Cayuga Coal Ash Disposal Facility

Mitigation & Remediation Options

John Dennis and Brian Eden

Cayuga Power
Lansing, NY
Next to Milliken Creek & Cayuga Lake
Drop from right to left is 300+ feet
Power Plant
Coal Pile
Coal Ash Landfill
Settling Pond
Legend
Google earth
3000 ft
N

Some Key Points

- Quarles: groundwater contamination widespread
- 38 acres unlined; Fagan Engr., 2005->radial flow
- “Upgradient Monitoring Wells” & drinking water wells contaminated
- >25M Gal/year untreated leachate->Cayuga Lake
- Discharge to Milliken Creek
- Illegal Coal Pile drainage
- Exceedances in MWs & absence of new MWs
- Milliken Creek Delta: homes on shallow wells

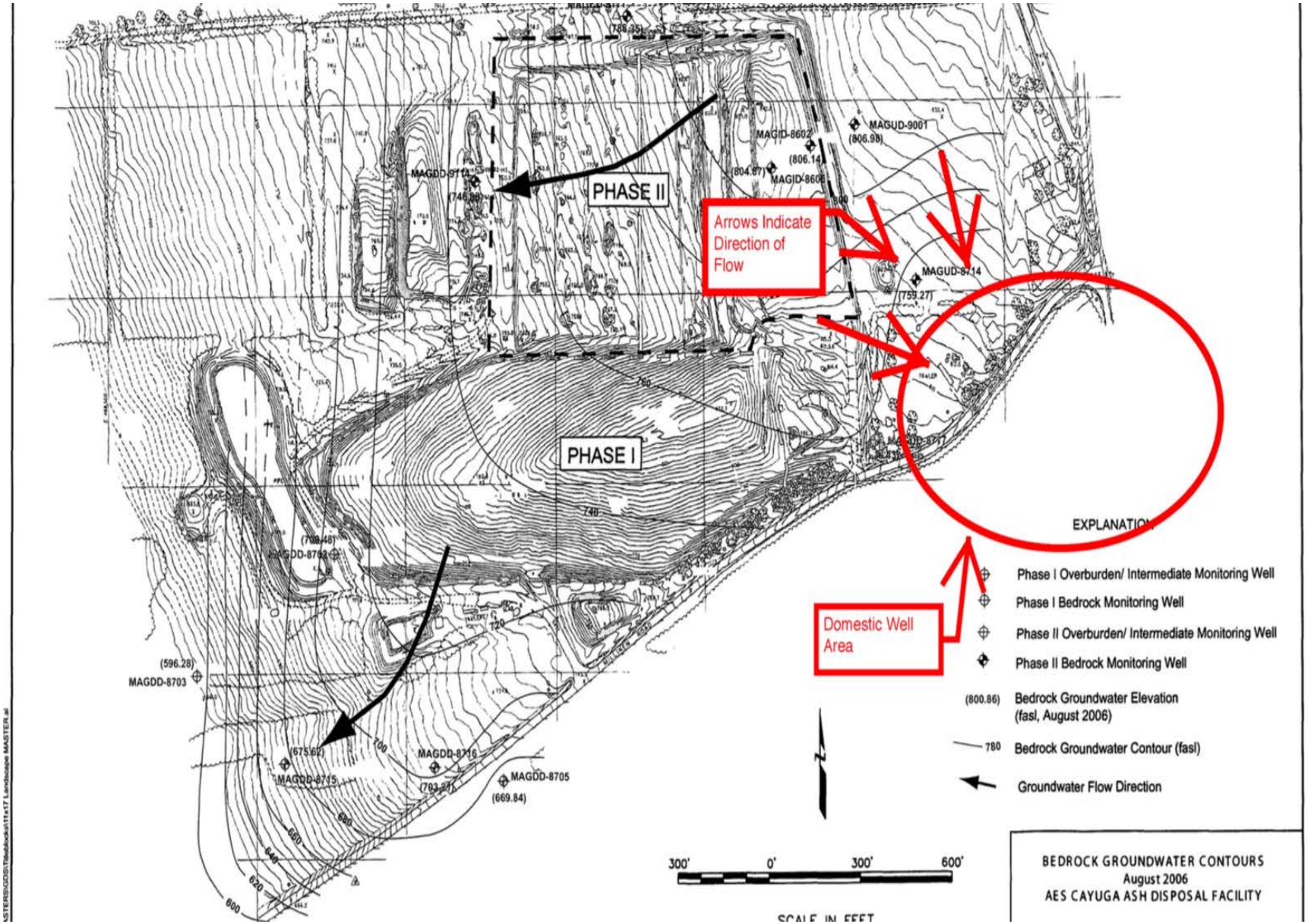
Suspected Coal Ash Leachate Seep

Illegal Coal Pile Effluent Basin

Coal Pipe Effluent Runoff Basin
100 yards south of coal pile east of Old Orchard Road
Legend
Google earth
N
300 ft

Exceedances in Monitoring Wells

Well Name	**Arsenic** (mg/L)	**Ammonia** (mg/L)	**Barium** (mg/L)	**Boron** (mg/L)	**TDS** (mg/L)	**Sodium** (mg/L)	**Sulfate** (mg/L)	**Chloride** (mg/L)	**Iron** (mg/L)	**Manganese** (mg/L)	pH
Standard	**0.01 (MCL)**	**2.0**	**1.0**	**1.0**	**500**	**20**	**250**	**250**	**0.3**	**0.3**	**6.5-8.5**
8105	**0.0134**	**-**	**-**	**8.33**	**1,380**	**60.3**	**560**	-	-	-	-
8703 SH	0.009	-	-	0.36	**500**	19.2	107	-	-	-	-
8703 DI	0.008	1.6	-	0.633	**950**	**275**	102	216	-	-	-
8703 DD	**0.0139**	1.4	**1.2**	0.785	**2,060**	-	-	**1,830**	**0.522**	-	-
8715 DI	-	-	-	-	**1,320**	**238**	**-**	**550**	-	-	-
