Appendix 8-C. Lost River core charts

Magnetic Susceptibility (cgs * 10 ⁻⁶) P-Wave Velocity (m/s) Gam (cg 0 0 0 0 0 0 0	s) (H, He, Li, Be, B, C, N, O, F, Ne & Na) (%) Ca (%) Si (%) Remai	ning (%) ₹ IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Core: LR 27 DH 251 Color Features
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Mummun Manululum Man Manululum Manululum Manululum Manululum Manululum Manulum Manululum Manulul	Dark to medium gray, regular evenly silty calcareous shale; darker shale i are thinly laminated and fossiliferrou intervals are very thinly bedded. Cal dolomite beds regularly bedded Dark gray clay shale alternating with gray silty shale; all units calcareou irregular fossiliferrous interbeds (1- Very organic rich black shale seam a	medium s with 10 cm). N2-N4 N2-N4 Fractures horizontally and vertically with
Site: Lost River Sub-Watershed Potomac River Watershed Project Site No 27 Core DH 251 Hardy County, West Virginia Elevation: 1970.4 feet	Origin: Cored as part of geotechnical dam survey. Earliest log information found is February 1977. June 2013 core arrived at WVGES. All scans done at the US Department of Energy National Energy Technology Laboratory in Morgantown, WV July 2013.	 Analysis By: Dustin Crandall, Johnathan Moore, Poonam Giri, Rebecca Rodriquez, Maggie Gill, John Tkach, Charles Alexander & Jamal Cherry Data Collection: Bryan Tennant, Karl Jarvis & Roger Lapeer Project Oversight: Dan Soeder, Dustin McIntyre & Brian Strazisar 	Equipment: Mag. Sus., P-Wave, Gamma - Geo-Tek Multi-Sensor Core Logger XRF - Innov-X Delta handheld XRF analyzer Computed Tomography Images - Toshiba Aquilion

Depth (feet)	Magnetic Susceptibility (cgs * 10 ⁻⁶) ² م م م	P-Wave Velocity (m/s) 00 00 00 22 22 23	Gamma (cgs) 0000 14 0000 2000 2000 2000 2000 2000 2	Light Elements (H, He, Li, Be, B, C, N, O, F, Ne & Na) (%) & & & & & & & & & & & & & & & & & & &	Ca (%) ≈ ♀ 。	Si (%) R ₀ ♀ ୠ ₀	Remaining (%) ~ 은 없	Remaining XRF Legend Mg P V Al K Fe S Ti Ni	l Cu Pb	Description	Color	Core: LR 27 DH 25 Features
31	Marray			 Trank and the second se			Mar Mu			Black to dark grey silty, calcareous shale. Irregular, even and thinly laminated to aminated beds. Uneven vertical calcite and organic filled fractures	N1-N3	Calcite filled fractures (0.5mm to 2 cm), with iron
31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51	Marth Marth Marthan	LUMMAN WUMM		water war with fully war	MMM MMM	MAN WAN	W. Marry Woward Jun		cale	Medium light grey to greyish black silty careous shale. Irregular and even, thin beds th regular and even, thin laminations within. Alternating light and dark beds	N2-N6	Fossil bed at 33.3-33.6 ft. Large vein of calcite at 37.6-39.0 ft
- 40 - 41 - 42 - 43 - 44 - 45									D	Dusky yellowish brown clayey shale. Highly weathered, very soft/friable. Only 20% recovered from this interval	N/A	Poor quality core
 46 47 48 49 50 51 52 	MMMM			properties and the second second	M M M M M M M M M M M M M M M M M M M	W MAN WANNA MA	MM who who have a fe		cald	Black to medium light grey silty, weakly careous shalewith irregular, even, very thinly dded with some laminations. Alternating light and dark beds	N1-N6	Vertical and oblique calcite filled fractures (hairline to ~1cm) with iron staining

