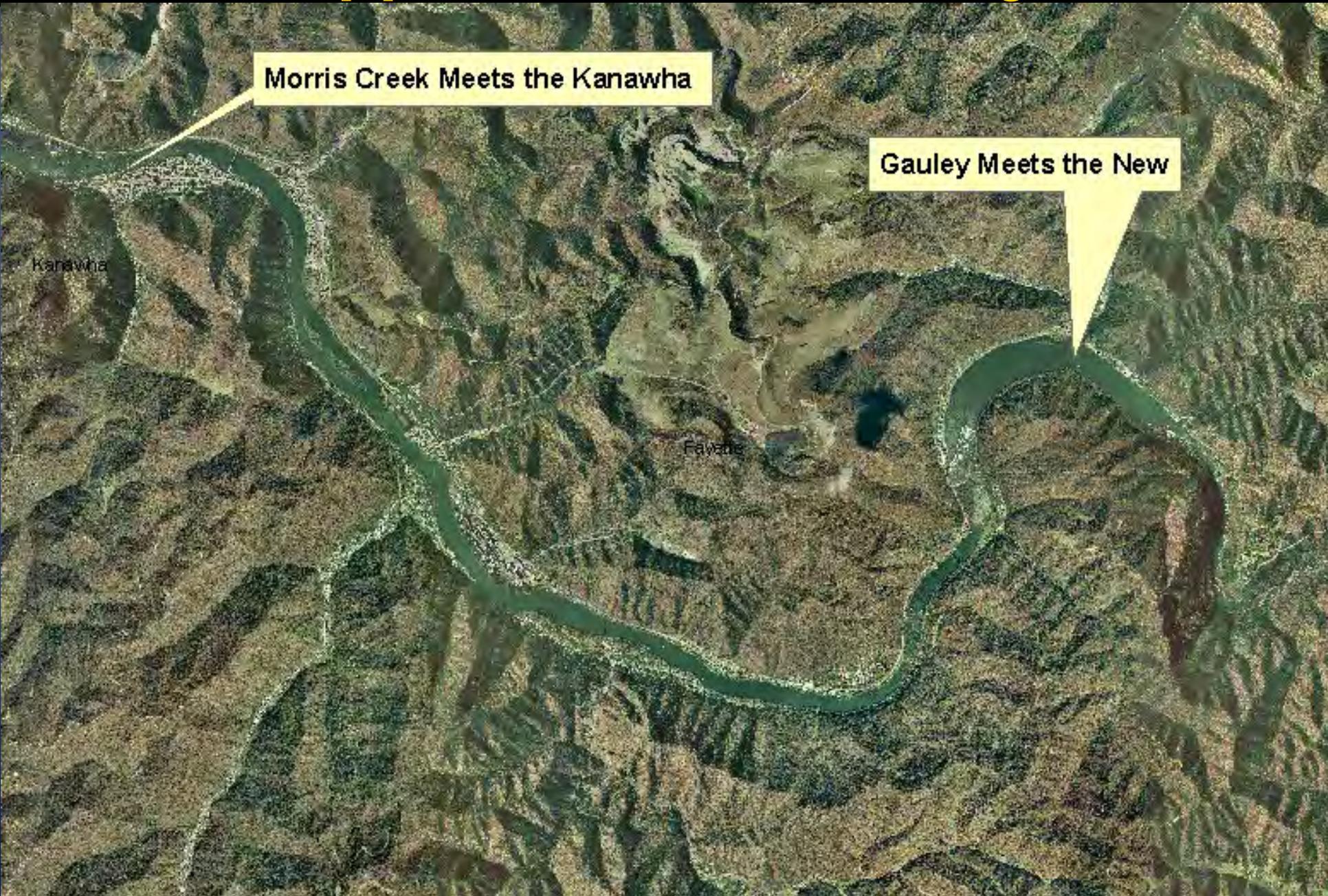




MCWA, Upper Kanawha Watershed Basin

Upper Kanawha Valley

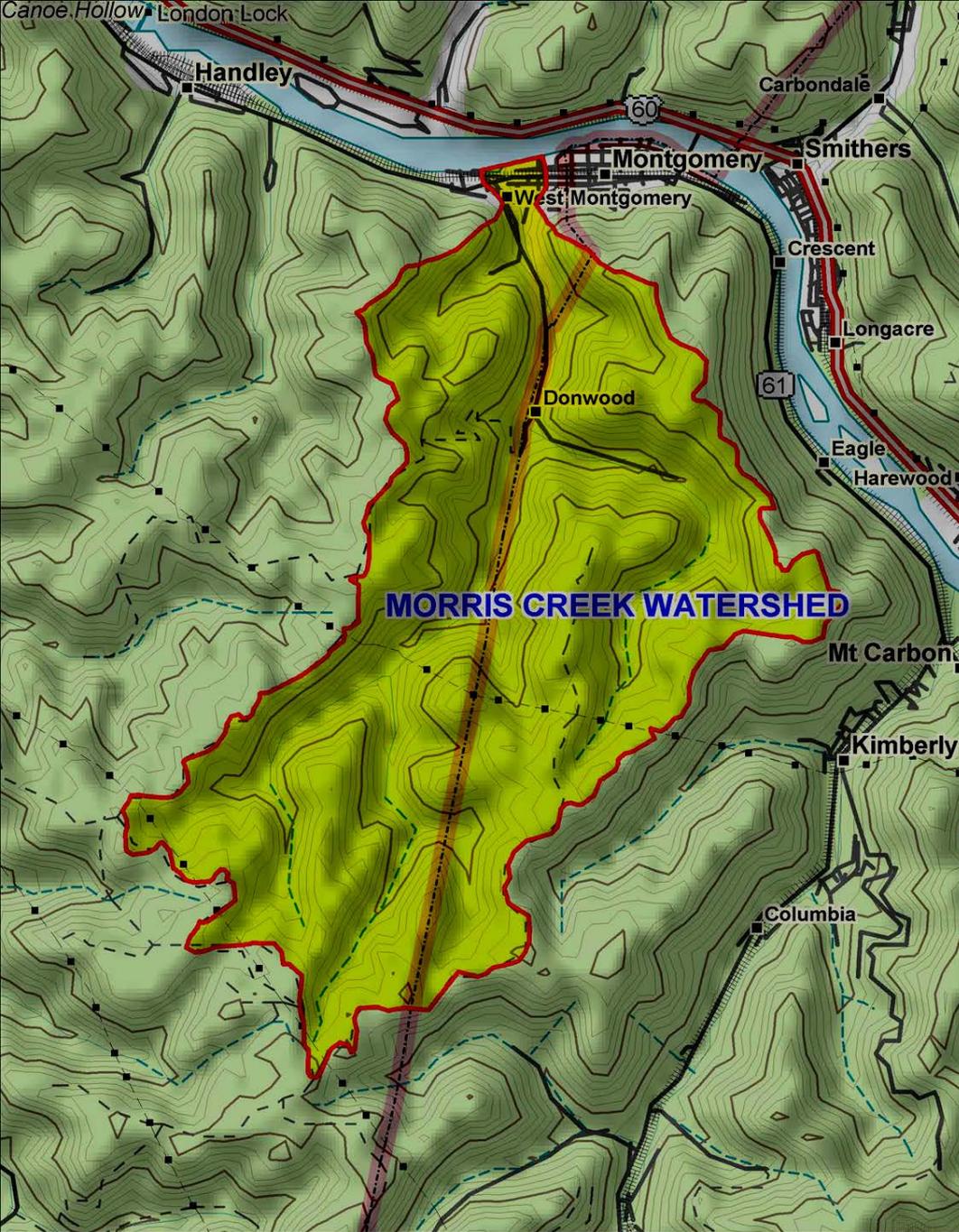


Morris Creek Meets the Kanawha

Gauley Meets the New

Kanawha

