

Hedin Environmental Passive Mine Water Treatment Systems

System / Location	Year	Influent	Effluent	Design	HE Role	O&M	System Operator
US91, Scrubgrass Creek, Venango County, PA	2020	23 gpm, pH 3, Al 28, Mn 7, Fe 2	under construction	drainable limestone bed	design, construction oversight	Inspections; limestone rehab	Scrubgrass Creek Watershed Association
19-D, Railroad Run, Mckean County, PA	2020	12 gpm, pH 3, Al 7, Fe 7	under construction	vertical flow pond	design, construction oversight	Inspections; substrate rehab	McKean County Conservation District
K-1, Cherry Run, Elk County PA	2020	600 gpm, pH 4, Al 5	under construction	drainable limestone bed	design, permitting, construction management	Inspections; limestone rehab	Western PA Conservancy
K-2, Cherry Run, Elk County PA	2020	250 gpm, pH 4, Al 6	pH 7, Al and Fe < 1	drainable limestone bed	design, permitting, construction management	Inspections; limestone rehab	Western PA Conservancy
18-D, Railroad Run, Mckean County, PA	2019	200 gpm, pH 5, 10 acid	pH 7, alkaline	oxic limestone bed	design, construction oversight	Inspections; limestone rehab	McKean County Conservation District
Kentucky Hollow, Allegheny County PA	2019	40 gpm, acid, Fe 1, Al 20, Mn 2	pH 7, alkaline, Al and Fe <1	drainable limestone bed	design, permittng, project management	Inspections; limestone rehab	Pittsburgh Botanic Garden
Potts Run, Clearfield County PA	2019	400 gpm, acid, Al 9, Fe 5, Mn 4	pH 7, alkaline, Al and Fe <1	vertical flow ponds	design, permitting, construction management	Inspections; substrate rehab	Trout Unlimited
Elizabeth Superfund, Strafford, VT	2019	12 gpm, acid, 160 Fe	pH 7, alkaline, Fe <1	ALD, pond, VFP, wetland	design, construction oversight	Inspections; substrate rehab	EPA and Vermont DEC
Private Mining Company, Paracatu, Brazil	2019	800 gpm, alkaline, Mn 6, Fe 2	pH 7, alkaline, Fe and Mn < 1	oxic dolomite bed	design	monitoring and aggregate rehab	private
Sovern England, Preston County, WV	2018	35 gpm, acid, Fe 1, Al 1, Mn 1	pH 7, alkaline, Al, Fe, and Mn <1	oxic limestone bed	design and construction	inspections, sampling, flushing	Friends of Cheat
MR-8, Morgan Run, Clearfield County PA	2017	150 gpm, acid 100, Al 10, Mn 8, Fe 2	pH 7, alkaline, Al and Fe <1	VFPs, DLB, wetland	design, permitting, construction management	inspection, substrate and limestone rehab	Clearfield County Conservation District
Blair, Butler County, PA	2016	26 gpm, acid 87, Fe and Al	pH 7.2, alkaline, Fe and Al <1	DLB and existing pond	design, construction oversight	Inspections; limestone rehab	Knox District Mining Office
Andrews Run, Westmoreland County, PA	2016	5 gpm, acid 133, Fe 47, Mn 60	pH 7.5, alkaline, Fe <1, Mn <1	ALD, pond, oxic limestone bed, pond	Design, permitting, project management	Inspections; substrate rehab	New Stanton District Mining Office
Klondike, Tioga County, PA	2016	70 gpm, acid, Fe and Al	pH 7, alkaline, Fe and Al < 1	redesigned vertical flow pond	Design, permitting, project management	Inspections; substrate rehab	Babb Creek Watershed Association
Fall Brook, South System, Tioga County, PA	2015	300-1500 gpm, acid, Al 10	pH 7, alkaline	Drainable LS beds, settling ponds	Design, permitting, project management	Inspections; limestone rehab	Tioga County Conservation District
Fall Brook, North System, Tioga County, PA	2015	30-150 gpm, acid, Fe and Al	pH 7, alkaline	Drainable LS bed, settling pond	Design, permitting, project management	Inspections; limestone rehab	Tioga County Conservation District
