,412,308.76
Date Started: 20 March 2001
Date Completed: 20 March 2001
Water Depth: 7.24 feet
Water Elevation: 1153.62 feet, msl

Well Materials List

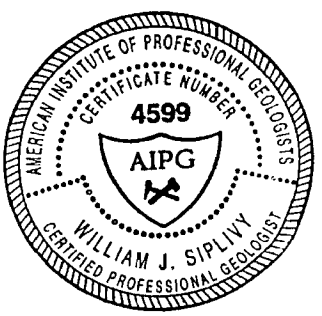
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type; Bentonite
4. Grout quantity: 2 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 5 bags
11. Installation method: Gravity

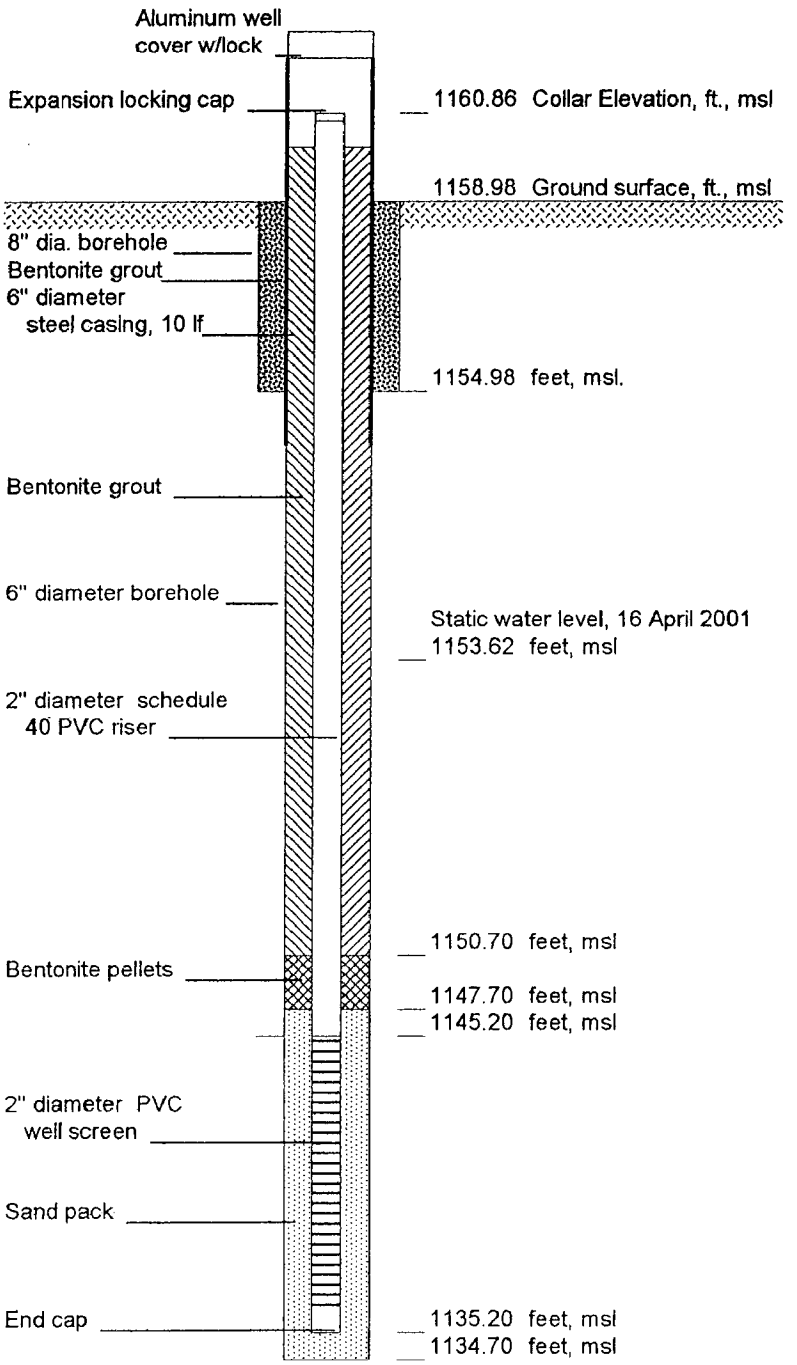
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Partly cloudy, high 40's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-5C.WK4

WJS

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 4, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-6B

Collar Elevation (feet, msl): 1166.7
Location: N 696,894.84 E 2,413,834.75
Date Started: 30 March 2001
Date Completed: 30 March 2001
Water Depth: 74.64 feet
Water Elevation: 1092.06 feet, msl

Well Materials List

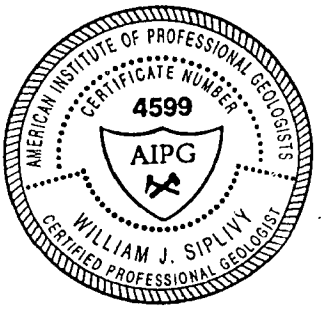
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 12 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

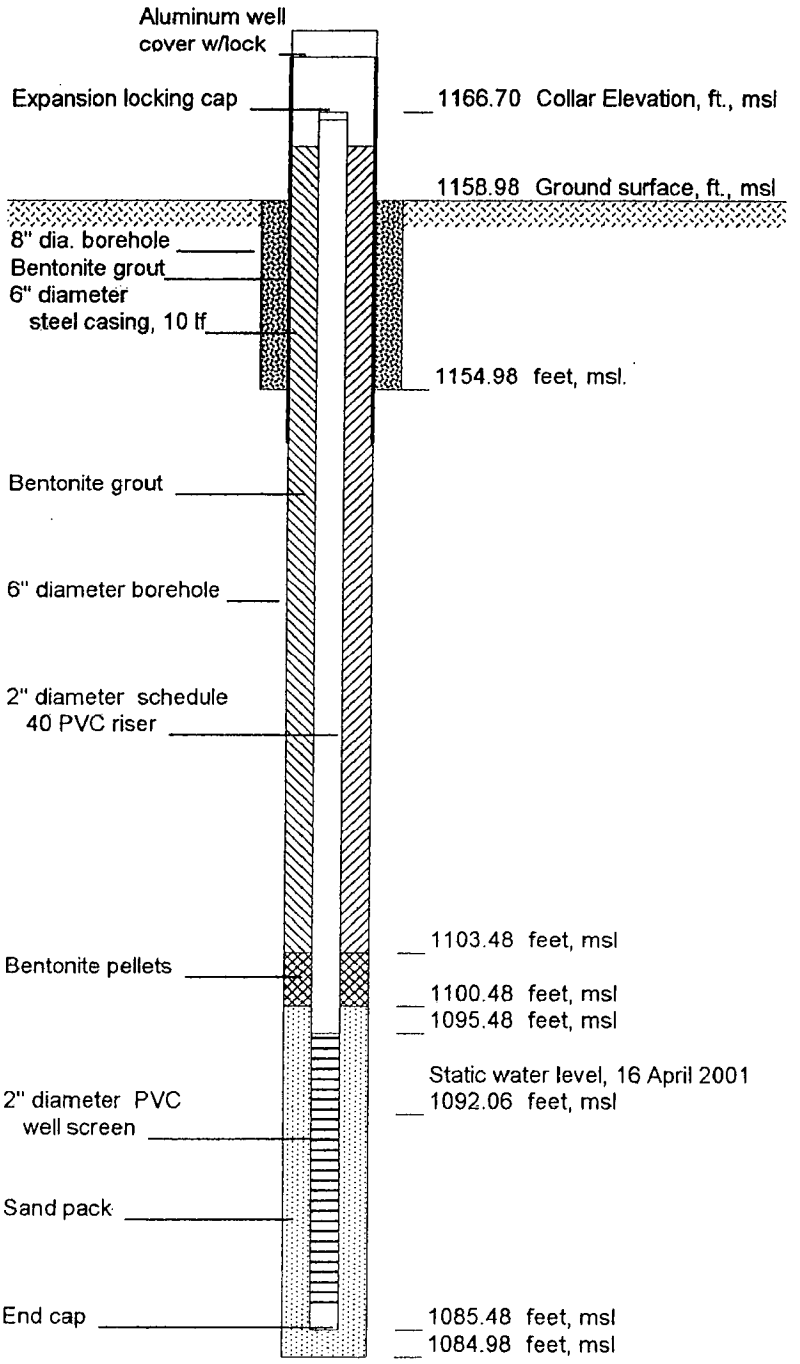
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Sunny, mid 50's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-6B.WK4 WJS

MONITOR WELL INSTALLATION LOG

HYDROGEOLOGIC INVESTIGATION - COARSE COAL REFUSE DISPOSAL FACILITY
CENTURY MINE
SECTION 4, WAYNE TOWNSHIP, BELMONT CO., OHIO

Well No.: CG-01-6C

Collar Elevation (feet, msl): 1167.01
Location: N 696,895.79 E 2,413,842.77
Date Started: 30 March 2001
Date Completed: 30 March 2001
Water Depth: 30.91 feet
Water Elevation: 1136.1 feet, msl

Well Materials List

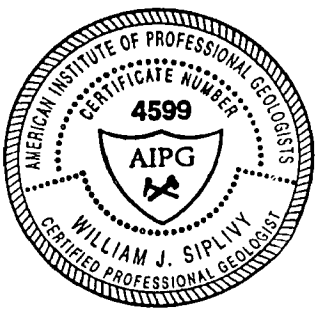
1. Well casing: 2" ID, Sch 40 PVC
2. Joint type: Flush thread
3. Grout type: Bentonite
4. Grout quantity: 6 bags
5. Well screen: 2" ID, 10 LF
6. Screen type: Machine cut Sch 40 PVC
7. Slot size: 0.010
8. Bentonite seal: Bentonite pellets, 1 bucket
9. Filter pack type: 430 silica stone
10. Filter pack quantity: 3 bags
11. Installation method: Gravity

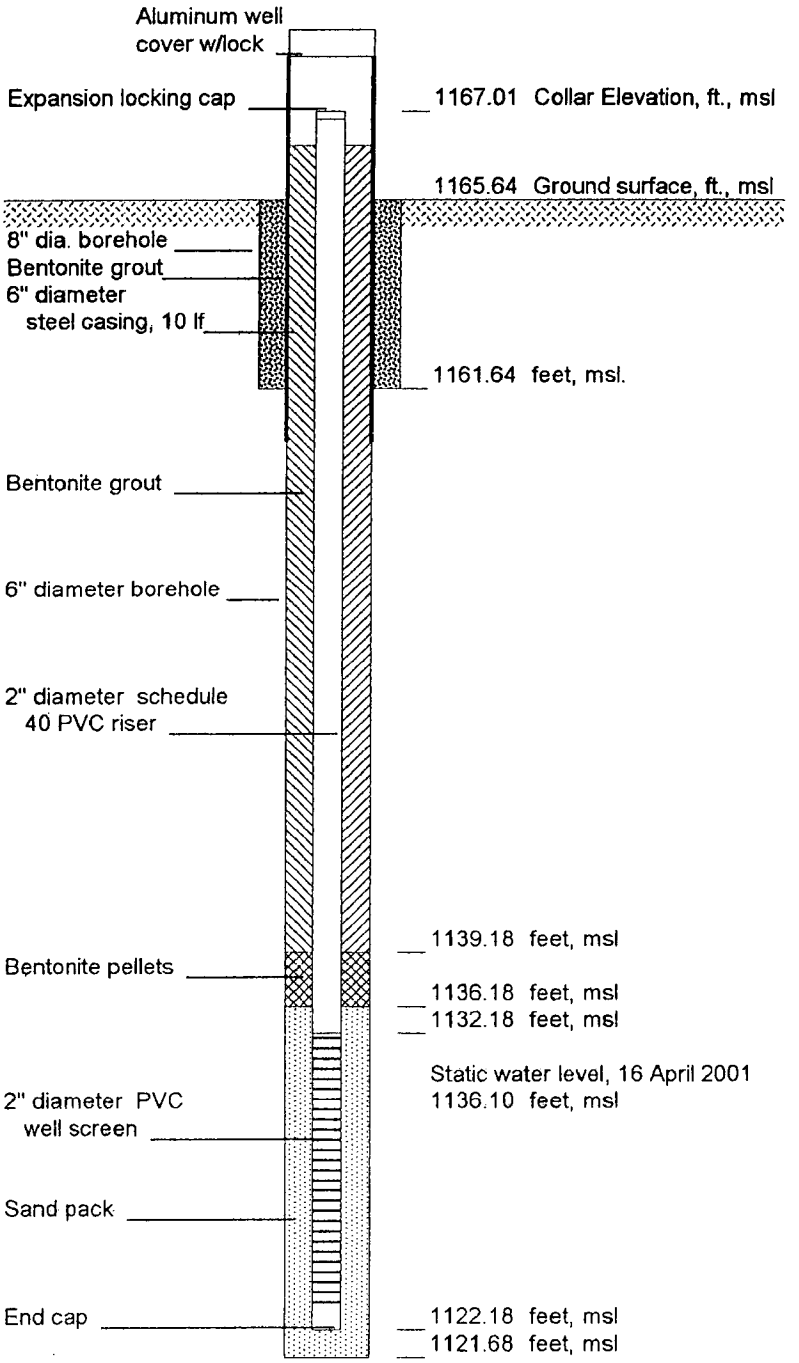
Drilling

1. Contractor: McKay & Gould, Drilling, Inc.
2. Driller: Randy McKay
3. Method: Air rotary, 6 & 8" diameter
4. Weather: Sunny, mid 50's
5. Supervision: William J. Siplivy

Respectfully submitted,

William J. Siplivy
Certified Professional Geologist
No. 4599, AIPG





CG-01-6C.WK4

WJS

19. Describe in detail the monitoring plan and analytical procedures to be followed for this disposal plan.

Ground and surface water sites as referenced and listed in item 15. above will be monitored quarterly for quality and quantity. See A.R.P. Application Map for location of these sites. Pond monitoring will be conducted as required by NPDES/Stormwater General Permit OHM000001, Facility No.3GM00018. Analytical procedures as identified by the U.S. EPA, Methods for Chemical Waste Analysis of Water and Waste, will be utilized for all water quality analysis. *(Pond 008 is monitored under Permit D-0425)*

20. Identify the parameter limits and frequencies to be met as set by the OEPA by the disposal area, if different from the NPDES/NSPS requirements.

NPDES/Stormwater General Permit No. OHM000001, Facility No. 3GM00018 parameter limits and frequency requirements for monitoring at Ponds 001, 009, and 010 will be observed.

21. If required per the modified MOA, submit an OEPA Application for Permit to Install or Plan Approval (Form 4309) as an addendum to this attachment.

N/A

AMERICAN ENERGY CORPORATION

43521 Mayhugh Hill Road • Twp. Hwy. 88 • Beallsville, OH 43716

PHONE: (740) 926-9152
FAX: (740) 926-9138

July 11, 2002

Mr. Timothy J. Thompson
U. S. Department of Labor
Mine Safety and Health Administration, District 3
5012 Mountaineer Mall
Morgantown, West Virginia 26505

Re: Temporary Coarse Coal Refuse Disposal Facility
Century Mine, Belmont County, Ohio
MSHA ID No. 3301070

Dear Mr. Thompson:

On behalf of the American Energy Corporation, attached please find three copies of the ODNR permit for construction of a temporary coarse coal refuse facility.

This facility has been designed for coarse coal refuse in an environmentally acceptable manner, in accordance with ODNR Policy and Procedure Directive, Permitting 95-1; Ohio EPA Policies2.05, 4.16, GD0303.010 and Section 401 (wetlands); and the Federal Mining Safety and Health Administration 30 CFR 77.215 and 77.716.

Please contact Ron Burdette at this office if you have any questions.