Site: Lost River Sub-Watershed Potomac River Watershed Project	Origin: Cored as part of geotechnical dam survey. Earliest log information found is February 1977. June 2013 core arrived at WVGES.	Analysis By: Dustin Grandali, Jonnathan Moore, Poonam Giri,	Equipment: Mag. Sus., P-Wave, Gamma - Geo-Tek Multi-Sensor Core Logger
	June 2013 core arrived at WVGES. All scans done at the US Department of Energy		XRF - Innov-X Delta handheld XRF analyzer
Hardy County, West Virginia	National Energy Technology Laboratory		Computed Tomography Images - Toshiba Aquilion
Elevation: 1983.9	in Morgantown, WV July 2013.	Project Oversight: Dan Soeder, Dustin McIntyre & Brian Strazisar	

Depth (feet)	$\begin{array}{c c} \mbox{Magnetic} & \mbox{P-Wave} & \mbox{Gamma} \\ \mbox{Susceptibility} & \mbox{(cgs * 10^{-6})} & \mbox{(m/s)} & \mbox{(cgs)} \\ \mbox{0} & \mbox{0} $	Light Elements ^(H, He, Li, Be, B, C, N, O, F, Ne & Na) (%) Ca (%) O S S S P O R 9 UUU	Si (%) Remaining (%) ○ ♀ ጺ ஜ ₀ ጺ ♀ □	Remaining XRF Legend Mg P V Cu Al K Fe Pb S Ti Ni		Color	Core: LR 27 DH 254 Features
28 32 36 40 44 48 52 56 60 60 64 68 72 76 80 80 84 88		rowly require device the device of the second of the secon		sha	ledium light grey to black calcareous clay ile. Color darkens with depth. Beds are thin and irregular with very thin laminations. ernating light and dark layers with frequent ds of fossil hash (0.05 ft to 2 ft in thickness)	N1-N6	Fossil beds, possible brachiopod casts, vertical calcite and organic filled fractures
56 60 64 68 72 76			Automotive and a start of the s	Alter beds calc	ight grey to greyish black silty, calcareous shale. Beds are uneven and irregular. irrating light and dark beds with some fossil s. Fossil beds have increased occurrence of cite veins. Hairline calcite veins also present throughout ight grey to greyish black calcareous clay le. Abundant and erratically oriented calcite dolomite veins. Hairline organic filled veins. eds are even and irregular with few fossil beds. Black shale bed (N1) at 79.9 ft	N2-N7	Calcite filled fractures, fossil beds
80 84 88 92 96 100		And	M M M M M M M M M M M M M M M M M M M	s lim	Medium grey to dark grey calcareous clay hale. Alternating light and dark beds with nited color variation. Irregular, largely even ds with some uneven beds present. Calcite and dolomite filled veins also present	N3-N5	Limited thin fossil beds, organic filled veins of varying orientation. Calcite and dolomite crystals at 82.4 ft

Site: Lost River Sub-Watershed Potomac River Watershed Project	Origin: Cored as part of geotechnical dam survey. Earliest log information found is February 1977. June 2013 core arrived at WVGES.	Analysis by: Dustin Grandall, Johnathan Woole, Poonant Gin,	Equipment: Mag. Sus., P-Wave, Gamma - Geo-Tek Multi-Sensor Core Logger	
Site No 27 Core DH 254	All scans done at the US Department of Energy National Energy Technology Laboratory	Charles Alexander & Jamal Cherry Data Collection: Bryan Tennant, Karl Jarvis & Roger Lapeer	XRF - Innov-X Delta handheld XRF analyzer Computed Tomography Images - Toshiba Aquilion	