Sterrett, Venango County, PA	2015	80 gpm, acid, Fe, Al, and Mn	pH 7, alkaline, Fe and Al <1; Mn 3	Drainable LS beds	Design, permitting, project management	Inspections; limestone rehab	Scrubgrass Creek Watershed Association
Lewis System, Sullivan County, PA	2015	20 gpm, acid, Fe and Al	pH 7, alkaline, Fe and Al < 1	rehabilitated VFP, settling pond/wetland	Design, permitting, project management	Inspections; substrate rehab	Moshannon District Mining Office
Lamberts Run, Somerset County, PA	2015	30-60 gpm, acid 250, Fe 170	Alkalinity 160 mg/L	Anoxic Limestone Drain	Design, construction oversight	Inspections	Somerset Conservation District
Teerco, Pond 4 & S-10, Greene County, PA	2014	30-150 gpm; acid 100, Fe 10, Al 3, Mn 25	pH 7, Fe and Al < 1; Mn < 2	Drainable LS beds, settling pond	Design, construction oversight	Inspections, limestone rehab	private

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Robbins Hollow, Pipes 1-4, Clinton County, PA	2013	15 gpm, acid, Fe and Al	pH 7, Fe and Al < 1	Drainable LS Bed, settling pond	Design, permitting, project management	Inspections; limestone rehab	Trout Unlimited
Robbins Hollow, 10A/10B, Clinton County, PA	2013	15 gpm, acid, Fe and Al	pH 7, alkaline, Fe and Al < 3	Drainable LS Bed, settling pond	Design, permitting, project management	Inspections; limestone rehab	Trout Unlimited
Private Copper/Gold Mining Company, Laos	2013	800 gpm, Fe 2, Mn 4	pH 7, Fe <1, Mn < 0.5	oxic rock bed	Conceptual design	Periodic cleaning of stone by mining company	private
Private Mining Company, Armstrong County, PA	2013	13 gpm, acid 128, Mn 47, Al 8	pH 7, 128 alkalinity, 2-3 Mn, <1 Al	Drainable LS Bed, settling pond	Conceptual design	Inspections; limestone rehab	private
MR-6, Muddy Run, Clinton County, PA	2013	43 gpm, acid 83, Fe 4, Al 3, Mn 22	pH 7, Fe < 1 mg/L, Al < 1 mg/L, Mn 1	Drainable LS Bed, settling pond	Design, project management	Inspections; limestone rehab	Clinton County Conservation District
MR-4, Muddy Run, Clinton County, PA	2013	18 gpm, acid 43 mg/L, Fe <1, Al 6, Mn 11	pH 7, Fe < 1 mg/L, Al < 1 mg/L, Mn < 1	Drainable LS Bed, settling pond	Design, project management	Inspections; limestone rehab	Clinton County Conservation District
MR-2, Muddy Run, Clinton County, PA	2013	41 gpm, acid 95 mg/L, Fe < 1, Al 8, Mn 20	pH 7, Fe < 1 mg/L, Al < 1 mg/L	Drainable LS Bed, settling pond	Design, project management	Inspections; limestone rehab	Clinton County Conservation District
Lotus Pond, PBG, Allegheny County, PA	2013	5-10 gpm, acid 175, Al 24	pH 6.5, Al < 1 mg/L	Drainable LS Bed	Design, project management	Inspections; limestone rehab	Pittsburgh Botanic Garden
Moore DLB System, Somerset County, PA	2012	7 gpm, pH 3.7, Fe 11, Al 2;	pH 7.2, Fe 1, Al <1	DLB, pond	Design, construction oversight	Inspections; limestone rehab	Cambria District Mining Office
Moore ALD System, Somerset County, PA	2012	8 gpm, pH 5.6, Fe 76, Al <1	pH 6.7, Fe <1, Al <1	ALD, pond, wetland	Design, construction oversight	Inspections, sludge and LS rehab	Cambria District Mining Office
Swamp, Clinton County, PA	2012	20-300 gpm, acid 430, Fe 74, Al 36, Mn 25	pH 7, Al and Fe <1, Mn 7	Vertical flow ponds, wetlands	Design, permitting, project management	Inspections; substrate rehab	Trout Unlimited
Tangascootac #1, Clinton County, PA	2010	75 gpm, acid 100, Al 10, Mn 25	pH 7, Al & Mn < 1 mg/L	Drainable limestone bed, VFP	Design, project management	Inspections; limestone rehab	Clinton County Conservation District