Sincerely,

Ron Burdette
Mine Engineer

Cc: Eric Grimm
Mark Bartkoski
File

attached a copy of ODNR ARP to store refuse in pits

77.215-2

(a) The temporary refuse location is N 696,894 E 2,413,834

(b) (1) The name and address of the facility:
American Energy Corporation
43521 Mayhugh Hill Road
Beallsville, Ohio 43716

The name associated with the refuse pile:
Temporary Coarse Coal Refuse Disposal Facility

MSHA ID No. 3301070

(2) Refer to attached USGS topographic map

(3) N/A

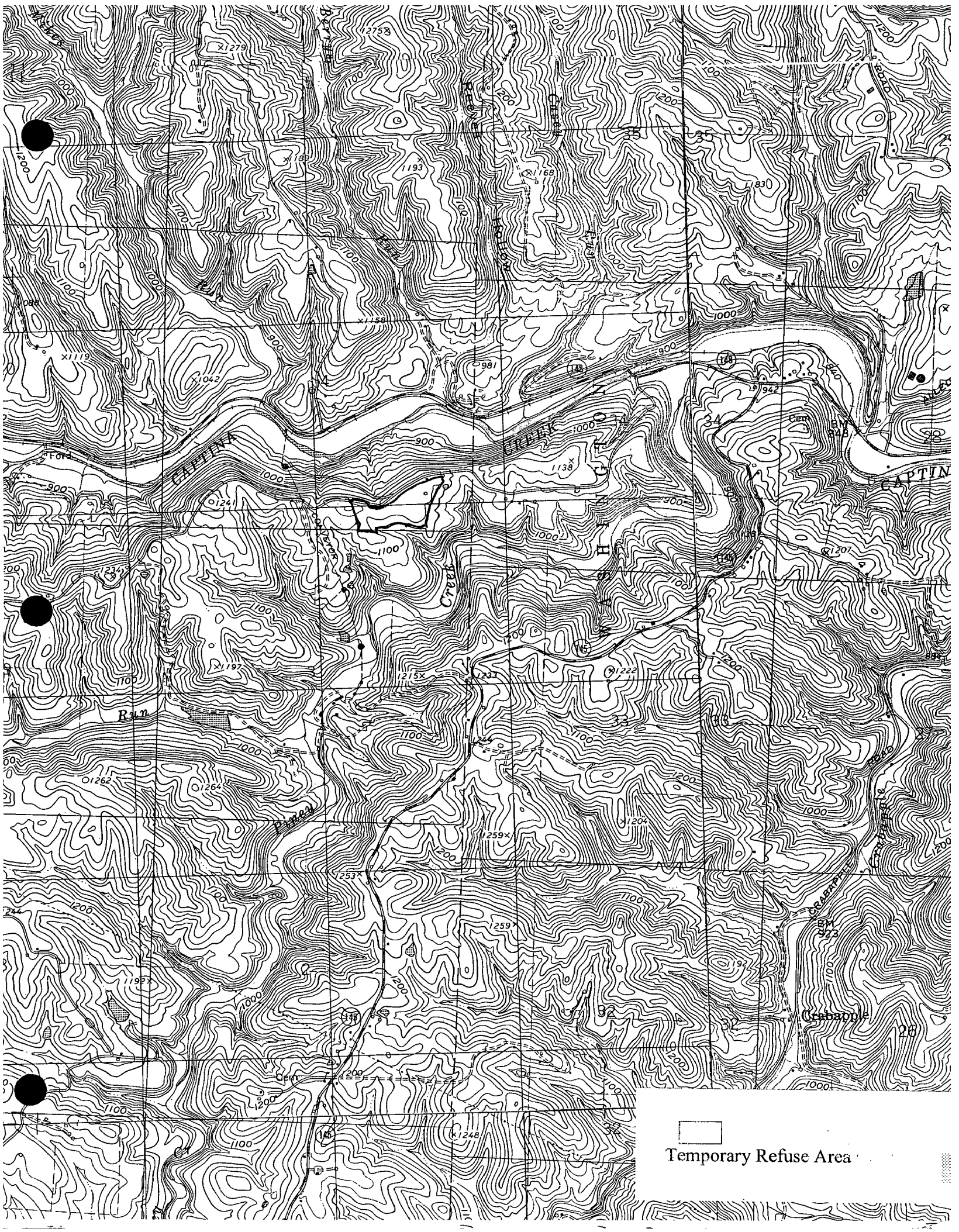
(4) Refer to drawing titled "Addendum to A.R.P., Item 4," for information on the extent of the refuse pile

(5) The refuse pile is not burning

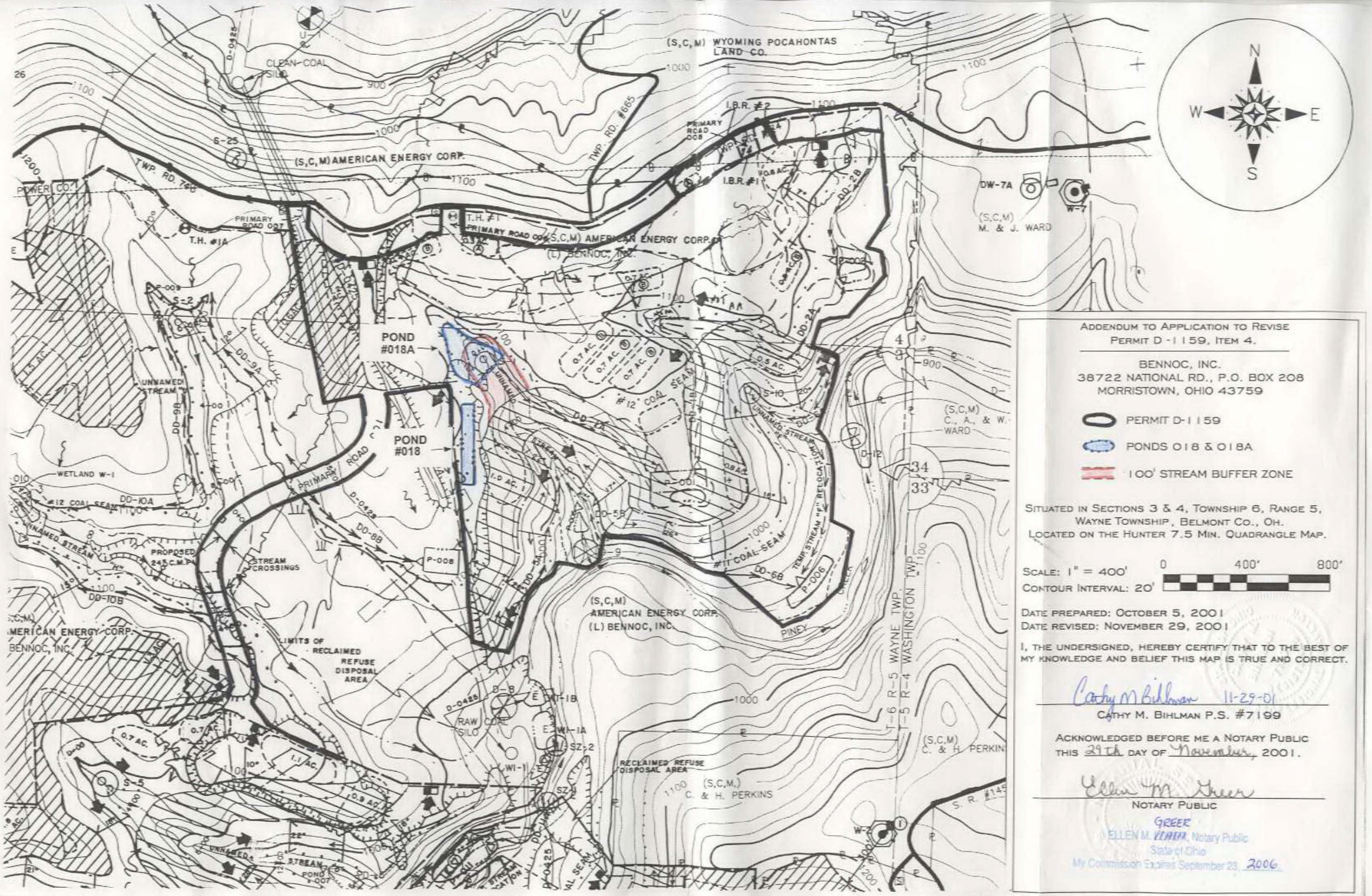
(6) Please refer to the document titled " Addendum to ARP, Item 4, American Energy Corporation" for information on preventing water from becoming impounded

(7) Refer to sheets 1 and 2 of "Addendum to A.R.P., Item 4, And Attachment 28, Item 14"

(8) Please refer to the attached document for required information



AEC 10574



ADDENDUM TO APPLICATION TO REVISE PERMIT D-1159, ITEM 4.

BENNOC, INC.
38722 NATIONAL RD., P.O. BOX 208
MORRISTOWN, OHIO 43759

PERMIT D-1159

PONDS 018 & 018A

100' STREAM BUFFER ZONE

SITUATED IN SECTIONS 3 & 4, TOWNSHIP 6, RANGE 5, WAYNE TOWNSHIP, BELMONT CO., OH.
LOCATED ON THE HUNTER 7.5 MIN. QUADRANGLE MAP.

SCALE: 1" = 400'
CONTOUR INTERVAL: 20'

0 400' 800'

DATE PREPARED: OCTOBER 5, 2001
DATE REVISED: NOVEMBER 29, 2001

I, THE UNDERSIGNED, HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS MAP IS TRUE AND CORRECT.

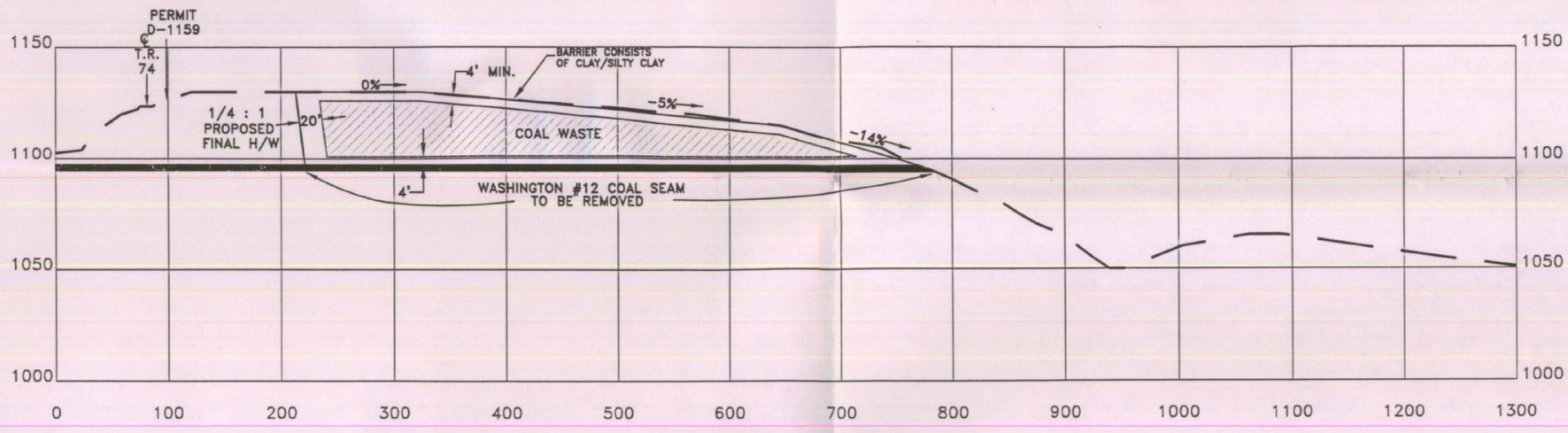
Cathy M Bihlman 11-29-01
CATHY M. BIHLMAN P.S. #7199

ACKNOWLEDGED BEFORE ME A NOTARY PUBLIC THIS 29th DAY OF November, 2001.

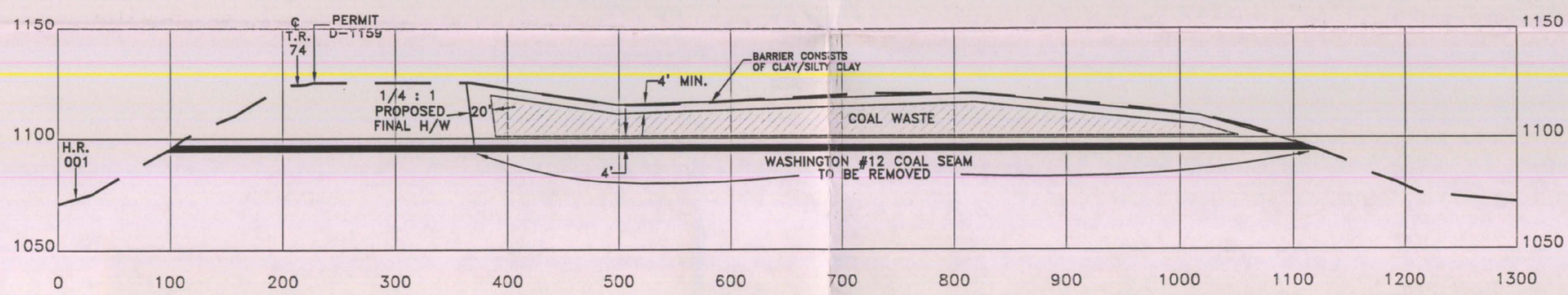
Ellen M. Greer
NOTARY PUBLIC

GREER
ELLEN M. GREER, Notary Public
State of Ohio
My Commission Expires September 23, 2006

AEC 10575



SECTION G–G'



SECTION F–F'

STATE OF OHIO
DONALD M. BRADFORD
E-29449
REGISTERED PROFESSIONAL ENGINEER

12-4-01

—— —— EXISTING GRADE

———— FINAL GRADE

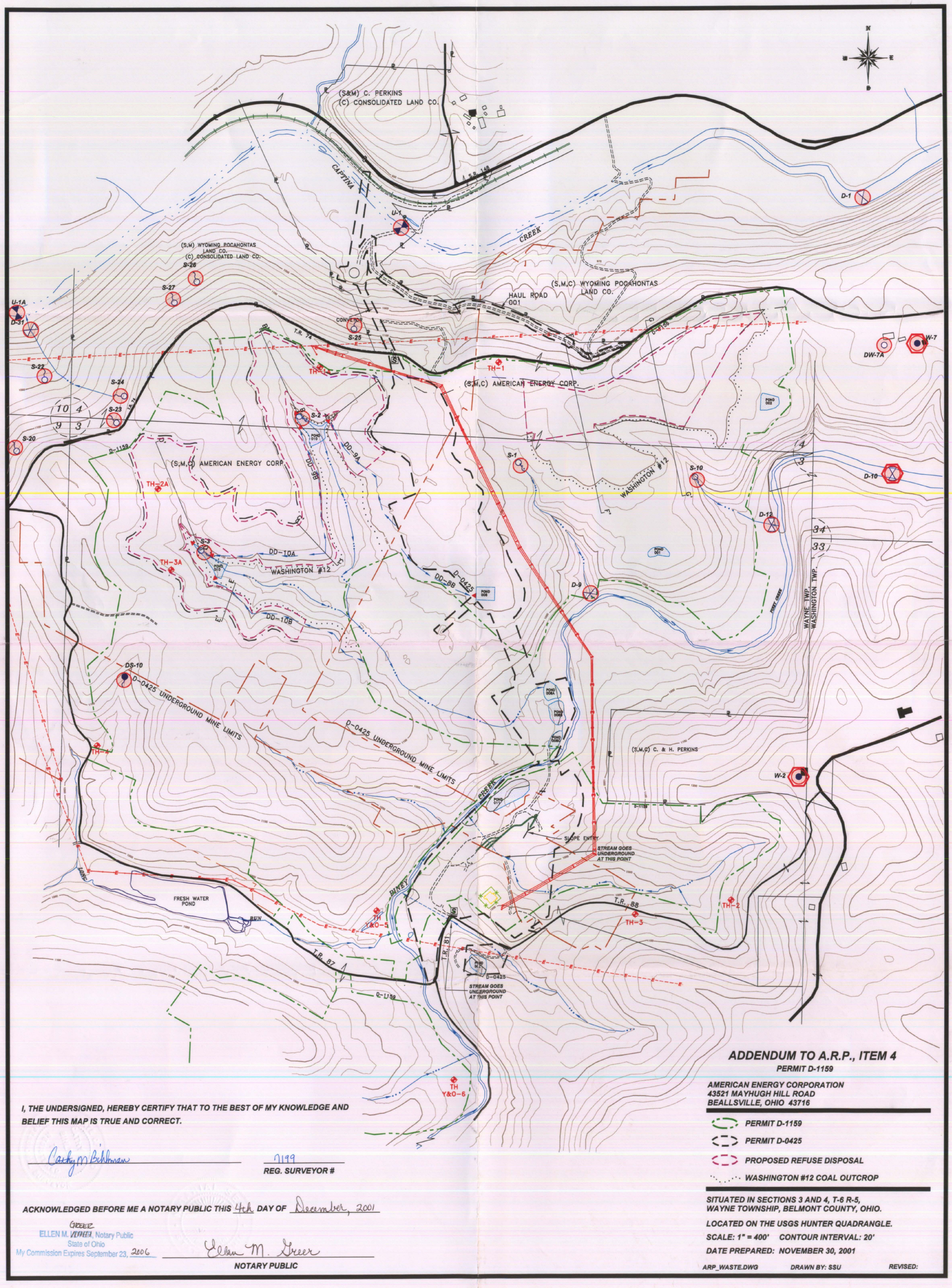
ADDENDUM TO A.R.P., ITEM 4
AND ATTACHMENT 28, ITEM 14

AMERICAN ENERGY CORPORATION	D-1159
SECTION: 3, 4	T.- 6 R.- 5
TWP.- WAYNE	COUNTY: BELMONT
HORIZ. SCALE: 1" = 100'	VERT. SCALE: 1" = 50'
DATE PREPARED: NOVEMBER 28, 2001	SHEET 2 OF 2

Jack Hamilton & Associates, Inc.
Engineering, Surveying & GIS
342 High St., Box 471
Flushing, Ohio 43977
Ph: (740) 968-4947
Fax: (740) 968-4225
E-mail: hamilton@1st.net
www.hamiltonandassoc.com

DATE REVISED:

425WASTECSL.DWG



ADDENDUM TO A.R.P., ITEM 4

PERMIT D-1159

AMERICAN ENERGY CORPORATION
43521 MAYHUGH HILL ROAD
BEALLSVILLE, OHIO 43716

- PERMIT D-1159
- PERMIT D-0425
- PROPOSED REFUSE DISPOSAL
- WASHINGTON #12 COAL OUTCROP

SITUATED IN SECTIONS 3 AND 4, T-6 R-5, WAYNE TOWNSHIP, BELMONT COUNTY, OHIO.

LOCATED ON THE USGS HUNTER QUADRANGLE.

SCALE: 1" = 400' CONTOUR INTERVAL: 20'

DATE PREPARED: NOVEMBER 30, 2001

ARP_WASTE.DWG DRAWN BY: SSU REVISED:

I, THE UNDERSIGNED, HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS MAP IS TRUE AND CORRECT.