Depth (feet)	Susceptibility (m/s) (c	Light mma Elements gs) (H, He, Li, Be, B, C, N, O, F, Ne & Na) 00000 (%) 00000 (%) 00000 (%) 00000 (%)	Ca (%) Si (%) Remaining ○ २ २० २ २ ० २ २ └───└──└──└──└──└──		Cu Pb Description	Color	Core: LR 27 DH 255 Features
16 18 20 22 24		har had my prover har and har when	alphall all all all all all all all all all		Grayish black to medium dark gray sil calcareous shale. Regular thinly lamin inly bedded intervals with Calcite fillec regular fractures. Regular very thinly the fossiliferrous interbeds	careous am. To N3-N6	Irregular calcite filled vertical fractures; black nodules in fossiliferrous regions Calcite veins that terminate in dark
26 28 30 32 34		way was a provident	WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW	- th	very thin-bedded and even. Lighter be hinly laminated and slightly uneven (wa fossiliferrous zones. Calcite veins cro- beds and also present as nodule Medium dark gray to light gray silty calk shale. Beds range from laminated to edded and regular in the absence of fr vertical organic rich fractures throughon herbedded fossiliferrous zones. Iron ri at 28.5 ft	avy) with psscut ss careous o thin actures; but with N4-N7	Vertical fractures throughout with organic rich fill material. Lighter nodules in organic-rich intervals
36 38 40 42 42 44 44	Marth Warren M Warren Mar	Marana and and and have	My Mart L 1 Marchen Mart	s	Grayish black to medium gray calcaro shale. Alternating dark and light beds; even beds which are laminated an iterbedded with fossiliferrous intervals. veins present and terminate at darke intervals.	regular nd N2-N4	Vertical calcite filled fractures. Soft sediment deformation with uneven bedding in minor intervals
Potom Site No Hardy	ost River Sub-Watershed ac River Watershed Project o 27 Core DH 255 County, West Virginia on: 1986.1 feet	Earliest log information f	bund is February 1977. at WVGES. Department of Energy logy Laboratory	nalysis By: Dustin Crandall, Johna ebecca Rodriquez, Maggie Gill, Jol harles Alexander & Jamal Cherry ata Collection: Bryan Tennant, Ka roject Oversight: Dan Soeder, Du	hn Tkach, arl Jarvis & Roger Lapeer	Equipment: Mag. Sus., P-Wave, Gam Multi-Sensor Core Logge XRF - Innov-X Delta hand Computed Tomography In Toshiba Aquilion	r Iheld XRF analyzer

Depth (feet)	Magnetic Susceptibility (cgs * 10 ⁻⁶) P-Wave Velocity (m/s) 00 00 00 2 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Gamma	Light Elements (H, He, Li, Be, B, C, N, O, F, Ne & Na) (%) & % % % & & & & & & & & & & & & & & & &	Ca (%) 2	o 30 50 40	emaining (%) ₂ ≌ ಔ ಔ	Remaining XRF Legend Mg P V Al K Fe S Ti Ni	Cu Pb Description		Color	Core: LR 27 DH 256 Features
16 20 24 28	יאולורווויאי-רייניין אווויאירין אין אין אייר איזער אייר איזער אייר איזער אווין אין אוווין אייר איזער אייר אייר גערערי-רייניין איזעריין אין אין אייר איזערער אייר איזער אייר איזער אייר איזער אייר איזער אייר אייר איזער אייר א		Adama and a set of a set of a set of the set	y Wey of the bootstate by the contract of the bootstate by the second second second second second second second	uhanaaanaanaanaanaanaanaanaanaanaanaanaan	When the second se		Very light gray to grayish black silty ca shale. Even irregular beds. Fossil diminish in thickness and abundance v (3-13 cm). Hairline calcite veins of v orientation; FeOH(x) present on fra surfaces	beds vith depth variable	N2-N8	Fossil beds and fractures
32			nthe legitication	MAN 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Horry Harlin 1	*		Medium gray to grayish black silty cal shale with abundant white calcite; may breccia. Highly deformed and fracture and calcite veins with limited isolated o No apparent bedding. FeOH(x) pr	y be fault e organic dolomite;	N2-N9	Soft sediment deformation with organics and calcite
40 44 48 52 56 60 60 64 68 72			radio and share been been an	Auth, "Territon, who have a first or the prophet of the source of the control of the control of the control of the source of the	עראט איר אינאראט איראאר אין איראט אינעראע איראט אינעראט אינעראינעראניעראניעראעראעראעראראנין אין אין אין אין אי אינעראעראעראעראער אין אינעראעראעראעראעראעראעראעראעראעראעראעראעראע	r-should have here the function of the testing the resultion with the second dependence of the second s		Light gray to grayish black silty calca shale. Alternating light and dark irregu very thin beds with few fossil beds inte (~5 cm thick). Infrequent calcite and filled veins; hairline calcite filled fra	ular even erspersed organic	N2-N7	Fossil beds and fractures
Potoma Site No Hardy	ost River Sub-Watershe ac River Watershed Proj 27 Core DH 256 County, West Virginia on: 2001.9 feet	ject June 2013 co All scans dor National Ene	d as part of gen formation fou ore arrived at v ne at the US D orgy Technolog vn, WV July 20	ind is Feb WVGES.)epartmer gy Labora	ruary 1977 nt of Energ	y Rebec Charle Data C	ca Rodriquez, Maggie Gill, s Alexander & Jamal Cherr collection: Bryan Tennant,		Multi-Sensor	Core Logger X Delta hand omography Ir	held XRF analyzer