Upper Latrobe, Westmoreland County, PA	2010	500 gpm, net alkaline, Fe 40 mg/L	pH 7, Fe <5 mg/L	3 aerobic ponds and constructed wetland	Design, permitting, project management	Inspections; iron removal every 10 years	Loyalhanna Watershed Association
Teerco, Seep B, Greene County, PA	2010	net acid, Fe 80 mg/L	pH 7, Fe <1 mg/L	ALD, aerobic pond, constructed wetlands	Design, permitting, and CO	Inspections; iron removal every 10 years	private
Wingfield Pines, Allegheny County, PA	2009	1,500 gpm, net alkaline, Fe 15	pH 8, Fe <1 mg/L	5 aerobic ponds and constructed wetland	Design, permitting, project management	Inspections; iron removal every 10 years	Allegheny Land Trust
Duquesne Slag, Allegheny County, PA	2009	net acid, Fe 15 mg/L; Mn 3 mg/L	net alkaline, Fe and Mn < 1 mg/L	ALD, settling pond, 2 constructed wetlands	Conceptual design and oversight	Inspections; iron removal every 10 years	private
Filson 7, Clarion County, PA	2008	80 gpm, net acid 180, Fe 105	net alkaline, Fe 20 mg/L	3 ALDs and 2 settlings ponds	Design, project management	Inspections; iron removal every 10 years	Mill Creek Coalition
Bilger Run, Clearfield County, PA	2008	20 gpm, net acid 50, Fe 10	net alkaline, Fe <1 mg/L	ALD and existing settling pond	Design, permitting, project management	Inspections; pond elevation modifications	Anderson Run Watershed Association
Glenraffan Creek	2008	84 gpm, alkaline, pH 7, Fe 12	pH 7-8, Fe < 3 mg/L	aerobic settling pond	Conceptual treatment design, permit review	Inspections; iron removal every 15 years	Pennonni Associates
Teerco, Seep A, Greene County, PA	2007	pH 5-6, Fe 2-10 mg/L	pH 7-8, Fe and Mn < 1 mg/L	ALD and constructed wetland	Design, permitting, construction oversight	Inspections	private

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Wilson Run, Westmoreland County, PA	2007	150-1200 gpm, net alkaline, Fe 30 mg/L	pH 7, Fe 1-5 mg/L Fe	cleaned out and redesigned settling pond	Design, permitting, construction oversight, O&M Plan	Inspections; iron removal (every 15-20 years)	Sewickley Creek Watershed Association
LC20D / Little Coon Run, Clarion County, PA	2007	55 gpm, acid 200 mg/L, Fe 110 mg/L	Fe<2 mg/L, pH 5-6	ALD, pond, wetland	Design, permitting, construction oversight, O&M Plan	Inspections; iron removal (every 15-20 years)	Farmington Township (Clarion County)
Marchand, Westmoreland County, PA	2007	1,800 gpm, net alkaline, pH 6, Fe 70	Fe<1 mg/L, pH 7-8	Aerobic ponds and aerobic wetland	Design, permitting, construction oversight	Inspections; iron removal in 2012	Sewickley Creek Watershed Association
Middle Branch Redesign, Clinton County, PA	2007	50 gpm, acid, Al 50, Fe 10	net alkaline, Fe and Al < 2 mg/L	deep mine collection system, VFPs, wetland	System redesign, construction oversight	Inspections; flow and water level adjustments	Trout Unlimited
Lewis System, Sullivan County, PA	2006	75 gpm, acid 75 mg/L, Al 10 mg/L	pH 6-7, net alkaline, Al and Fe < 1 mg/L	vertical flow pond	Design	Inspections	Moshannon District Mining Office
Audenreid/Catawissa Creek, Schuylkill County, PA	2005	8,500 gpm, net acid, Al 8 mg/L	initially, pH 7 Al < 3	Tself-flushing limestone tanks, 2 ponds	Conceptual design	Inspections; sludge removal	Schuylkill Co. Conservation District