Cathy M Behlman 7199
REG. SURVEYOR #

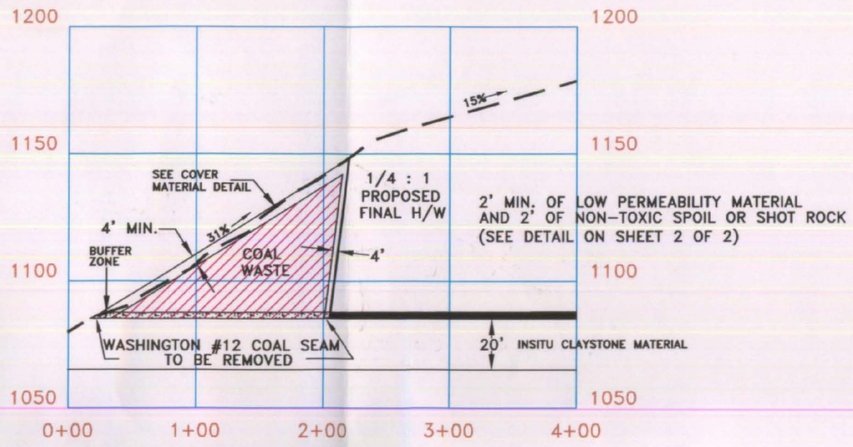
ACKNOWLEDGED BEFORE ME A NOTARY PUBLIC THIS 4th DAY OF December, 2001

GREER
ELLEN M. ~~WHITE~~, Notary Public
State of Ohio
My Commission Expires September 23, 2006

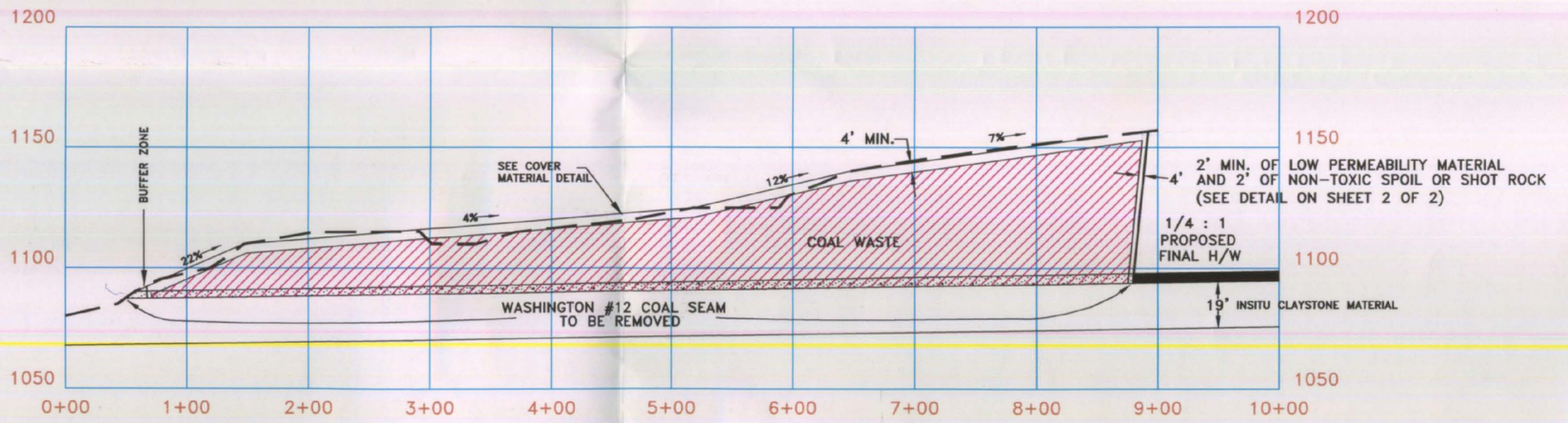
Ellen M. Greer
NOTARY PUBLIC

AEC 10577

AEC 10578

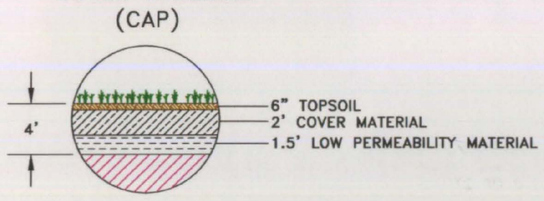


SECTION E–E'

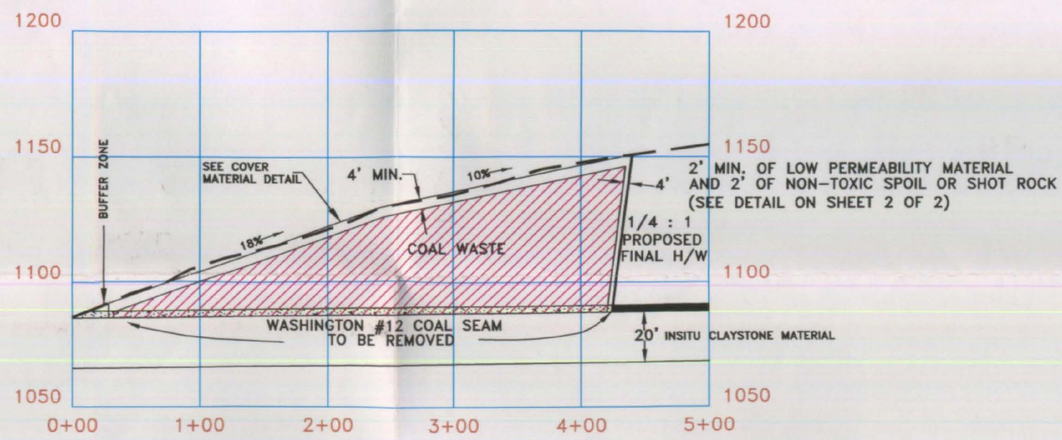


SECTION D–D'

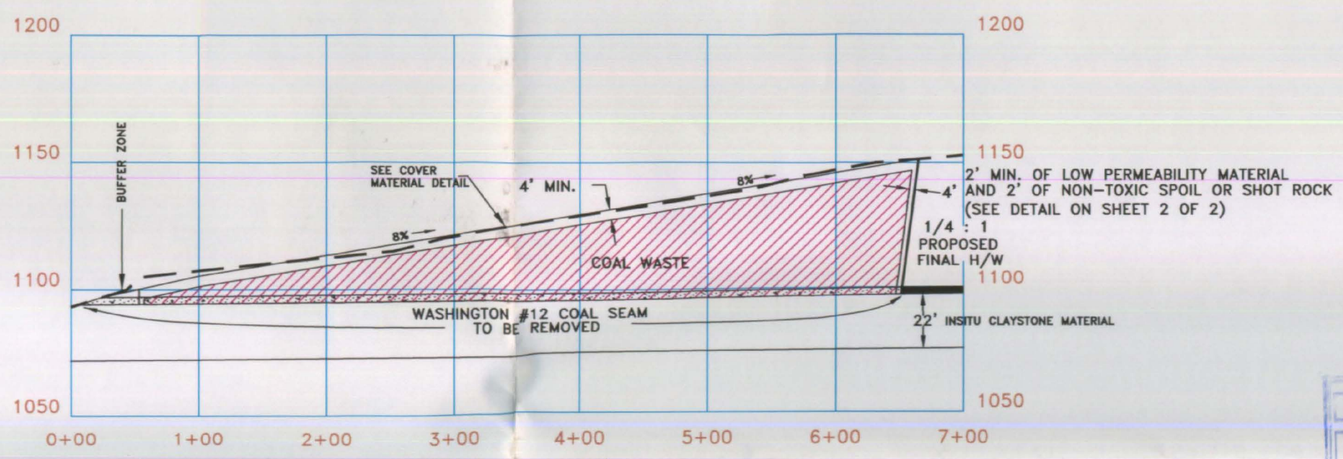
DETAIL OF COVER MATERIAL (CAP)



SCALE: 1" = 10'

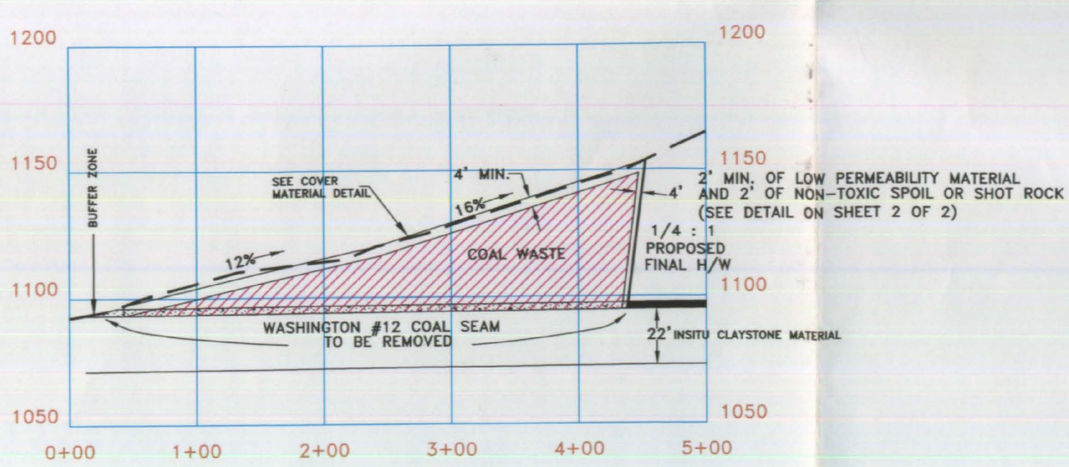


SECTION C–C'



SECTION B–B'

RECEIVED
APR 23 2002
DEPARTMENT OF NATURAL RESOURCES MANAGEMENT



SECTION A–A'

— — — EXISTING GRADE
——— FINAL GRADE

OPERATOR

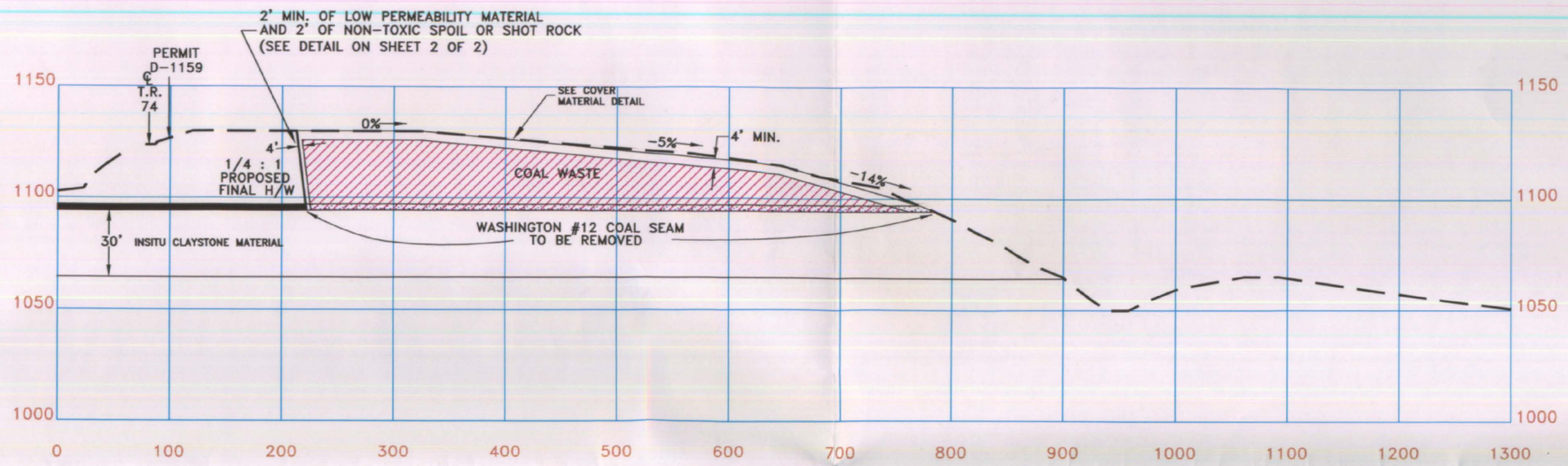
ADDENDUM TO A.R.P., ITEM 4 AND ATTACHMENT 28, ITEM 14

AMERICAN ENERGY CORPORATION	R-1159-4
SECTION: 3, 4	T.- 6 R.- 5
TWP.- WAYNE	COUNTY: BELMONT
HORIZ. SCALE: 1" = 100'	VERT. SCALE: 1" = 50'
DATE PREPARED: NOVEMBER 28, 2001	SHEET 1 OF 2

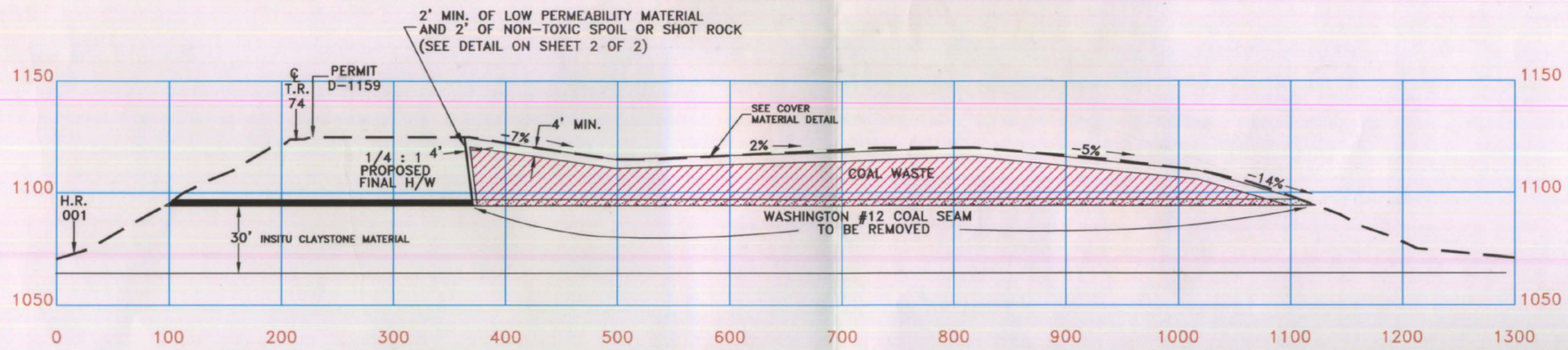
Jack Hamilton & Associates, Inc.
Engineering, Surveying & GIS
342 High St., Box 471
Flushing, Ohio 43977
Ph: (740) 968-4947
Fax: (740) 968-4225
E-mail: hamilton@1st.net
www.hamiltonandassoc.com

DATE REVISED: 3-11-02
DATE REVISED: 4-10-02

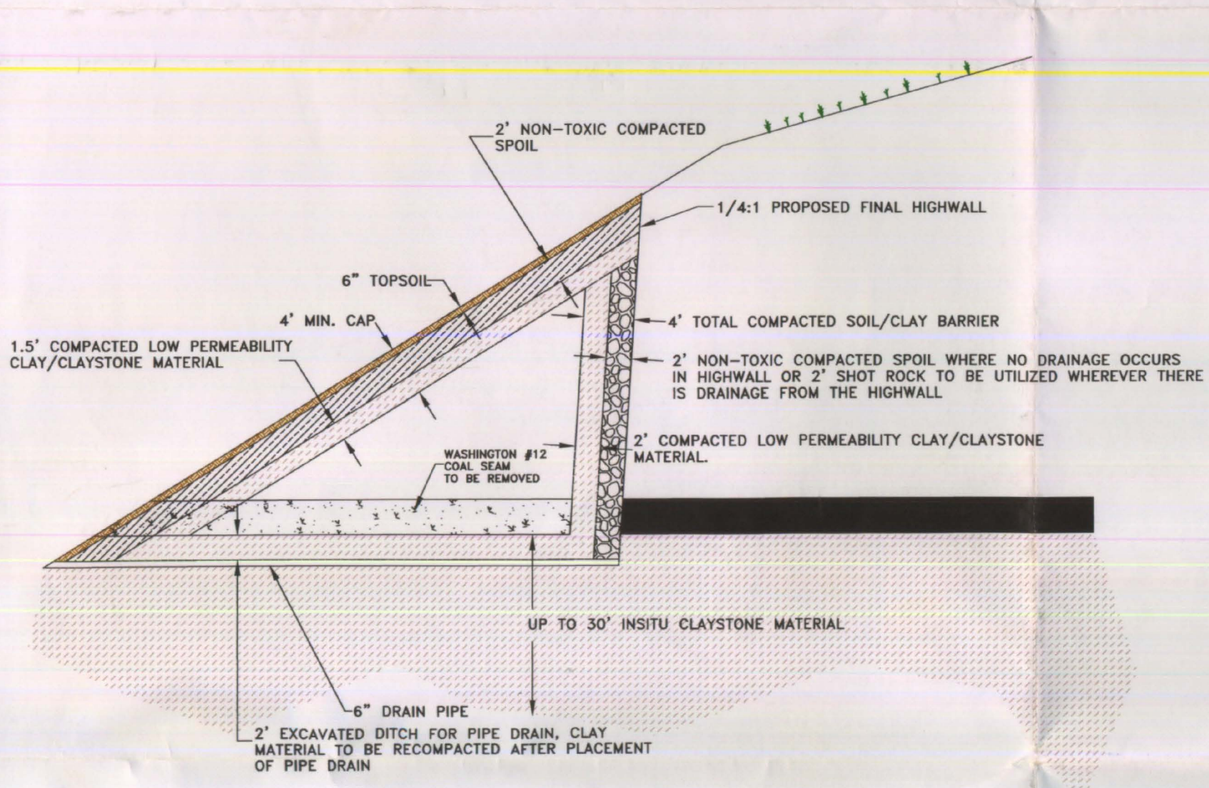
425WASTESSU.DWG



SECTION G-G'