Depth (feet)	Magnetic Susceptibility (cgs * 10 ⁻⁶)	P-Wave Velocity (m/s) 00 00 00 25 25 25 002 00 00 25 10 20 20 20 20 20 20 20 20 20 20 20 20 20	Gamma (cgs) 5 80 00 00 5 90 00		Light Elements (M, He, Li, Be, B, C, N, O, F, Ne & Na) (%) 2, 4, 5, 5, (%)	Ca (%)		Remaining o º ೪ ೫ j		d Cu Pb	Description	C	olor	Core: LR 27 DH 51 Features
20 22 24 24 26	MW W WW				Mrs Man	MM NM-M	Mm Mm				lium to dark grey silty calcareous sha nitant even and irregular thinly lamina layers (~2 cm thick)	ated	3-N5	Irregular and uneven vertical fractures with calcareous fill
28					۳ بار <i>د</i> ر	M.	1 VI n	T N.Y		shale;	dium grey to dark grey silty calcareou prone to breakage along thinly lamin egions. Laminae are even and irrgula	ated		Calcite and dolomite filled fractures, typically perpendicular to bedding
32 34 36 38	www.w.w. w. h. h. h. h. h. h.	Man ~ 11 - Marthal			Many la prophylication		Month I Work M	MMMMMM II - hnurry		s Lamir biotu	um dark grey to light grey silty calcare shale with thinly laminated sections . nations are even and more regular. S urbation in lighter colored portions alc sporadic 2-10 cm calcareous fossil be More cohesive section	ome N3	3-N6	Irregular calcite filled fractures
40	n phile why	1 Mr Mr	\$ } }		representation of the second		Why MI	Marthe Mehrer		shale; and d and u Dark	um light grey to dark grey silty calcare color lightens with depth. Alternating ark bands (~1cm width) and thin , irre uneven laminations present. Evidence bioturbation grey, silty calcareous shale. Some ~1 and dark color banding. Hairline oblic	light gular e of	2-N5 N2	Wide cross-cutting horizontal and vertical fractures filled with crystalline calcite and dolomite Slickensides on bedding and vertical fracture surfaces (tend
46					Mar	~Nw M	Ar Jan U			Med	calcite-filled vertical fractures ium dark grey to dark grey massive c shale with slight olive grey hue	lay N2	2-N3	to coincide with calcite) Irregular hairline fractures with calcite fill
Potoma Site No Hardy	ost River Su ac River Wa 27 Core Di County, Wes on: 1958 fee	tershed P H 51 st Virginia	roject All so Natio	est log ir 2013 co cans dor onal Ene	d as part of formation fore arrived a ne at the US rgy Techno vn, WV July	ound is Fe at WVGES Departme logy Labor	oruary 197 Int of Ener	rgy Reb Dat	Iysis By: Dustin Crandall, J ecca Rodriquez, Maggie Gil rles Alexander & Jamal Che a Collection: Bryan Tennan ject Oversight: Dan Soeder	ll, John T erry it, Karl Ja	rkach, Kach, Roger Lapeer	Ilti-Sensor Co	e Logge elta han graphy I	dheld XRF analyzer