8715 DD	0.0077	**4.3**	0.856	-	**1,580**	**234**	-	**664**	**1.45**	**0.336**	**-**
8716 DI	0.0078	-	-	-	415	15.9	-	-	**1.3**	-	-
8716 DD	0.005	**1.6**	-	-	-	-	-	-	-	-	-
8705 SH	0.0067	**0.7**	-	-	**610**	**59.4**	-	106	-	-	-
8705 DI	0.0083	-	-	-	**875**	**48.4**	148	**265**	**2.35**	-	-
8705 DD	**0.0118**	**4.4**	-	0.677	**900**	**351**	201	168	**0.831**		-
0501 SH	**0.0171**	-	-	-	400	-	-	-	-	-	-
0501 DD	-	-	-	-	-	-	-	-	-	-	11.8
X01 DW	**0.016**	-	-	-	**755**	**58.1**	94.6	195	**0.56**	-	-



PHASE II
PHASE I
Arrows Indicate Direction of Flow
Domestic Well Area
MAGUD-9001
(806.98)
MAGID-8602
(806.14)
(804.87)
MAGID-8608
MAGDD-9114
(746.88)
MAGUD-8714
(759.27)
MAGDD-8717
(709.48)
MAGDD-8702
(596.28)
MAGDD-8703
(675.62)
MAGDD-8715
MAGDD-8716
(703.27)
MAGDD-8705
(669.84)
EXPLANATION
Phase I Overburden/ Intermediate Monitoring Well
Phase I Bedrock Monitoring Well
Phase II Overburden/ Intermediate Monitoring Well
Phase II Bedrock Monitoring Well
(800.86) Bedrock Groundwater Elevation (fasl, August 2006)
780 Bedrock Groundwater Contour (fasl)
Groundwater Flow Direction
300' 0' 300' 600'
SCALE IN FEET
BEDROCK GROUNDWATER CONTOURS
August 2006
AES CAYUGA ASH DISPOSAL FACILITY

Drinking water well exceedances

Parameter	Standard	X_Lake Ridge Road
-TDS, mg/L	500	1,220
-Chloride,mg/L	250	477
-EC uS/cm	------	2,184
-Na mg/L	20	163
-Fe mg/L	0.3	5.2
-Mn mg/L	0.05	0.143

Phase 1: started 1977

1994
Source: NYS GIS Clearinghouse

Cayuga Coal Ash 2009

Is the landfill drying up?