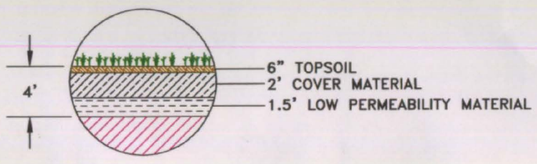


SECTION F-F'

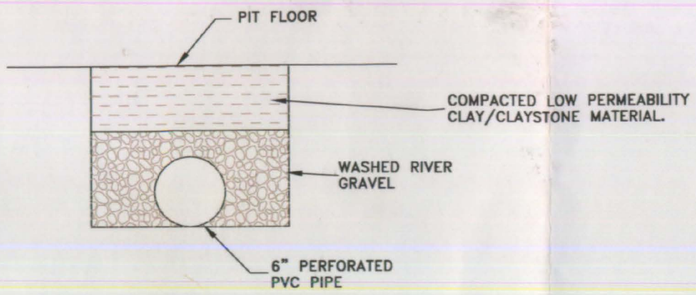


(TYPICAL)
DETAIL OF SEALED
REFUSE DISPOSAL AREA
SCALE: 1" = 10'

DETAIL OF
COVER MATERIAL
(CAP)



SCALE: 1" = 10'



(TYPICAL)
DETAIL OF
DRAIN PIPE
SCALE: NOT TO SCALE

— — — EXISTING GRADE
——— FINAL GRADE

OPERATOR

ADDENDUM TO A.R.P., ITEM 4
AND ATTACHMENT 28, ITEM 14

AMERICAN ENERGY CORPORATION R-1159-4

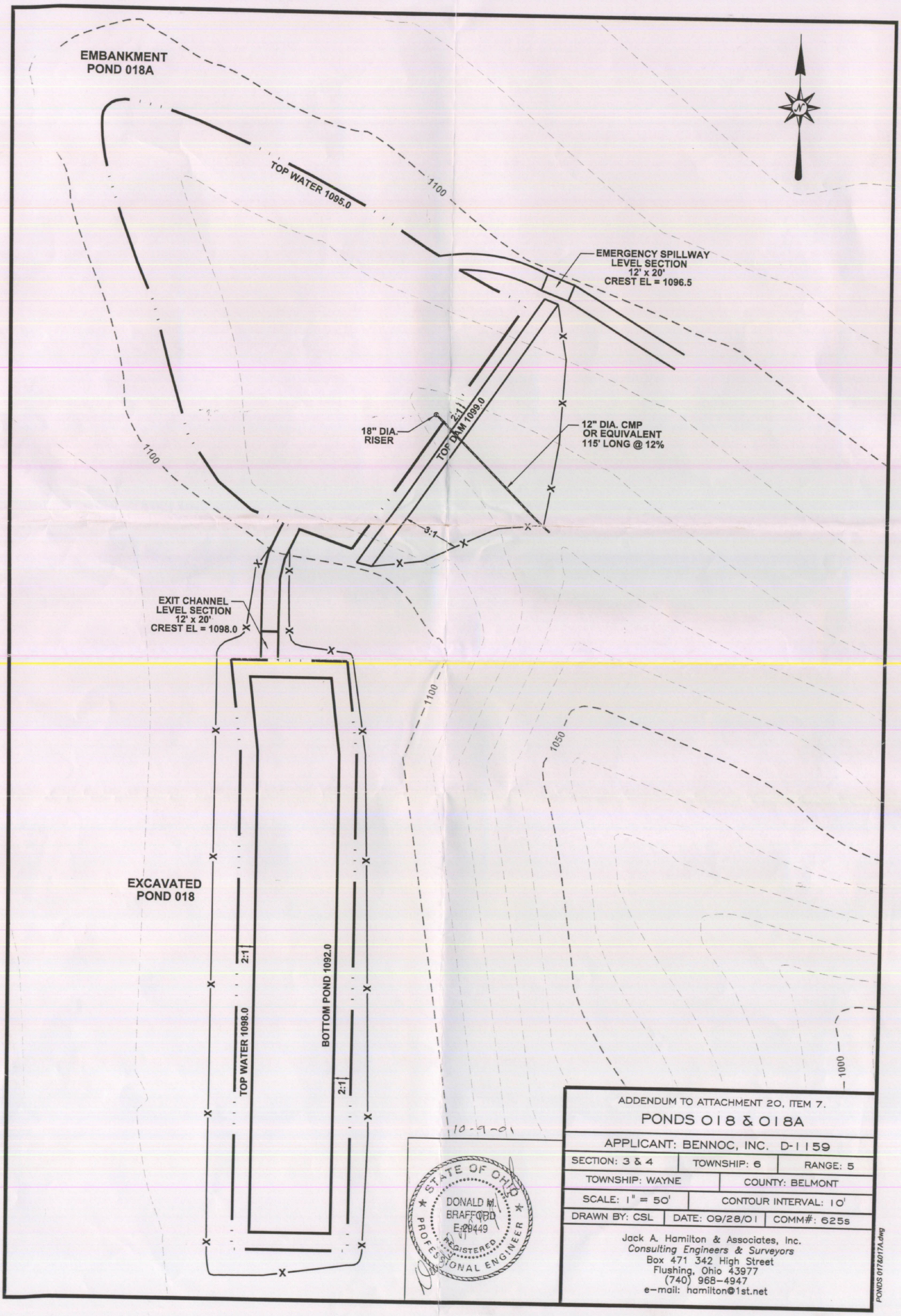
SECTION: 3, 4	T.- 6 R.- 5
TWP.- WAYNE	COUNTY: BELMONT
HORIZ. SCALE: 1" = 100'	VERT. SCALE: 1" = 50'

DATE PREPARED: NOVEMBER 28, 2001 SHEET 2 OF 2

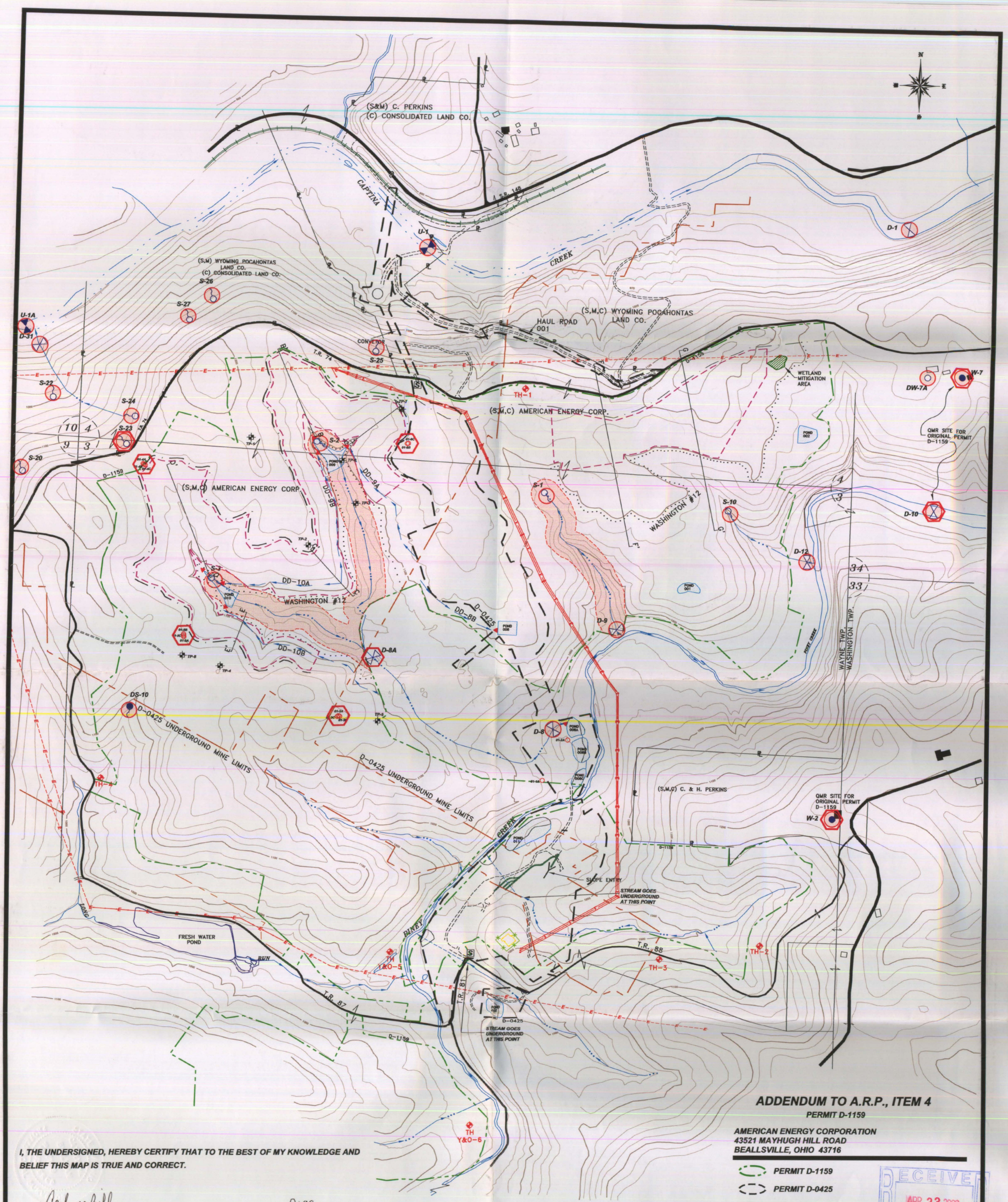
Jack Hamilton & Associates, Inc.
Engineering, Surveying & GIS
342 High St., Box 471
Flushing, Ohio 43977
Ph: (740) 968-4947
Fax: (740) 968-4225
E-mail: hamilton@1st.net
www.hamiltonandassoc.com

DATE REVISED: 3-7-02
DATE REVISED: 4-10-02

425WASTESSU.DWG


EMBANKMENT
POND 018A
TOP WATER 1095.0
1100
EMERGENCY SPILLWAY
LEVEL SECTION
12' x 20'
CREST EL = 1096.5
18" DIA.
RISER
2:1
TOP DAM 1099.0
12" DIA. CMP
OR EQUIVALENT
115' LONG @ 12%
1100
3:1
EXIT CHANNEL
LEVEL SECTION
12' x 20'
CREST EL = 1098.0
1100
1050
EXCAVATED
POND 018
2:1
TOP WATER 1098.0
BOTTOM POND 1092.0
2:1
1000
10-9-01
STATE OF OHIO
DONALD M.
BRAFFORD
E-29449
REGISTERED
PROFESSIONAL ENGINEER
ADDENDUM TO ATTACHMENT 20, ITEM 7.
PONDS 018 & 018A
APPLICANT: BENNOC, INC. D-1159
SECTION: 3 & 4
TOWNSHIP: 6
RANGE: 5
TOWNSHIP: WAYNE
COUNTY: BELMONT
SCALE: 1" = 50'
CONTOUR INTERVAL: 10'
DRAWN BY: CSL
DATE: 09/28/01
COMM#: 625s
Jack A. Hamilton & Associates, Inc.
Consulting Engineers & Surveyors
Box 471 342 High Street
Flushing, Ohio 43977
(740) 968-4947
e-mail: hamilton@1st.net
PONDS 017&017A.dwg

AEC 10581



I, THE UNDERSIGNED, HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS MAP IS TRUE AND CORRECT.

Cathy M Bihlman — 7199
REG. SURVEYOR #

ACKNOWLEDGED BEFORE ME A NOTARY PUBLIC THIS 22nd DAY OF April, 2002

ELLEN M. GREER, Notary Public
State of Ohio
My Commission Expires September 23, 2006

Ellen M. Greer
NOTARY PUBLIC

OPERATOR

TP-4 TEST PITS
MONITORING WELL
QUARTERLY MONITORING SITE
BUFFER ZONE (100')

ADDENDUM TO A.R.P., ITEM 4

PERMIT D-1159

AMERICAN ENERGY CORPORATION
43521 MAYHUGH HILL ROAD
BEALLSVILLE, OHIO 43716

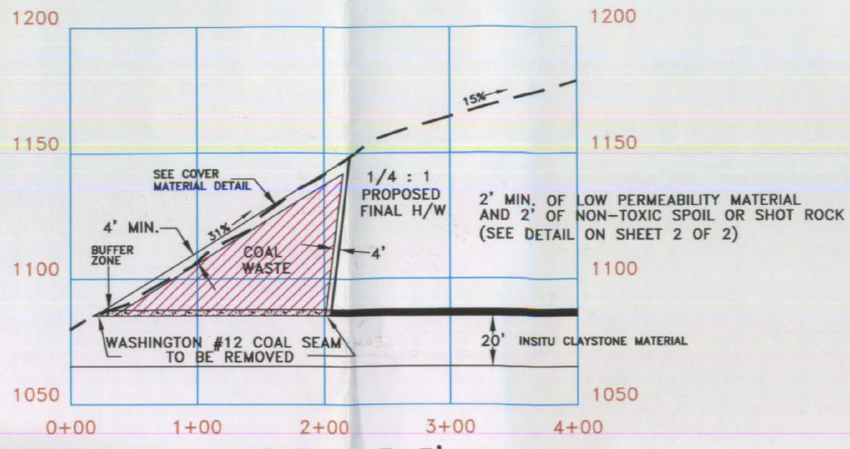
PERMIT D-1159
PERMIT D-0425
PROPOSED REFUSE DISPOSAL
WASHINGTON #12 COAL OUTCROP

RECEIVED APR 23 2002

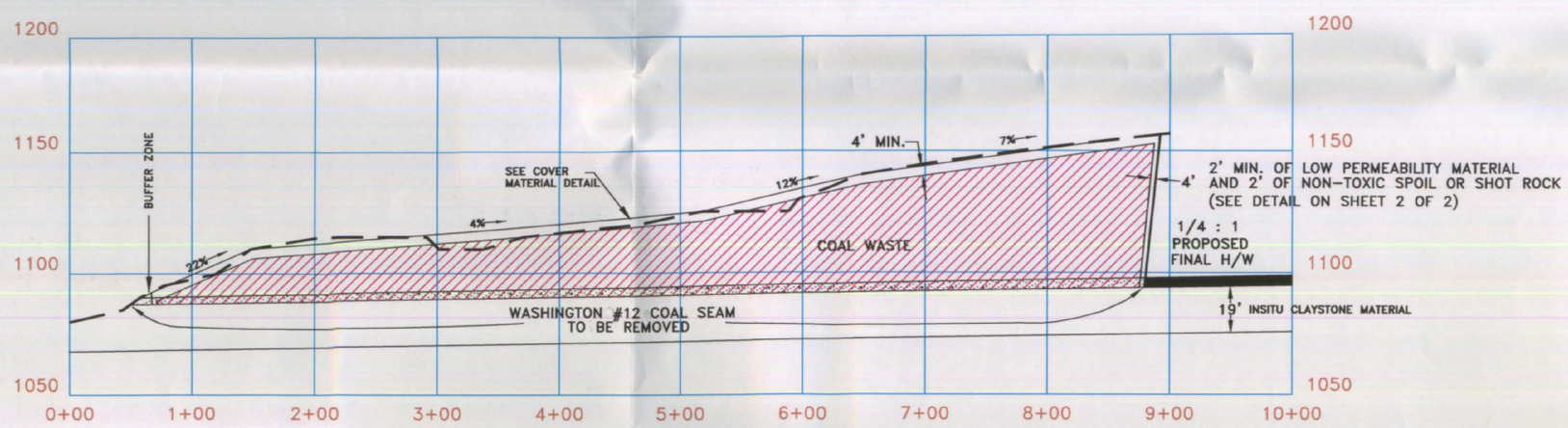
SITUATED IN SECTIONS 3 AND 4, T-6 R-5, WAYNE TOWNSHIP, BELMONT COUNTY, OHIO.
LOCATED ON THE USGS HUNTER QUADRANGLE.
SCALE: 1" = 400' CONTOUR INTERVAL: 20'
DATE PREPARED: NOVEMBER 30, 2001

ARP_WASTE.DWG DRAWN BY: SSU
REVISED: 3-8-02
REVISED: 4-10-02

AEC 10582

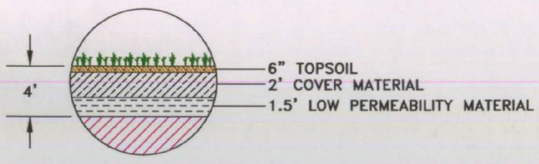


SECTION E-E'