Depth (feet)	Magnetic Susceptibility (cgs * 10 ⁻⁶)	P-Wave Velocity (m/s) 00 00 00 25 25 25 00 00 02 24 25	Gamma (cgs) 5000 00 1400 5000 000 5000 00000000		Light Elements (H, He, Li, Be, B, C, N, O, F, Ne & Na) (%)	Ca (%) 2 2 2 3 2 1 1 2	Si (%) to	Remaining (% ೫ ₀ ♀ ೫ ೫	Remaining XRF Legend Mg P V Al K Fe S Ti Ni	Cu Pb	Description		Color	Core: LR 27 DH 61 Features
14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44					why hy h h		I'M / Mul	North And A Marked Market		clay s bre Mo sha	ium dark grey to greyish black calc shale. Highly fractured rubble, with eakage planes. No discernable bed Some calcite filled fractures edium grey to light grey calcareous ile. ~1 cm thick calcite-filled fracture arent bedding. Horizontal breakage at fairly regular (~5 cm) intervals	varying Iding. s silty es. No planes	N2-N4 N5-N7	Calcite filled fractures, small fossil bed Calcite filled fractures
28 28 30 32 34 34	11 1444 12 14 444 14 14 14									clay : reg lay	lium light grey to greyish black calc shale. When present, bedding is ev jular. Alternate competant and crun yers. Few calcite filled fractures, un ertical hairline fractures with organic calcite fill. Some fossil beds	ven and nbling leven	N2-N6	Calcite filled fractures, fossil beds
38 40 42 44 46 46 48 50	And the Mar product of the product o				program with the preserve and	John May My Mary Mary	In marine of the Marine and the second of the second secon	hall be a second for the second secon		Irre with clean	lack to dark grey calcareous clay sl gular and even, very thin beds. Col fairly uniform coloration. Most brea and even and still fit together. Sm at 44.4-44.7 ft; minimal calcite and filled fractures	hesive aks are all fossil	N1-N3	Very dark, fractures present, fossil bed
Potoma Site No Hardy	ost River Su ac River Wat 27 Core DH County, Wes on: Unknowr	tershed Pi H 61 st Virginia	roject Earlie June All so Natio	est log in 2013 co cans don onal Ener	l as part of formation for re arrived a e at the US gy Technol n, WV July	ound is Fel at WVGES. Departme ogy Labora	bruary 19 ent of Ene	ergy Data	sis By: Dustin Crandall, Jo cca Rodriquez, Maggie Gill es Alexander & Jamal Cher Collection: Bryan Tennant ct Oversight: Dan Soeder	, John [:] ry , Karl J	Tkach, Jarvis & Roger Lapeer	Multi-Senso XRF - Inno	P-Wave, Gan or Core Logge v-X Delta han Tomography I	dheld XRF analyzer

Magnetic Susceptibility (cgs * 10 ⁻⁶)	Constant of the second	Light Elements ^(H, He, Li, Be, B, C, N, O, F, Ne & Na) (%) Ca (9)	, , ,	Remaining (%)	Remaining XRF Legend Mg P V A	Cu Pb		Core: LR 27 DH 651
تې ې _۵ ۵ ۲ ۲ ۵ ۵ Depth (feet)		2 2 2 2 8 8 8 8 8 8 8 8			S Ti Ni	Description	Color	Features
		why yhould	MMM M MMM			Dark gray to medium gray, very thinly to thinly bedded shale. Alternating even regular banding of dark and light intervals. Light sections are calcareous with small calcite (~1 cm) nodules	N3-N5	Fractures perpendicular to bedding with dark organic fill
		r W W /				Light gray to medium dark gray, irregularly bedded calcareous shale; very thinly to thinly bedded and uneven beds with fossiliferrous interbeds which are irregular and very thinly	N4-N7	Fractures between fossiliferrous beds with calcite
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		My 11 11 11 11 11 11 11 11 11 11 11 11 11	Many Many Mary Mary Mary Mary man he in the international and the second and the second and the second of the second and the second of the sec	Morrison and the second of the		Grayish black to medium light gray regularly bedded calcareous shale. Light calcareous and fossliferrous beds are very thinly bedded; alternating darker intervals are thinly bedded. Calcite nodules and veins coincide with fossils and soft sediment deformation	N2-N6	Fractures in calcite regions. FeOH(x) is present