Cayuga Landfill Leak Detection Systems
Wetness over Time

PHASE 2 LINER LEAK DETECTION	Cell Phase	Cover	Q	2009	2010	2011	2012	2013	2014	Exceedances 2014
			1	DRY	DRY	**WET**			**WET**	**Sulfate**
MAPXLDXX01	Leaks from	**2010**	2	**WET**	DRY	**WET**	NO	NO	**WET**	**TDS**
	1986 ext	**Cap(?)**	3	DRY	DRY	**WET**	DATA	DATA	**WET**	
			4	DRY	**WET**	**WET**			**WET**	
			1	DRY	DRY	DRY			**WET**	
MAPXLDXX02	Leaks from	**2009**	2	DRY	DRY	DRY	NO	NO	DRY	
	1990 ext	**Overliner**	3	DRY	DRY	DRY	DATA	DATA	DRY	
			4	DRY	DRY	DRY			DRY	
GROUNDWATER SUPPRESSION	**Cell Phase**	**Cover**	Q	2009	2010	2011	2012	2013	2014	**Exceedances 2014**
			1	WET	WET	DRY		DRY	DRY	
MAGXGDXX04	Phase 1	**2009**	2	WET	WET	DRY	NO	DRY	DRY	
	1979	**Overliner**	3	WET	DRY	DRY	DATA	DRY	DRY	
			4	WET	DRY	DRY		DRY	DRY	
			1	WET	WET	DRY		WET	WET	**Boron**
MAGXGDXX06	Phase 1	**2009**	2	WET	DRY	DRY	NO	WET	WET	**Selenium**
	(1977?)	**Overliner**	3	WET	DRY	WET	DATA	WET	WET	**Sulfate**
			4	WET	DRY	WET		WET	WET	**TDS (+Na)**
			1		WET	WET		WET	WET	**Boron**
MAGXGDXX07	Phase 2	**2007**	2	NO	WET	WET	NO	WET	WET	**pH**
	1982-1984	**Overliner**	3	DATA	WET	WET	DATA	WET	WET	**Sulfate**
			4		WET	WET		WET	WET	**TDS**
			1		WET	WET		WET	WET	**Sodium**
MAGXGDXX09	Phase 2	**2010**	2	NO	WET	WET	NO	WET	WET	**Sulfate**
	1986	**Cap(?)**	3	DATA	WET	WET	DATA	WET	WET	**TDS**
			4		WET	WET		WET	WET	