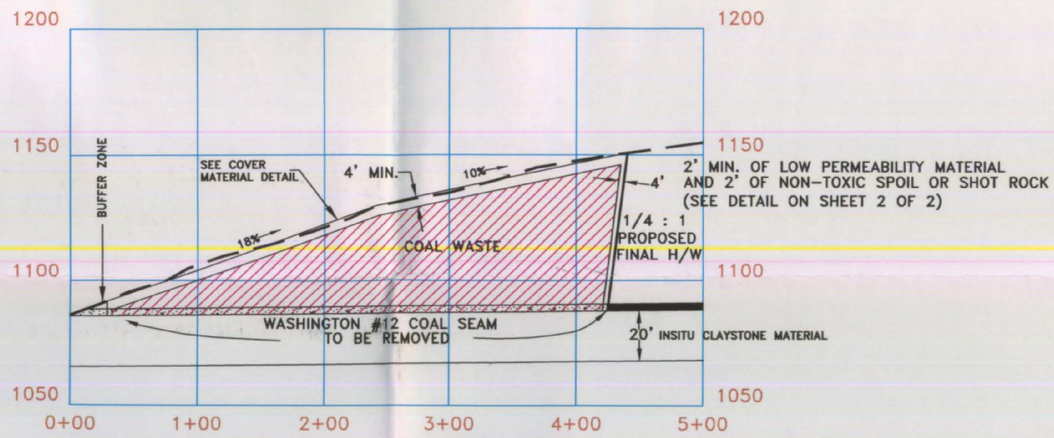


SECTION D-D'

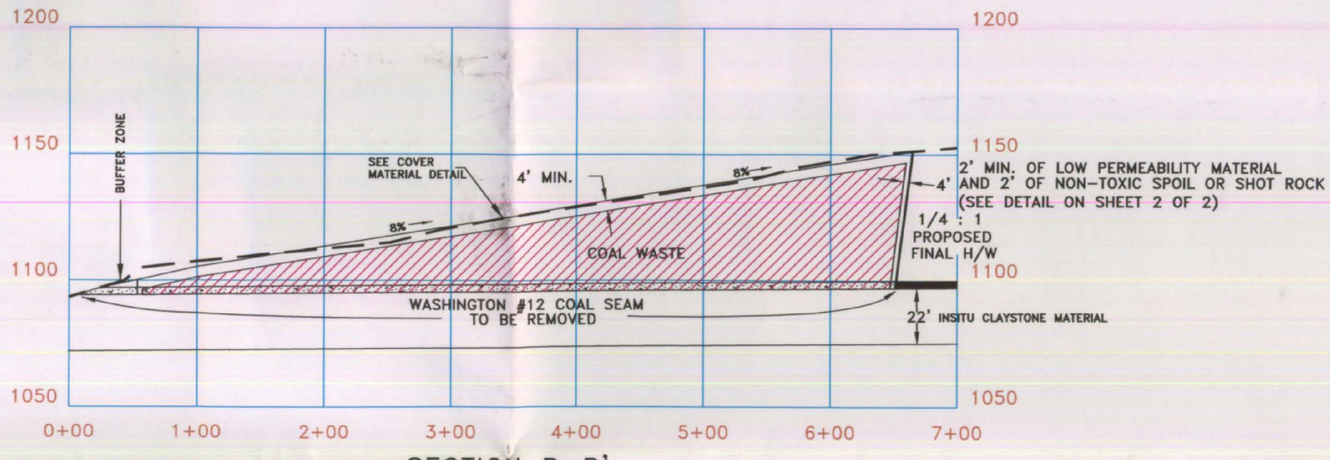
DETAIL OF COVER MATERIAL (CAP)



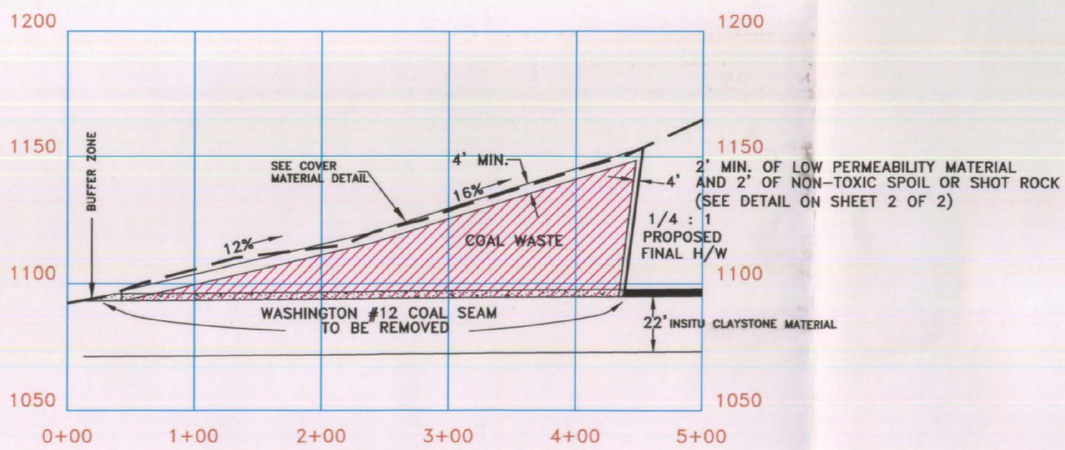
SCALE: 1" = 10'



SECTION C-C'



SECTION B-B'



SECTION A-A'

EXISTING GRADE

FINAL GRADE

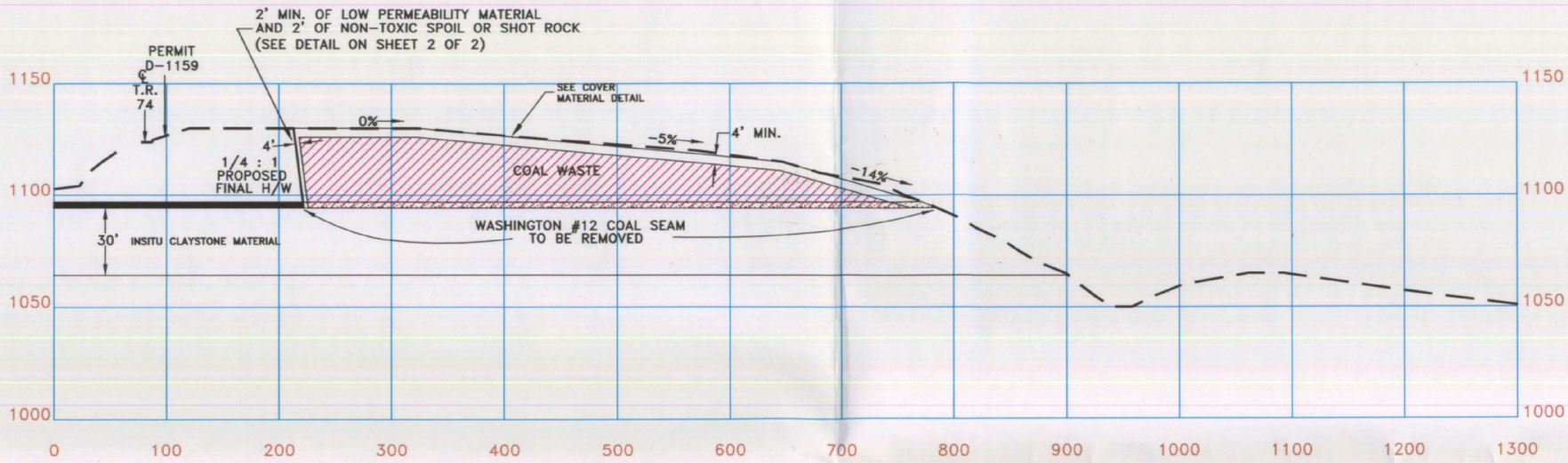
ADDENDUM TO A.R.P., ITEM 4
AND ATTACHMENT 28, ITEM 14

AMERICAN ENERGY CORPORATION	R-1159-4
SECTION: 3, 4	T.- 6 R.- 5
TWP.- WAYNE	COUNTY: BELMONT
HORIZ. SCALE: 1" = 100'	VERT. SCALE: 1" = 50'
DATE PREPARED: NOVEMBER 28, 2001	SHEET 1 OF 2

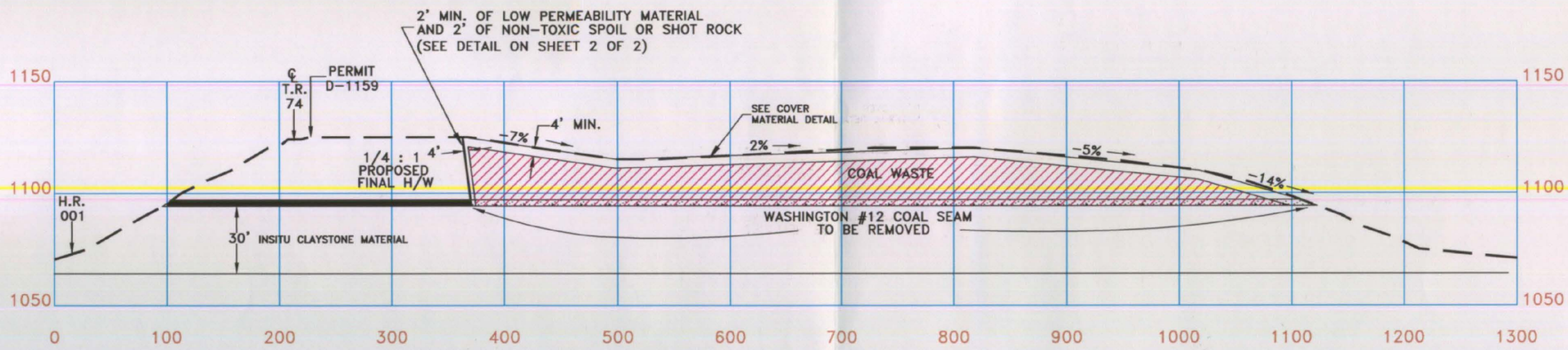
Jack Hamilton & Associates, Inc.
Engineering, Surveying & GIS
342 High St., Box 471
Flushing, Ohio 43977
Ph: (740) 968-4947
Fax: (740) 968-4225
E-mail: hamilton@1st.net
www.hamiltonandassoc.com

DATE REVISED: 3-11-02
DATE REVISED: 4-10-02

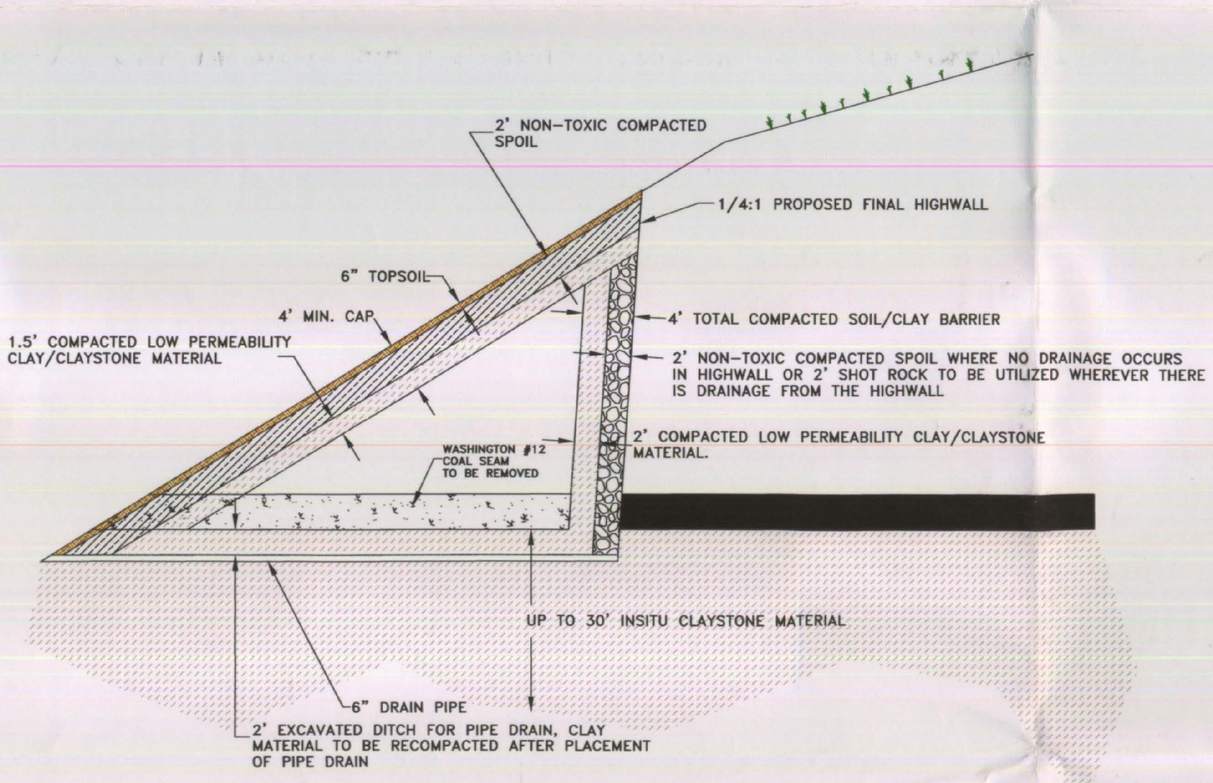
425WASTESSU.DWG



SECTION G-G'

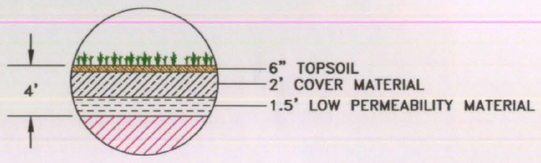


SECTION F-F'



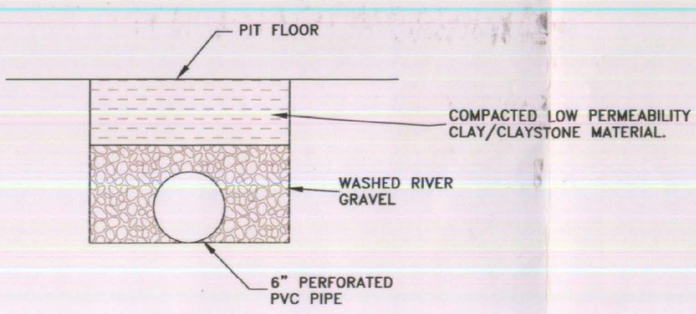
(TYPICAL)
DETAIL OF SEALED
REFUSE DISPOSAL AREA
SCALE: 1" = 10'

DETAIL OF
COVER MATERIAL
(CAP)



SCALE: 1" = 10'

— — — EXISTING GRADE
——— FINAL GRADE



(TYPICAL)
DETAIL OF
DRAIN PIPE
SCALE: NOT TO SCALE

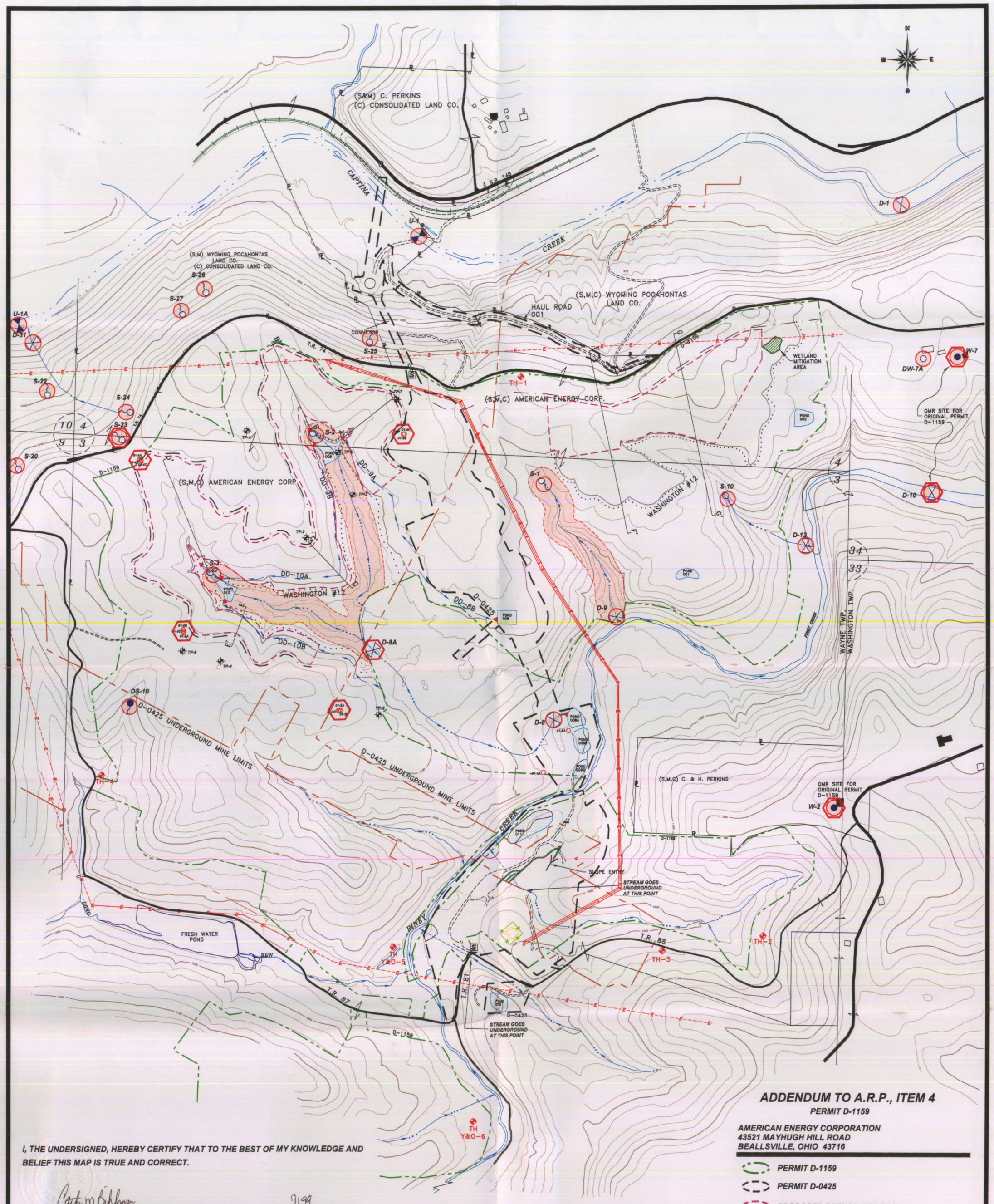
ADDENDUM TO A.R.P., ITEM 4
AND ATTACHMENT 28, ITEM 14

AMERICAN ENERGY CORPORATION R-1159-4

SECTION: 3, 4	T.- 6 R.- 5
TWP.- WAYNE	COUNTY: BELMONT
HORIZ. SCALE: 1" = 100'	VERT. SCALE: 1" = 50'
DATE PREPARED: NOVEMBER 28, 2001	SHEET 2 OF 2

Jack Hamilton & Associates, Inc.
Engineering, Surveying & GIS
342 High St., Box 471
Flushing, Ohio 43977
Ph: (740) 968-4947
Fax: (740) 968-4225
E-mail: hamilton@1st.net
www.hamiltonandassoc.com

DATE REVISED: 3-7-02
DATE REVISED: 4-10-02
425WASTESSU.DWG



ADDENDUM TO A.R.P., ITEM 4

PERMIT D-1159

AMERICAN ENERGY CORPORATION
43521 MAYHUGH HILL ROAD
BEALLSVILLE, OHIO 43716

- PERMIT D-1159
- PERMIT D-0425
- PROPOSED REFUSE DISPOSAL
- WASHINGTON #12 COAL OUTCROP

- TEST PITS
- MONITORING WELL
- QUARTERLY MONITORING SITE
- BUFFER ZONE (100')

SITUATED IN SECTIONS 3 AND 4, T-6 R-5, WAYNE TOWNSHIP, BELMONT COUNTY, OHIO.