	Origin: Cored as part of geotechnical dam survey. Earliest log information found is February 1977. June 2013 core arrived at WVGES.		Equipment: Mag. Sus., P-Wave, Gamma - Geo-Tek Multi-Sensor Core Logger
Site No 27 Core DH 651	June 2013 core arrived at WVGES. All scans done at the US Department of Energy	1	XRF - Innov-X Delta handheld XRF analyzer
Hardy County, West Virginia Elevation: Unknown	National Energy Technology Laboratory		Computed Tomography Images - Toshiba Aquilion
	in Morgantown, WV July 2013.	Project Oversight: Dan Soeder, Dustin McIntyre & Brian Strazisar	A MARK

Depth (feet)	Magnetic Susceptibility (cgs * 10 ⁻⁶)	P-Wave Velocity (m/s) 00 00 00 22 22 02 42	Gamma (cgs) 6000 6000 6000 6000 6000 6000 6000 60		Light Elements (H, He, Li, Be, B, C, N, O, F, Ne & Na) (%) ₩ ₩ ₩ ₩ ₩ ₩ ₩	Ca (%) - 8 9 8	Si (%) 20 8 9	Remaining (%) ∾ ♀ ଋ ₨	Remaining XRF Legend Mg P V Al K Fe S Ti Ni	Cu Pb	Description		Color	Core: LR 27 DH 751 Features
12			·····		*					: (rownish gray to yellowish gray, reg thin-bedded, medium to fine graine sandstone. Interbeds of clayey (me cemented lithics (2-3mm) with obvic shrinking. Sandstone is well cemer	ed ed) ous	N4-N8	Brittle with abundant clay interbeds. FeOH in some intervals
16 18 20 22 24 26 28 30 32 34 36 38	10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				12 voly have short pyther for for	14 July Clauder 14 July	1 MM J. Marked J. Market	1 Mandul Mahan		gray	dium bluish gray transitioning to yel y, regular thin to thick bedded, med se grained sandstone. Loosely cer to well cemented	ium to 🛛 / [N5-N8	Minor fractures with dark organic fill
24 26 28 28 30	MAR AND	1 hours hugh 1 h			Hope		1 Marthall Anger	he was a fund and here have		shale bed	rk gray to very light gray silty calcar e. Darker beds are thinly laminated ded and even. Lighter beds are im d more calcareous. Wavey fossilife zones throughout	l to thin egular	N4-N7	Vertical calcite filled fractures. Calcite cross-cuts beds
32					a top for the top and	An An All more	N AL MANN	s A Homen		Gray	ish black to medium dark gray shal	e. Beds		Vertical calcite filled
40 42			and the second sec		-	Mar March Mark	My month	And a second sec		Bec	e regular and even; thin to thick bed ds alternate light and dark througho ction, calcite veins present with dolo inclusions; euhedral crystals	ut the	N2-N4	fractures. Soft sediment deformation with uneven bedding in minor intervals
Potoma	ost River Su ac River Wa 27 Core Di	tershed Pi	roject June 2	st log inf 2013 cor	as part of formation fore arrived a at the US	ound is Fe t WVGES	bruary 19 [°]	77. Rebect	s is By: Dustin Crandall, Joh ca Rodriquez, Maggie Gill, s Alexander & Jamal Cherr	John	an Moore,Poonam Giri, Tkach,	Multi-Senso	P-Wave, Gam r Core Logge	nma - Geo-Tek r dheld XRF analyzer

Potomac River Watershed Project Site No 27 Core **DH 751** Hardy County, West Virginia Elevation: Unknown Normation Found is restricting Trond is restricting Torrest June 2013 core arrived at WVGES. All scans done at the US Department of Energy National Energy Technology Laboratory in Morgantown, WV July 2013. Rebecca Rodriquez, Maggie Gill, John Tkach, Charles Alexander & Jamal Cherry Data Collection: Bryan Tennant, Karl Jarvis & Roger Lapeer Project Oversight: Dan Soeder, Dustin McIntyre & Brian Strazisar

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