Cayuga Leachate Collection

LEACHATE COLLECTION	Cell Phase	Cover	Q	2005	2007	2010	2012	2013	2014
MAPXUD-XX01	Phase 1 1977-78	2009 Overliner	1	WET	WET	WET	DRY	DRY	DRY
			2	WET	WET	WET	DRY	DRY	DRY
			3	WET	WET	WET	DRY	DRY	DRY
			4	WET	WET	WET	DRY	DRY	DRY
MAPXUD-XX02	Phase 1 1979-82	2009 Overliner	1	WET	WET	WET	DRY	DRY	DRY
			2	WET	WET	WET	DRY	DRY	DRY
			3	WET	WET	DRY	DRY	DRY	DRY
			4	WET	WET	DRY	DRY	DRY	DRY
MAPXUD-XX04	Phase 2 1990	2009 Overliner	1	WET	WET	DRY	DRY	DRY	DRY
			2	WET	WET	DRY	DRY	DRY	DRY
			3	WET	WET	DRY	DRY	DRY	DRY
			4	WET	WET	DRY	DRY	DRY	DRY
MAPXUD-XX03	Phase 2 1984-86	2007 Overliner	1					WET	WET
			2	NO	NO	NO	NO	WET	WET
			3	DATA	DATA	DATA	DATA	WET	WET
			4					WET	WET
MAPXUD-XX05	Phase 2 1984	2007 Overliner	1	WET	WET	WET		WET	WET
			2	WET	WET	WET	NO	WET	WET
			3	WET	WET	WET	DATA	WET	WET
			4	WET	WET	WET		WET	WET
MAPXUD-XX06	2007 Vertical over 1984	closed?	1					WET	WET
			2	NOT	NOT	NO	NO	WET	WET
			3	BUILT	BUILT	DATA	DATA	WET	WET
			4					WET	WET
MAPXUD-XX07	2009 Vertical over Phase 1	open	1					WET	WET
			2	NOT	NOT	NO	NO	WET	WET
			3	BUILT	BUILT	DATA	DATA	WET	WET
			4					WET	WET

Bolton Point Water >2000

Conclusions/Objectives

- Ground & Surface water contamination
- Cayuga using too high protection standards
- >25M G/yr untreated leachate->Cayuga Lake
- Financial Assurance Fund: background, triggers (3SD), funding $6.2->$7.5
- Make remediation of landfill/contamination a condition for bankruptcy or repowering
- Press DEC & Cayuga: 100 yrs of leakage vs $15M for new lined landfill.

Mitigation and Remediation of Coal Combustion Residuals Contamination at the Cayuga Power Plant Site - Brian Eden and John Dennis. Brian introduced himself as the Chair of the Hillview Road Landfill Citizens Advisory Committee and a participant in the Hillview Road Landfill closure process and post closure environmental monitoring reviews. In 1979 as a private citizen he became involved in advocating for environmental monitoring at the facility. In 1992 the facility discontinued operations and a formal Citizens Advisory Committee was appointed by the Legislature. Brian appreciates the great support that the Committee has received from both the Legislature and the Solid Waste Management Division staff over the past 20+ years.

In contrast, Brian has been unable to generate much local governmental interest in the risks to public health posed by 38 years of ash disposal at the Cayuga facility, which lies adjacent to Cayuga Lake and from which about 25 million gallons of untreated leachate are released into Cayuga Lake annually. The concern with such facilities has generated much national interest during the past 5 years. The Environmental Integrity Project produced a report in 2010 (In Harm's Way: Lack of Coal Ash Regulations Endanger Americans and Their Environment) which featured a brief report on the potential problems at the Cayuga facility. The EPA adopted a ***Final Rule: Disposal of Coal Combustion Residuals*** on December 19, 2014.

Why should our community seek to better understand the potential environmental threat posed by this site? The landfill is not regulated as an ash monofill, but rather as an industrial and commercial waste landfill due to industrial waste and sewage treatment sludge having been disposed there in addition to the bottom and fly ash. From 1955 – 1976 such disposal occurred at upland sites on Ford Hill Road and Davis Road in the Town of Lansing. The on-site landfill opened in

1977 prior to the adoption of our current much more environmentally protective regulatory framework.

> "The first stage was constructed during 1977 by excavating approximately five feet below existing ground surface and placing a two-foot bottom ash drainage blanket on top of native soils. Leachate collection drains were placed in the bottom ash layer at a nominal spacing of approximately 50 feet and a toe drain was place along the inside edge of the outer berm" (2014 Environmental Management Plan).

Leachate, groundwater, and surface waters are collected in a sedimentation pond and are released periodically through an outfall untreated to the Lake. The landfill, which has been expanded both horizontally and vertically on numerous occasions, is located on a down slope portion of a ridge. It is situated on unconsolidated glacial deposits which overlie shale and siltstone bedrock which are fractured both horizontally and vertically. Ground water flows west/southwest toward the Lake. Milliken Creek flows adjacent to the landfill and is another potential source of contaminant access to the Lake

Brian noted that the EPA Facility Report on Cayuga can be accessed on the EPA web site. It indicates that "no wastewater treatment technology is currently in place at the facility". A potable drinking water source was added to the plant in the 1990s and some residents on the north side of Milliken Creek at Lake Ridge Point were added to the Bolton Point system in 2001.