LOCATED ON THE USGS HUNTER QUADRANGLE.

SCALE: 1" = 400' CONTOUR INTERVAL: 20'

DATE PREPARED: NOVEMBER 30, 2001

ARP_WASTE.DWG DRAWN BY: SSU

REVISED: 3-8-02
REVISED: 4-10-02

I, THE UNDERSIGNED, HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS MAP IS TRUE AND CORRECT.

Carty M Bihlman

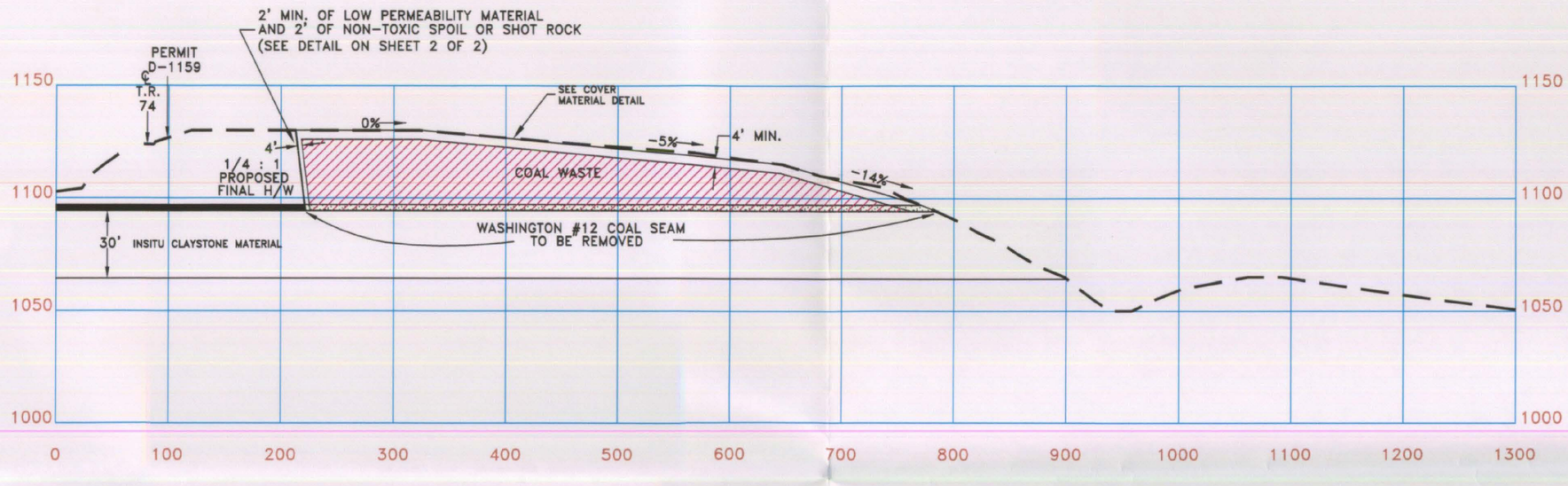
7199
REG. SURVEYOR #

ACKNOWLEDGED BEFORE ME A NOTARY PUBLIC THIS 22nd DAY OF April, 2002

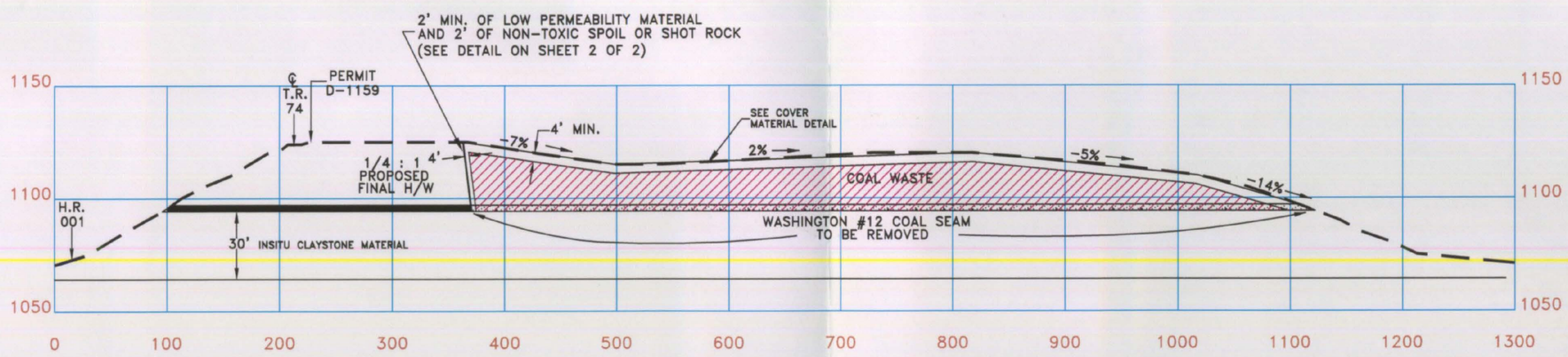
ELLEN M. GREER, Notary Public
State of Ohio
My Commission Expires September 23, 2006

Ellen M. Greer
NOTARY PUBLIC

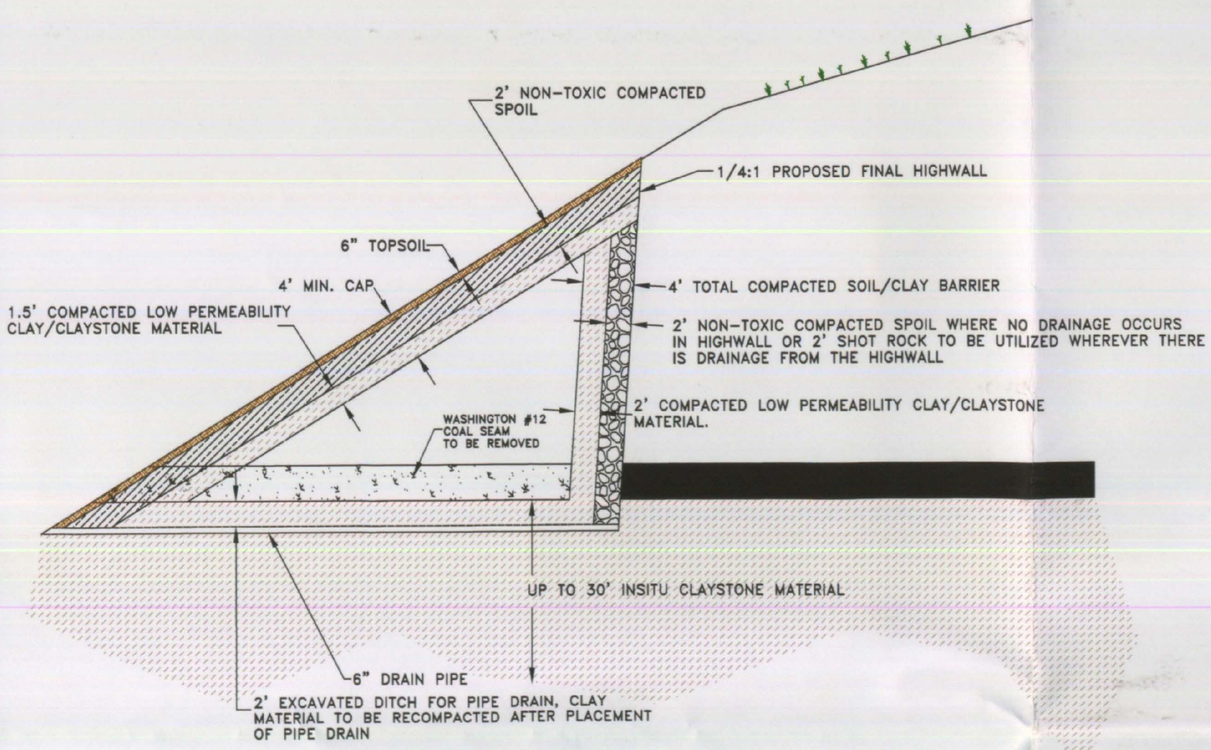
AEC 10585



SECTION G-G'

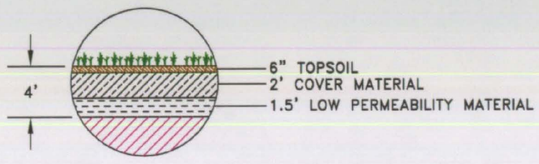


SECTION F-F'



(TYPICAL)
DETAIL OF SEALED
REFUSE DISPOSAL AREA
SCALE: 1" = 10'

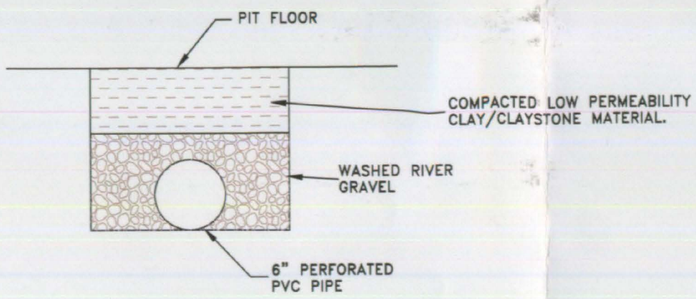
DETAIL OF
COVER MATERIAL
(CAP)



SCALE: 1" = 10'

— — — EXISTING GRADE

——— FINAL GRADE



(TYPICAL)
DETAIL OF
DRAIN PIPE
SCALE: NOT TO SCALE

ADDENDUM TO A.R.P., ITEM 4
AND ATTACHMENT 28, ITEM 14

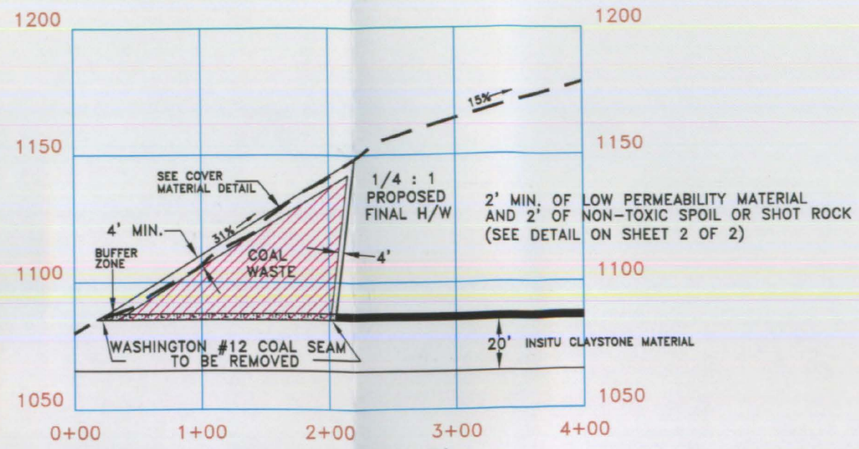
AMERICAN ENERGY CORPORATION R-1159-4

SECTION: 3, 4	T.- 6 R.- 5
TWP.- WAYNE	COUNTY: BELMONT
HORIZ. SCALE: 1" = 100'	VERT. SCALE: 1" = 50'
DATE PREPARED: NOVEMBER 28, 2001	SHEET 2 OF 2

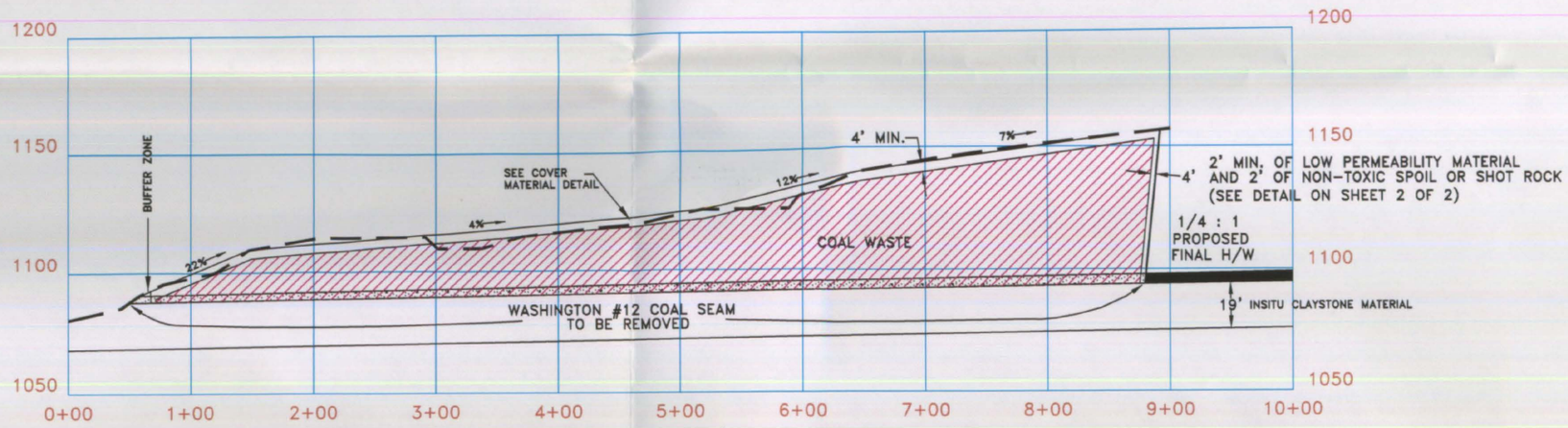
Jack Hamilton & Associates, Inc.
Engineering, Surveying & GIS
342 High St., Box 471
Flushing, Ohio 43977
Ph: (740) 968-4947
Fax: (740) 968-4225
E-mail: hamilton@1st.net
www.hamiltonandassoc.com

DATE REVISED: 3-7-02
DATE REVISED: 4-10-02

425WASTESSU.DWG

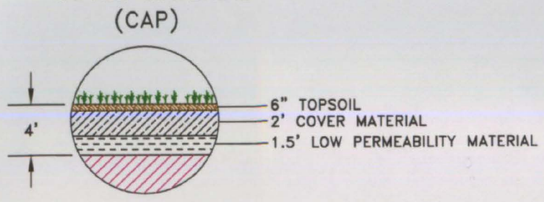


SECTION E–E'

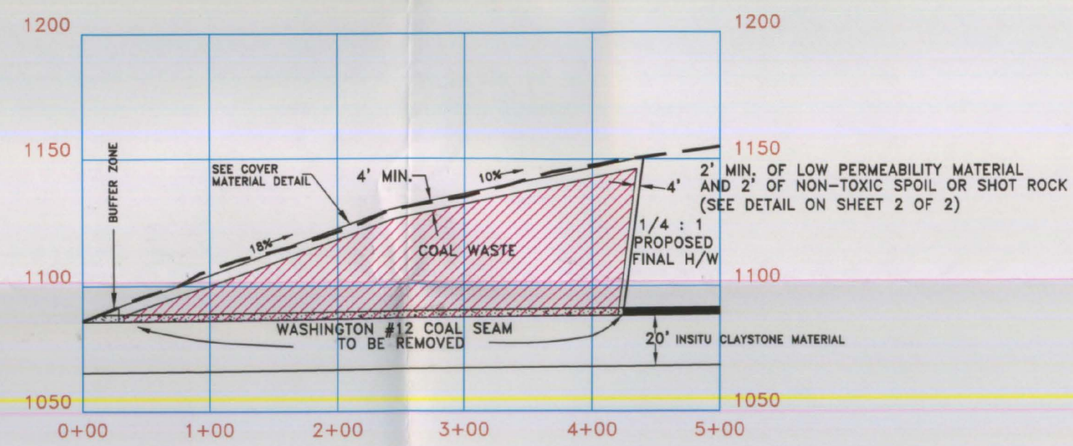


SECTION D–D'