Fayette

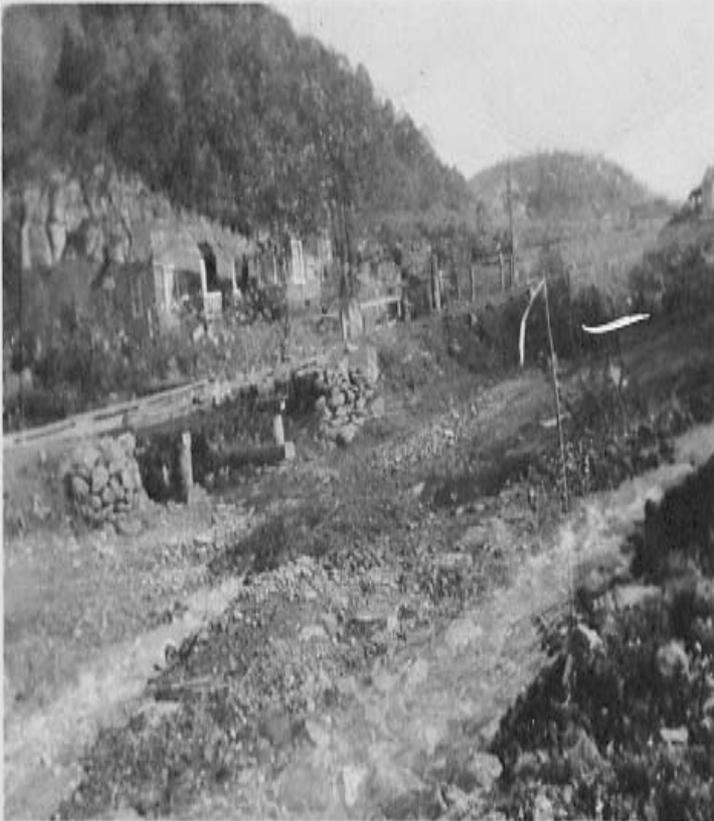


MCWA Data

- Total Length:
5.1 miles
- Total Area:
7.53 sq. miles
4,819 acres
- Elv. at Source:
1,800 feet
- Elv. at Mouth:
640 feet
- Avg. Drop:
228 ft./mi.