The footprint of the power plant site near the landfill has been expanded across Milliken Station Road over time. A private well was purchased and the adjoining house was demolished. Another 27 acre parcel was purchased whose deed included a restrictive covenant as follows: "the property shall not be used for residential, industrial commercial, agricultural or recreational purposes".

Cayuga's SPDES Permit expired at the end of 2014. The NYSDEC published a notice that the renewal would be reviewed as a Type II ministerial action. The NYSDEC's intent to administratively approve a 5-year renewal of the SPDES permit was challenged with the expectation that a review of the past 5 years of Discharge Monitoring Report data was necessary to ascertain whether a full technical review should be required pursuant to Clean Water Act provisions. A number of organizations and individuals filed more than 100 pages of comments in opposition to the renewal. The NYSDEC's response was to continue the existing permit without the renewal. The NYSDEC Environmental Benefit Permit Strategy (EBPS) ranking score for Cayuga placed it at 376 out of 858 facilities in New York State requiring SPDES Permits. Subsequently the NYSDEC informed us that a new ranking score would be available in April 2015. However, we have been unable to obtain a reply to our inquiries to ascertain the outcome of this review.

John Dennis (see attached power point) went on to voice his concerns about an unpermitted coal pile run-off basin that is located approximately 100 yards from the facility. He further commented that according to a consulting geologist with national expertise on coal ash landfills, the chemical signatures found in ground water seeps to Milliken Creek indicate that these seep originate from the landfill (i.e., it is leaking). Exceedances of drinking water standards found in these seeps and in some local wells are for chloride, iron, manganese, sodium, and total dissolved solids. In 2014, Cayuga Power Plant' owners proposed that the landfill's Financial Assurance Fund be decreased from $6,200,000 to $5,200,000. However, subsequent to a delegation of concerned citizens from Ithaca meeting with the NYSDEC in Syracuse, this fund was increased to $7,500,000.

Applying the drinking water standard to the entire landfill was discussed as a way to reduce contamination issues. Due to the lack of

any new monitoring wells having been installed by Cayuga after 2006, it is no longer possible to know the extent of contaminated ground water moving from the landfill. Dennis favors all homes in the immediate vicinity of the landfill and on Milliken Creek delta being connected to Bolton Point municipal water. Currently, only the 40% of homes on the north side of the Milliken Creek delta are on Bolton Point water. The remaining 60% are using shallow wells that are not adequately protected.

A list of issues that should receive continued public attention include the following:

Upgrade the water pollution controls at the facility utilizing Best Available Technology

- Segregation of leachate from surface water run-off for separate treatment.
- Reduce toxic metal discharges from the Flue Gas Desulfurization (FGD) treatment system.

Also of significant importance are the following:

- Expand the environmental monitoring network to ascertain the vertical and horizontal extent of groundwater contamination on and off site.
- Employ corrective measures to restrict groundwater contamination to the facility site itself.
- Request that the DEC require Financial Assurance Funding to expand the monitoring network and for remediation of the site. These costs are not currently provided for in the FAF.
- Advocate that those residents of Lake Ridge Point not currently receiving potable water be added to Bolton Point's water system.

- Review the EPA adopted final rule on coal combustion residuals from electric utilities and its implications for this facility.
- Request that the DEC review which iteration of the Part 360 regulations govern the final closure of this landfill.
- Encourage the conduct of studies to assess the environmental fate of pollutant discharges on Cayuga Lake sediments.
- Ensure that the NYSDEC provides the community the opportunity to participate in a public hearing before there is a SPDES Permit renewal.
- Undertake measures now that will limit the extent of remediation costs.