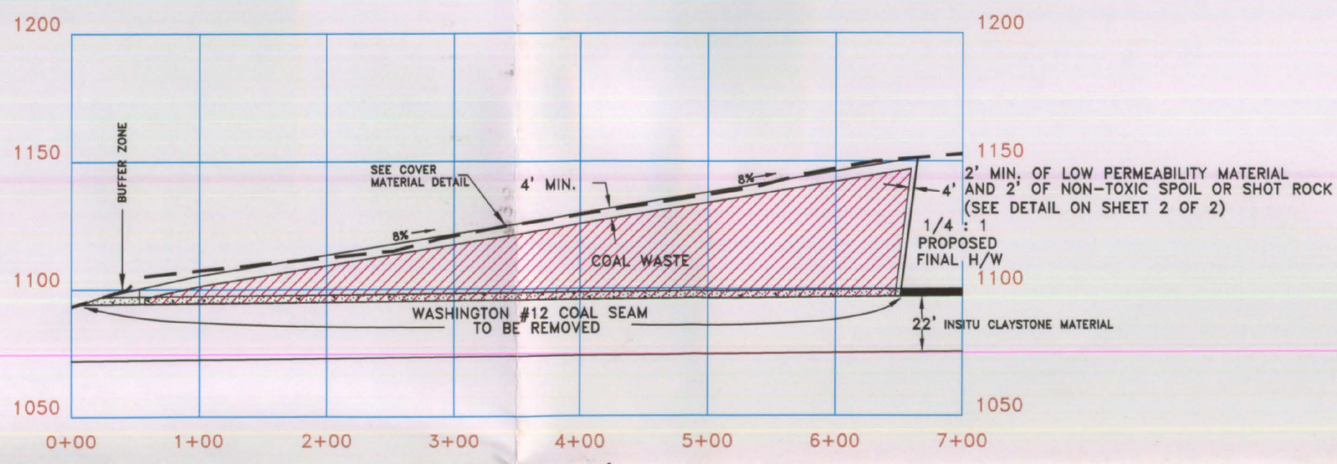
DETAIL OF COVER MATERIAL (CAP)



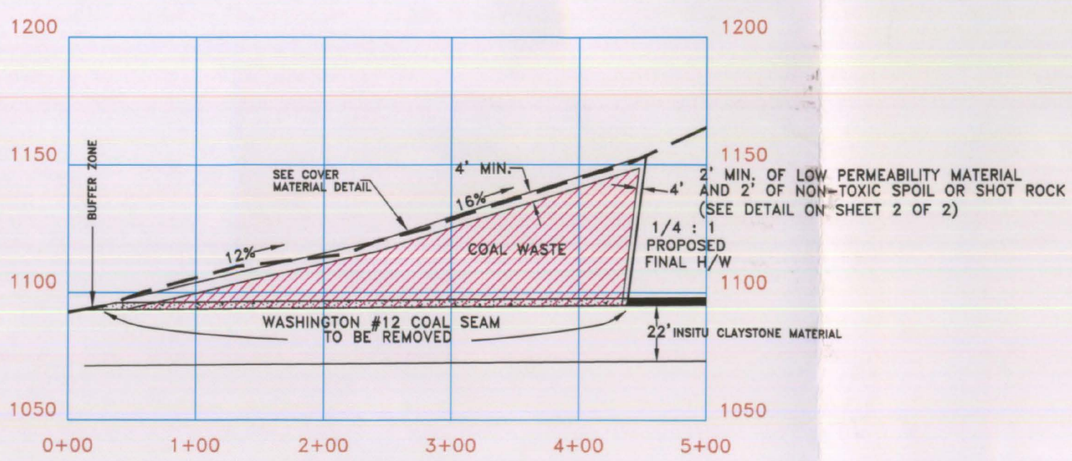
SCALE: 1" = 10'



SECTION C–C'



SECTION B–B'



SECTION A–A'

— — — EXISTING GRADE

——— FINAL GRADE

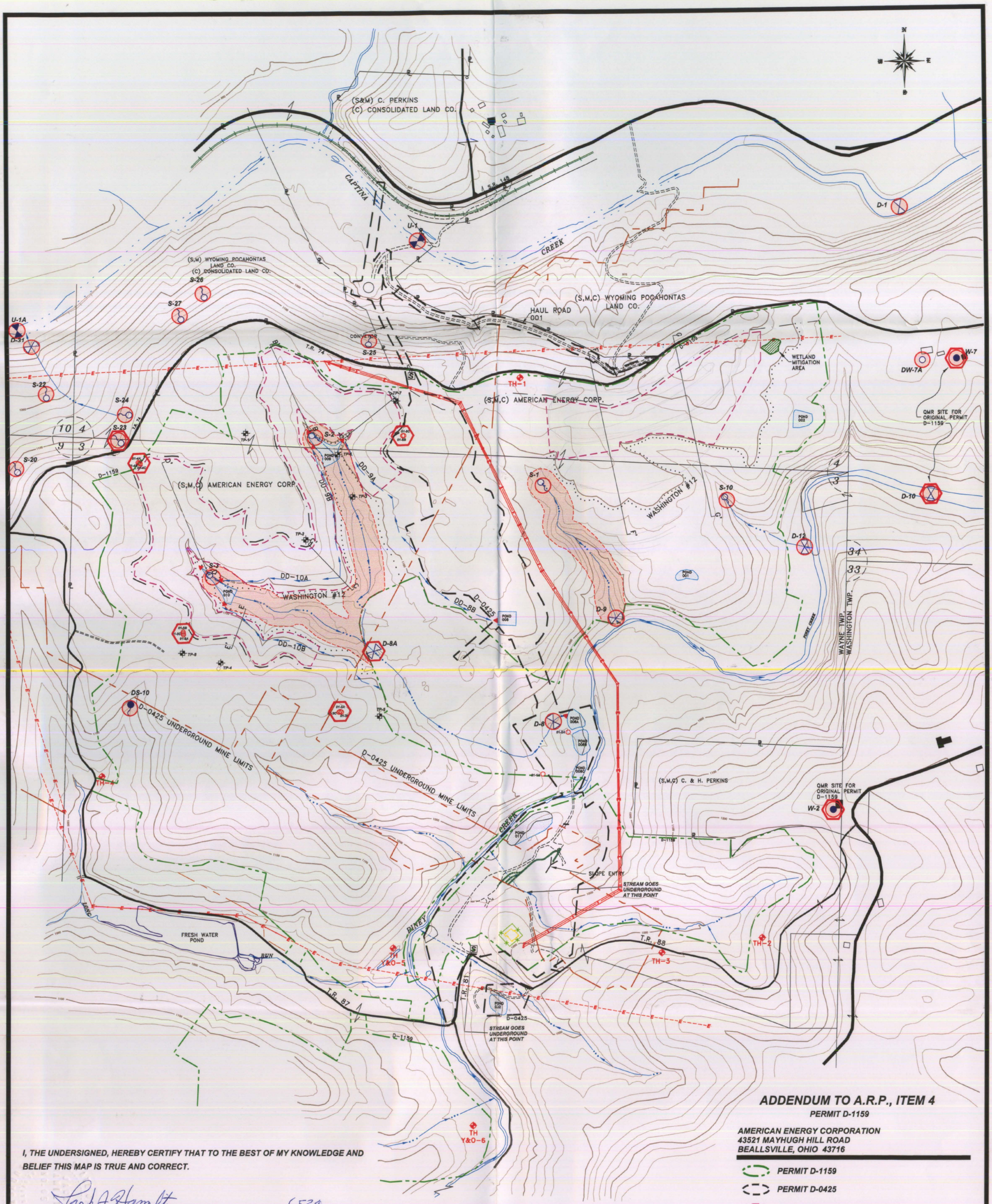
ADDENDUM TO A.R.P., ITEM 4 AND ATTACHMENT 28, ITEM 14

AMERICAN ENERGY CORPORATION	R-1159-4
SECTION: 3, 4	T.- 6 R.- 5
TWP.- WAYNE	COUNTY: BELMONT
HORIZ. SCALE: 1" = 100'	VERT. SCALE: 1" = 50'
DATE PREPARED: NOVEMBER 28, 2001	SHEET 1 OF 2

Jack Hamilton & Associates, Inc.
Engineering, Surveying & GIS
342 High St., Box 471
Flushing, Ohio 43977
Ph: (740) 968-4947
Fax: (740) 968-4225
E-mail: hamilton@1st.net
www.hamiltonandassoc.com

DATE REVISED: 3-11-02
DATE REVISED: 4-10-02

425WASTESSU.DWG



ADDENDUM TO A.R.P., ITEM 4

PERMIT D-1159

AMERICAN ENERGY CORPORATION
43521 MAYHUGH HILL ROAD
BEALLSVILLE, OHIO 43716

- PERMIT D-1159
- PERMIT D-0425
- PROPOSED REFUSE DISPOSAL
- WASHINGTON #12 COAL OUTCROP

SITUATED IN SECTIONS 3 AND 4, T-6 R-5, WAYNE TOWNSHIP, BELMONT COUNTY, OHIO.

LOCATED ON THE USGS HUNTER QUADRANGLE.

SCALE: 1" = 400' CONTOUR INTERVAL: 20'

DATE PREPARED: NOVEMBER 30, 2001

ARP_WASTE.DWG DRAWN BY: SSU

REVISED: 3-8-02
REVISED: 4-10-02

- TP-# TEST PITS
- MONITORING WELL
- QUARTERLY MONITORING SITE
- BUFFER ZONE (100')

I, THE UNDERSIGNED, HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS MAP IS TRUE AND CORRECT.

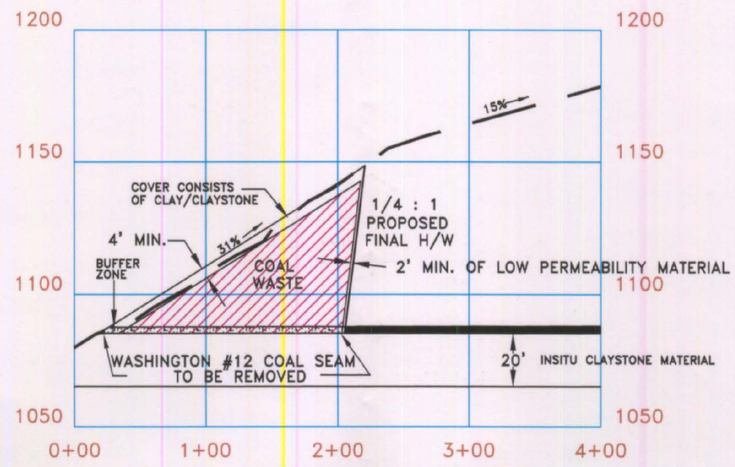
Jack A Hamlin
6524
REG. SURVEYOR #

ACKNOWLEDGED BEFORE ME A NOTARY PUBLIC THIS 10th DAY OF April, 2002

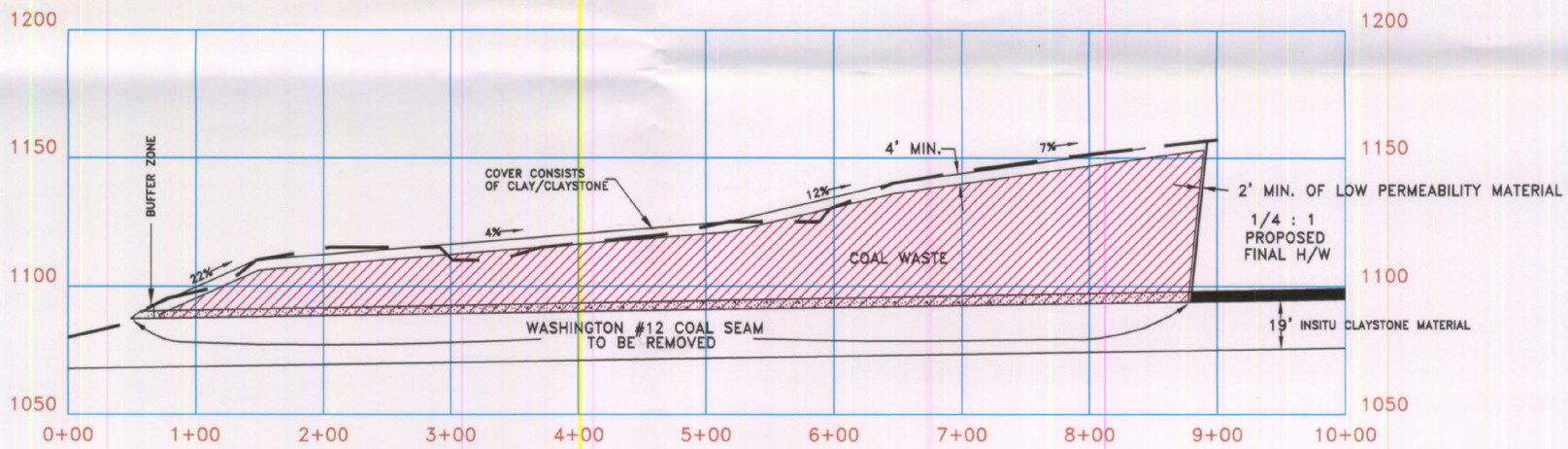
Arlene Warner
Notary Public, State of Ohio
My Commission Expires 7/22/2002

Arlene Warner
NOTARY PUBLIC

AEC 10588

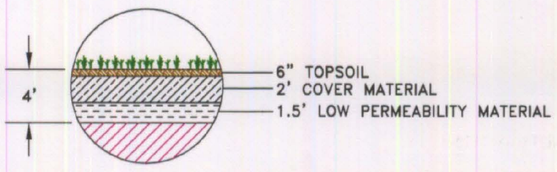


SECTION E–E'

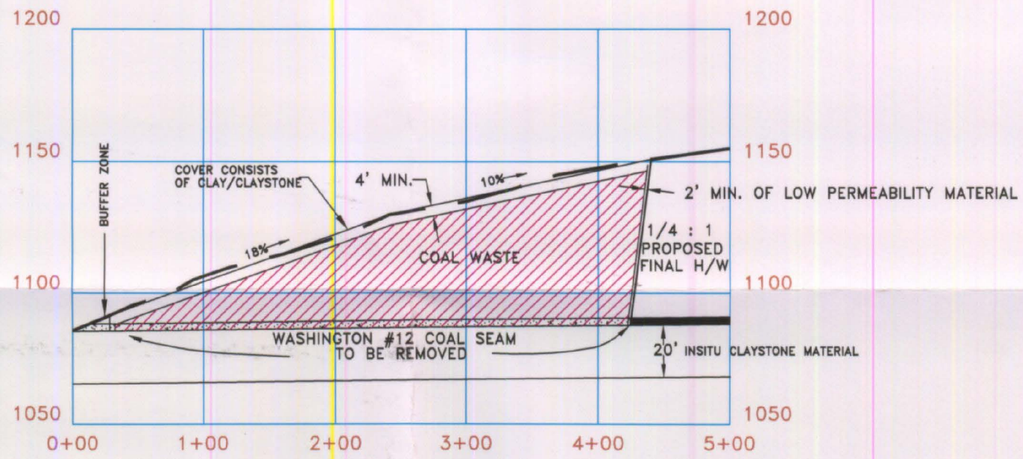


SECTION D–D'

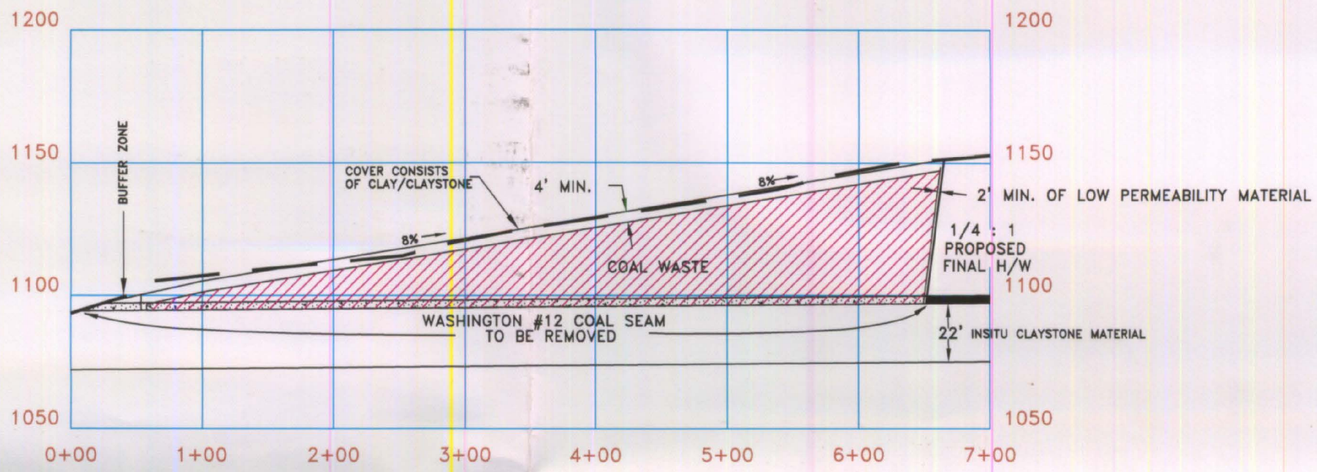
DETAIL OF COVER MATERIAL (CAP)