Robbins Hollow Complex, Clinton County, PA	2005	< 5 - 200 gpm, acidity 200-500; Al 40-80; Fe 1-60; Mn 10-15	variety of discharges; summed flow is pH 6-7 with Fe and Al < 1 mg/L	4 minisystems including an ALD, two OLDs, 4 VFPs, and ponds	Design, permitting, construction oversight, O&M Plan	Inspections; flushing	Trout Unlimited
Mitchell Self-Flusher, Tioga County, PA	2005	40 gpm, pH 3, Fe, Al 30	initially, pH 5-6 Fe and Al < 3 mg/L;	Self-flushing limestone bed, settlign pond	Design, permitting, construction oversight	Inspections	Babb Creek Watershed Association
K&J Coal, Pond 23, Cambria County, PA	2005	75 gpm, pH 5, Al 2 mg/L, Mn 5 mg/L, Fe < 1 mg/L	Net alkaline 40 mg/L, Al < 1 mg/L; Mn < 1 mg/L; Fe < 1 mg/L	VFPs (2), flush system, settling pond	Bond Forfeiture COA; managed technical components of passive treatment system design, construction oversight, and O&M Plan	Inspections; flushing of VFPs	Cambria District Mining Office
K&J Coal, Pond 4, Cambria County, PA	2005	200 gpm, pH 4.5, Al 10 mg/L, Mn 40 mg/L, Fe < 1 mg/L	Net alkaline 90 mg/L, Al < 1 mg/L; Mn < 1 mg/L; Fe < 1 mg/L	VFPs (2), flush system, settling pond and oxic LS bed			
K&J Coal, Pond P Site, Cambria County, PA	2005	150 gpm, pH 3.5, Al 15 mg/L, Mn 40 mg/L, Fe < 1 mg/L	Net alkaline 40 mg/L, Al < 1 mg/L; Mn < 5 mg/L; Fe < 1 mg/L	VFPs (3), flush system, settling pond, wetland			
K&J Coal, Gaber-Brown Site, Cambria County, PA	2004	200 gpm, pH 3.5, Al 25 mg/L, Mn 40 mg/L, Fe < 1 mg/L	Net alkaline 50 mg/L, Al < 1 mg/L; Mn < 1 mg/L; Fe < 1 mg/L	VFPs (2), flush system, settling pond, oxic LS bed, wetland			
LERMD20 / Elk Run, Jefferson County, PA	2003/04	125 gpm, net acid 230 mg/L, Fe 15 mg/L, Al 12 mg/L	Net alkalinity 100 mg/L, Fe < 1. Al < 1	Downflow compost bed, upflow LS bed, pond, wetland	Design, permitting, construction oversight, O&M Plan	Inspections; flushing	Young Township (Jefferson County)
Anna S Mine Complex, Tioga County, PA	2003	440 gpm, pH 3, Fe 10 mg/L, Al 10 mg/L	Net alkaline, Fe < 1 mg/L, Al < 1 mg/L	VFPs (4), flush system, and polishing wetland	Conceptual design, construction oversight and project management	Regular flushing	Babb Creek Watershed Association
Hunters Drift / Babb Creek, Tioga County, PA	2003	330 gpm, pH 3, Fe 50 mg/L, Al 25 mg/L	Net alkaline, Fe < 1 mg/L, Al < 1 mg/L	VFPs (4), flush system, and polishing wetland	Conceptual design, construction oversight and project management	Regular flushing	Babb Creek Watershed Association

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Soberdash, Eastern Discharge, Somerset County, PA	2003	1 - 200 gpm; pH 3-4, Fe 10-50 mg/L, Al 1-10 mg/L	per PADEP, net alkaline with low metals under design conditons	oxic limestone channel, oxic limestone bed	Conceptual design and plan review (with RAR Engineering)	Should be minimal but actual O&M unknown	Cambria District Mining Office
Soberdash, MD1 and MD2, Somerset County, PA	2003	5-50 gpm, net acid, pH 5, 12-35 mg/L	per PADEP, net alkaline	ALD, pond, wetland	Conceptual design and plan review (with RAR Engineering)	Should be minimal but actual O&M unknown	Cambria District Mining Office
Scrubgrass, Allegheny County, PA	2003	175 gpm, net alkaline, pH 6.0, 70 mg/L Fe	Net alkaline, pH 6.5, Fe 30-40 mg/L	Two settling ponds with Maelstrom Oxidizer	System redesign and project management	Routine O&M handled by IOR	Scott Conservancy
Ace Drilling, Site 26, Cambria County, PA	2002	20-100 gpm, net acid, pH 5, Fe 130 mg/L, Al 1-2 mg/L	net alkaline, Fe < 2 mg/L	ALD, reconfigured settling pond constructed wetland	Conceptual design and plan review (with Minetech, Inc.)	Routine flushing by watershed association	Cambria District Mining Office
Ace Drilling, Site 26A, Cambria County, PA	2002	1-10 gpm, pH 3-4, Fe 130 mg/L, Al 9 mg/L	net alkaline, Fe and Al < 2 mg/L	VFP, reconfigured settling pond, oxic limestone bed	Conceptual design and plan review (with Minetech, Inc.)	Routine flushing by watershed association	Cambria District Mining Office
JRU 88 and 89, Elk County, PA	2002	100 gpm, Fe 10 mg/L, Al 10 mg/L, net acid 125 mg/L	Net alkalinity 60 mg/L, Fe < 1 mg/L, Al < 1 mg/L	Self-flushing LS, VFP, settling Pond, and aerobic wetland	Complete design and project management	Regular flushing	North Central RPDC
Conifer East, Beaver Run, Jefferson County, PA	2001	10-50 gpm	net acid, pH 4, Fe 1-10 mg/L, Al 1-8 mg/L	alkaline-amended wetland followed by oxic limestone bed	Complete design and project management	No routine O&M; some repairs due to flood and muskrat damage	Knox District Mining Office
Little Hefren / Toms Run, Cook Forest State Park, Clarion County, PA	2001	15 gpm, net acid, pH 5.8, Fe mg/L Fe	Net alkaline, Fe 1-5 mg/L	ALD, settling pond and aerobic wetland	Complete design and project management	Periodic channel cleanout	DEP 319 Program
Keystone Power Plant, Armstrong County, PA	2000	20 gpm, pH 3, Fe 40, Al 6	alkaline water with <2 mg/L Fe and Al	VFP and constructed wetland	Conceptual design and construction consultation	Reported to be minimal by client	GAI Consultants
Conifer West, Beaver Run, Jefferson County, PA	1998	0-200 gpm, net acid, pH 4.4, Fe 30 mg/L, Al 2 mg/L	net alkaline with Fe and Al <1 for 4 years; variable effluent since 2003	ALD, settling ponds, and aerobic wetland	Complete design and project management	Periodic ALD flushing which has not occurred	Knox District Mining Office
C&K Pit 601 / Mill Creek, Jefferson Co.	1997	80 gpm, net acid, pH 5.7, Fe 80 mg/L	Net alkaline, Fe < 7 mg/L	ALD, reconfigured constructed wetland	Design of ALD and reconfigured system	To our knowledge, none	private
Jennings / Slippery Rock Creek, Butler County, PA	1997	22 gpm, pH 3.3, Fe 56 mg/L, Al 19 mg/L	net alkaline, Fe and Al < 1 mg/L	VFP	Conceptual design and construction consultation	Organic substrate replacement in 2013	Slippery Rock Watershed Association
SR-101A / Slippery Rock Creek, Butler County, PA	1996	30 gpm, net acid, pH 5.5, Fe 90 mg/L	Net alkaline, Fe 9 mg/L	ALD, settling pond and aerobic wetland	Conceptual design, project management	Negligible, periodic channel cleanouts	Knox District Mining Office
Delta Maust, Somerset County, PA	1996	25-50 gpm, net acid, pH 3, Fe 25, Al 6	net alkaline, Fe and Al < 2 mg/L	two VFPs followed by aerobic wetland	System design (with CDS, Inc.)	Reported to be negligible by PADEP	Cambria District Mining Office
SR 114D, Butler County, PA	1995	125 gpm, net acid, pH 5.8, Fe 40	Net alkaline with Fe 1-10;	ALD, settling pond, wetland	Design, permitting construction	periodic sludge removal	Slippery Rock Watershed Association
SR-114B, Butler County, PA	1995	40 gpm, net acid, pH 6, Fe 20	Net alkaline, Fe < 10	ALD and settling pond	Design, permitting construction	periodic sludge removal	Slippery Rock Watershed Association

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Area 1 Passive System, Sequatchie County, TN	1995	200 gpm; net acid, pH 5.8, Fe 120, Mn 40	Net alkaline discharge with Fe < 1	ALD, settling ponds, aerobic wetland	Conceptual design and construction consultation	None during first two years	Private