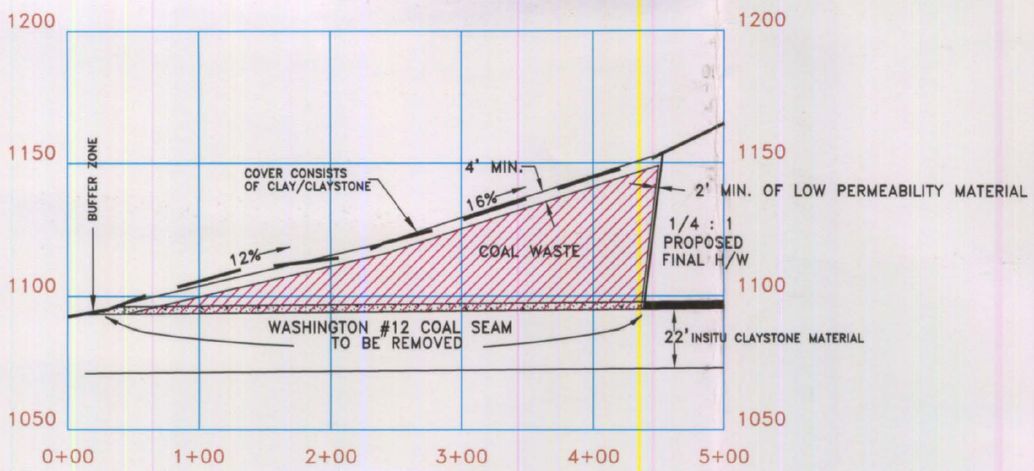
SCALE: 1" = 10'



SECTION C–C'



SECTION B–B'



SECTION A–A'

EXISTING GRADE

FINAL GRADE

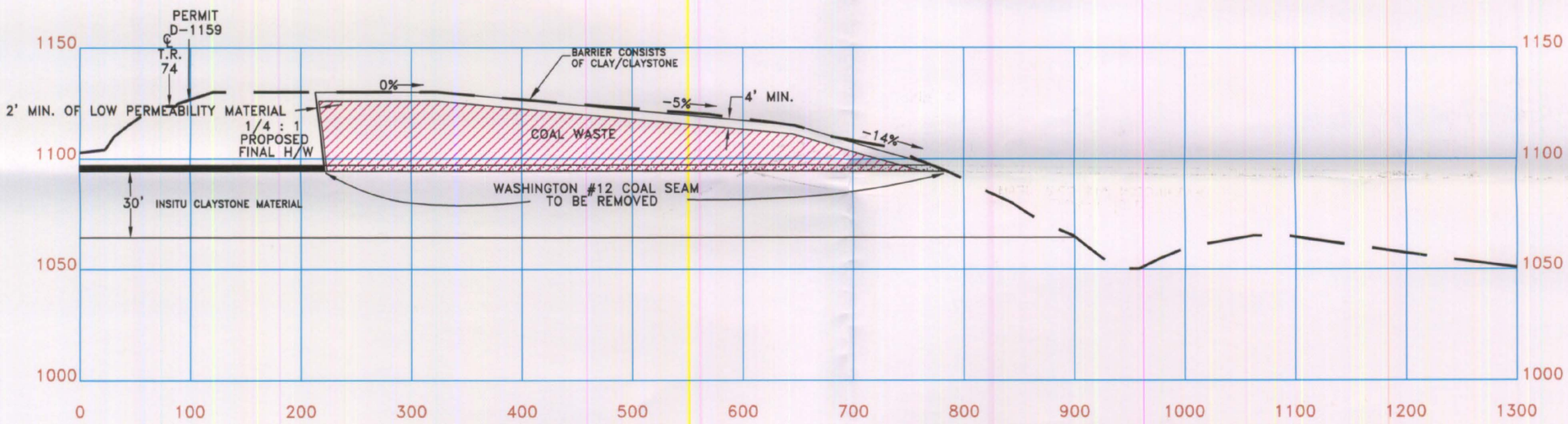
ADDENDUM TO A.R.P., ITEM 4
AND ATTACHMENT 28, ITEM 14

AMERICAN ENERGY CORPORATION	R-1159-4
SECTION: 3, 4	T.- 6 R.- 5
TWP.- WAYNE	COUNTY: BELMONT
HORIZ. SCALE: 1" = 100'	VERT. SCALE: 1" = 50'
DATE PREPARED: NOVEMBER 28, 2001	SHEET 1 OF 2

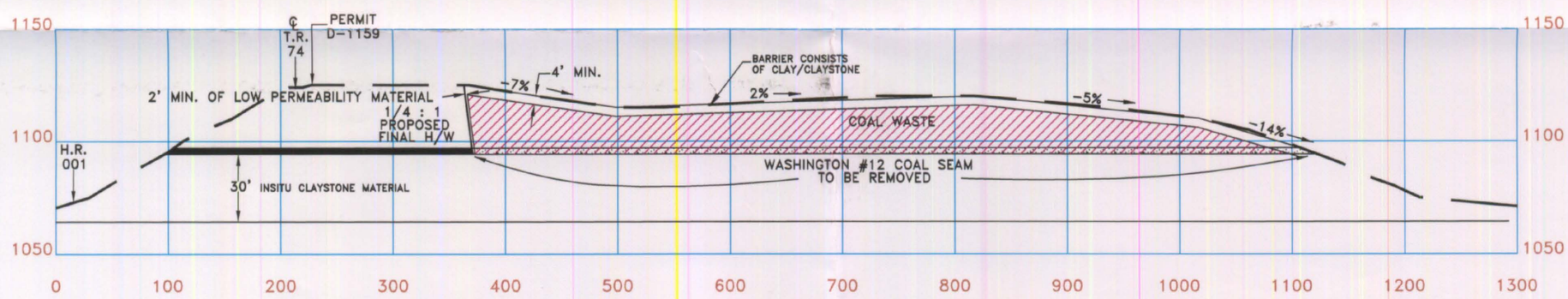
Jack Hamilton & Associates, Inc.
Engineering, Surveying & GIS
342 High St., Box 471
Flushing, Ohio 43977
Ph: (740) 968-4947
Fax: (740) 968-4225
E-mail: hamilton@1st.net
www.hamiltonandassoc.com

DATE REVISED: 3-11-02

425WASTESSU.DWG

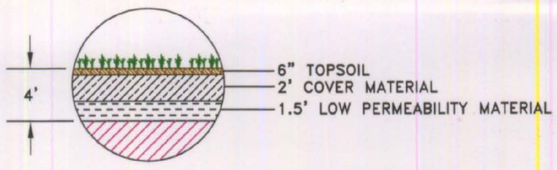


SECTION G-G'



SECTION F-F'

DETAIL OF
COVER MATERIAL
(CAP)



SCALE: 1" = 10'

EXISTING GRADE

FINAL GRADE

ADDENDUM TO A.R.P., ITEM 4
AND ATTACHMENT 28, ITEM 14

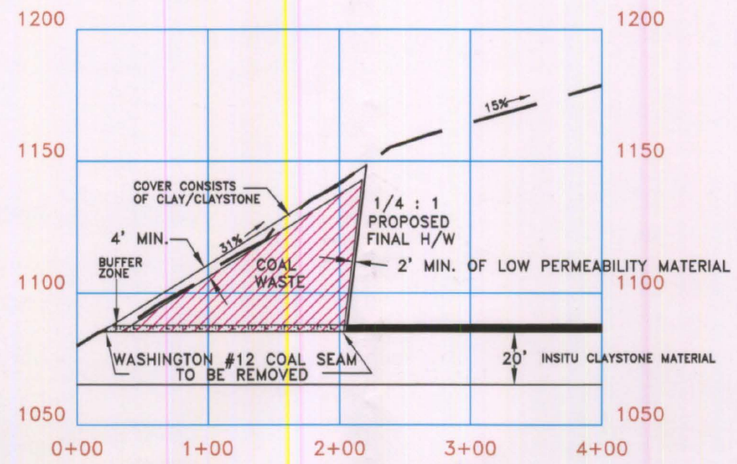
AMERICAN ENERGY CORPORATION R-1159-4

SECTION: 3, 4	T.- 6 R.- 5
TWP.- WAYNE	COUNTY: BELMONT
HORIZ. SCALE: 1" = 100'	VERT. SCALE: 1" = 50'
DATE PREPARED: NOVEMBER 28, 2001	SHEET 2 OF 2

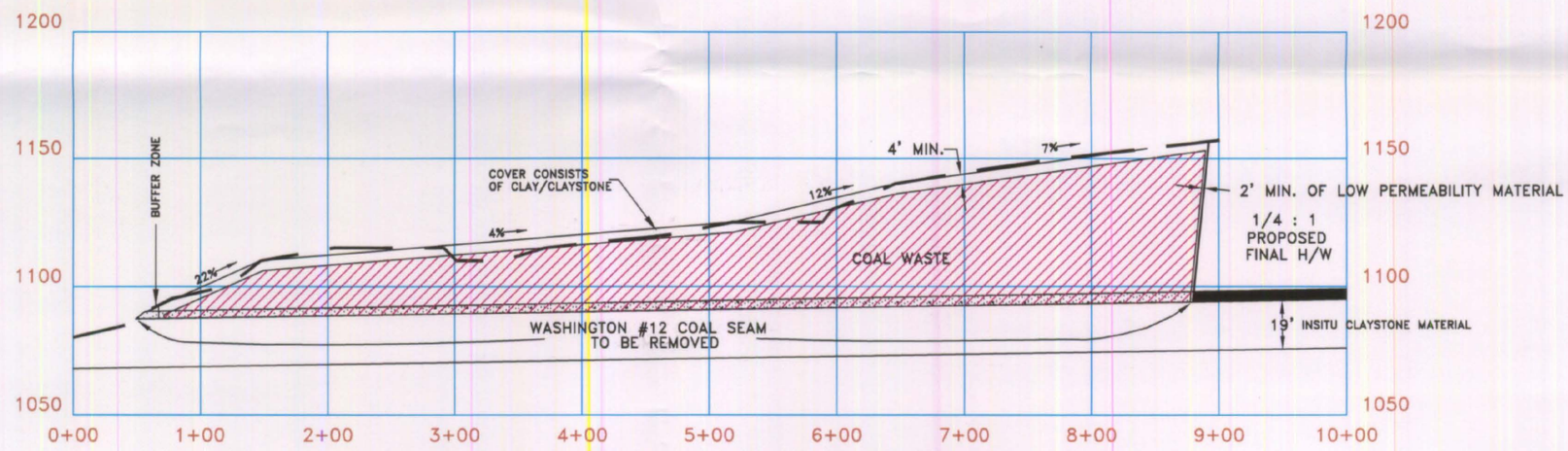
Jack Hamilton & Associates, Inc.
Engineering, Surveying & GIS
342 High St., Box 471
Flushing, Ohio 43977
Ph: (740) 968-4947
Fax: (740) 968-4225
E-mail: hamilton@1st.net
www.hamiltonandassoc.com

DATE REVISED: 3-7-02

425WASTESSU.DWG

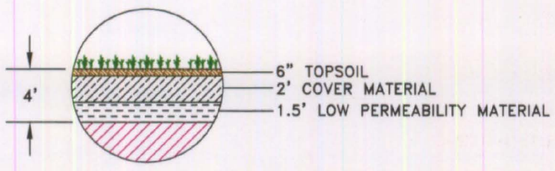


SECTION E–E'

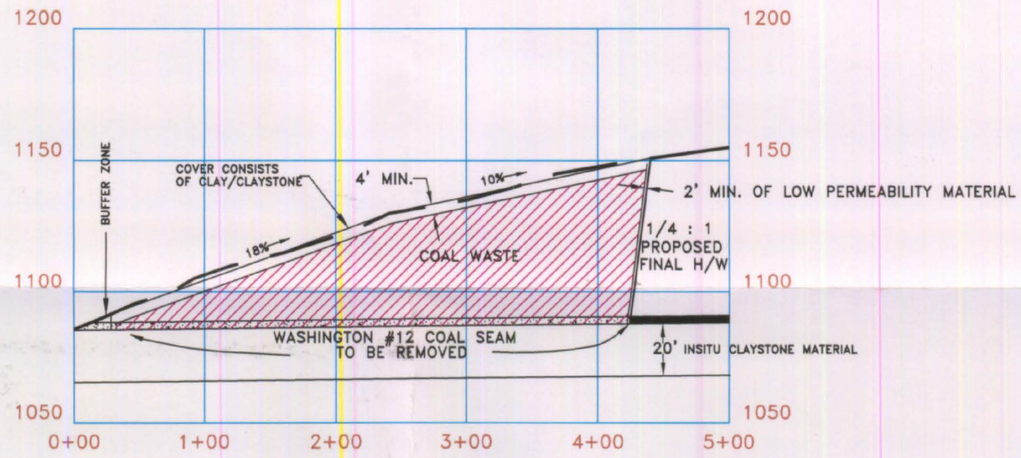


SECTION D–D'

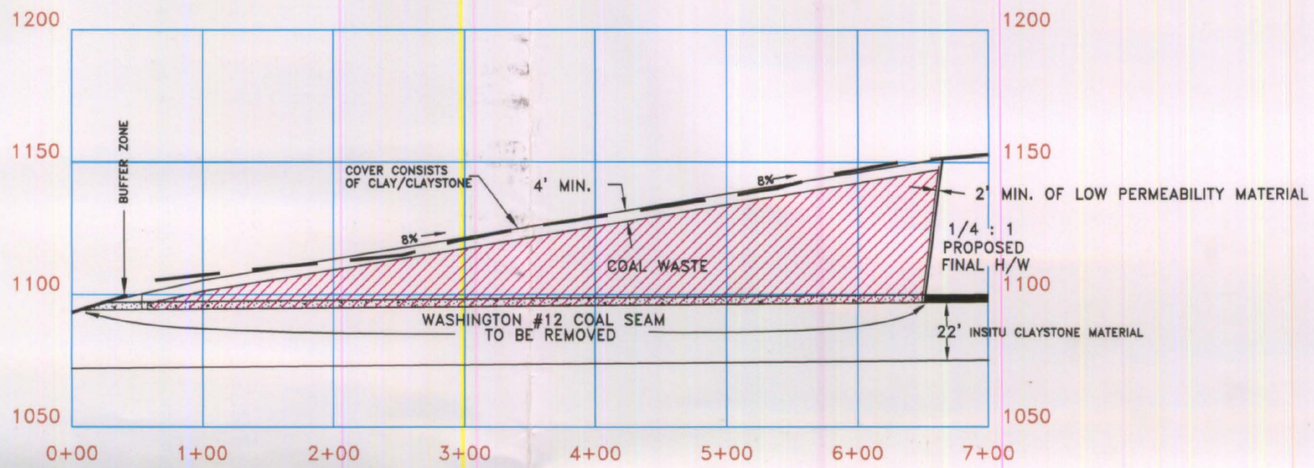
DETAIL OF COVER MATERIAL (CAP)



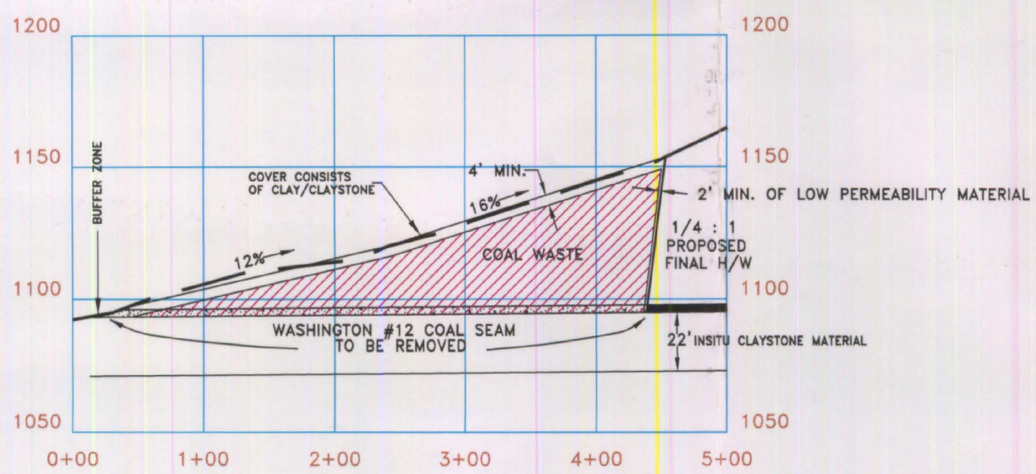
SCALE: 1" = 10'



SECTION C–C'



SECTION B–B'



SECTION A–A'

EXISTING GRADE

FINAL GRADE

ADDENDUM TO A.R.P., ITEM 4
AND ATTACHMENT 28, ITEM 14

AMERICAN ENERGY CORPORATION	R-1159-4
SECTION: 3, 4	T.- 6 R.- 5
TWP.- WAYNE	COUNTY: BELMONT
HORIZ. SCALE: 1" = 100'	VERT. SCALE: 1" = 50'
DATE PREPARED: NOVEMBER 28, 2001	SHEET 1 OF 2

Jack Hamilton & Associates, Inc.
342 High St., Box 471
Flushing, Ohio 43977
Ph: (740) 968-4947
Fax: (740) 968-4225
E-mail: hamilton@1st.net

DATE REVISED: 3-11-02