Legacy of Unregulated Mining

Carver Hollow Creek joining
Morris Creek - 2 House on left



(AMD) Acid Mine Drainage



Low PH-High: Conductivity: Low DO



Heavy Iron and Aluminum Deposits



Passive AMD Treatment





2013/03/09



2014/03/17



2014/03/18



2013/04/04

Hydro Generator



Charge Controller



Batteries 4-12volt DC in series 48vdc





Cooling

Fans

On Off Switch

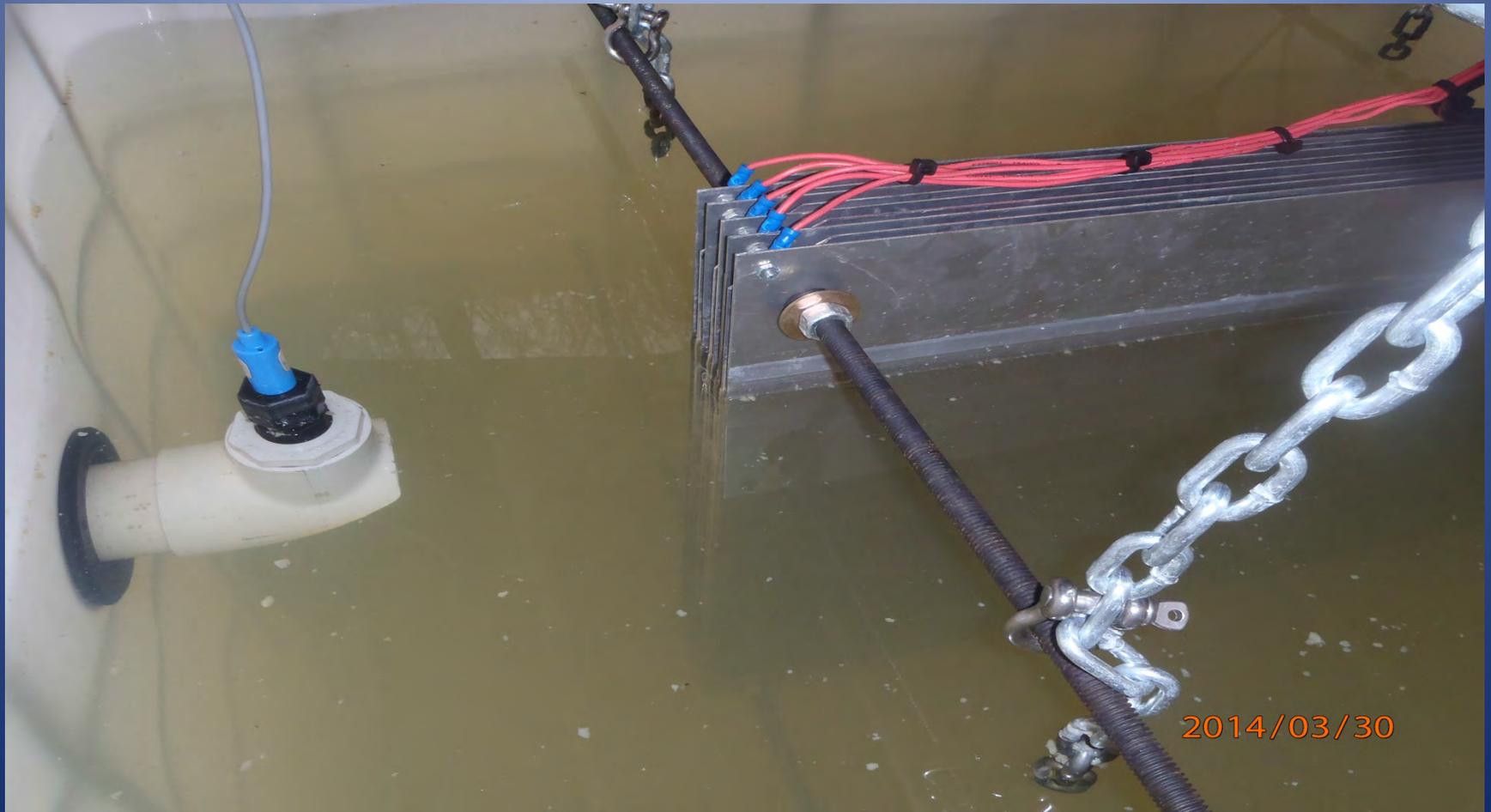
The System



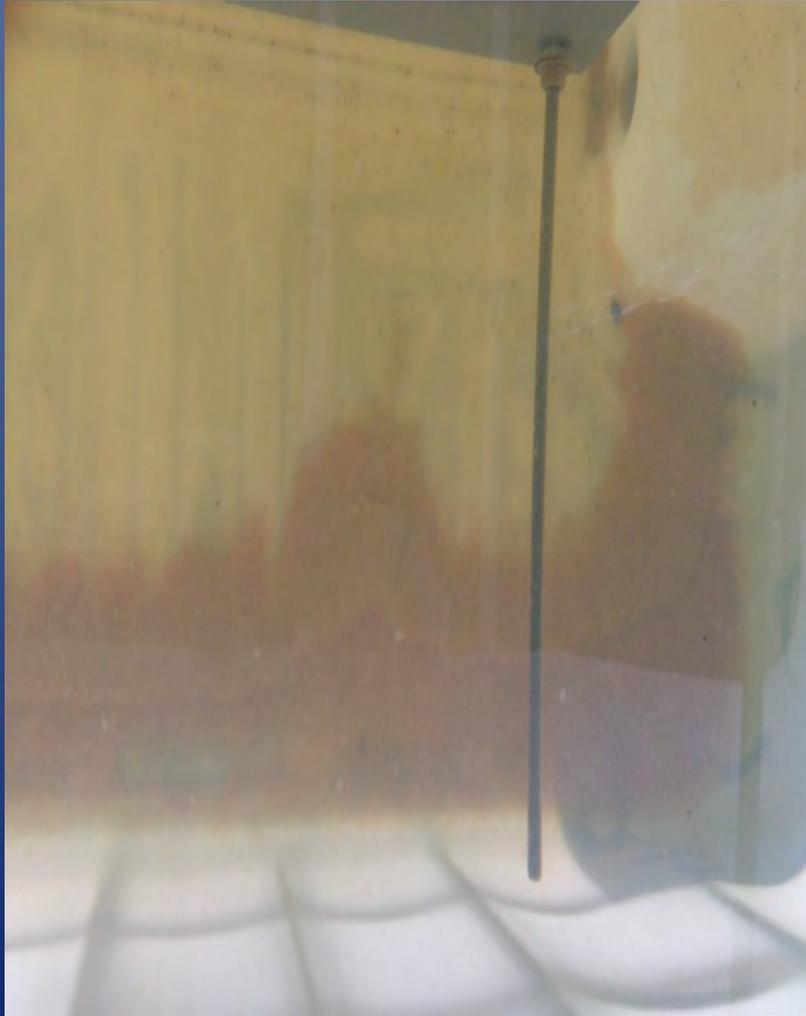
Power in Use



Using Hydro and Solar to treat Acid Mine Drainage



Electrolysis treating AMD





**Distributed
Generation**



HURRICANE CENTRAL

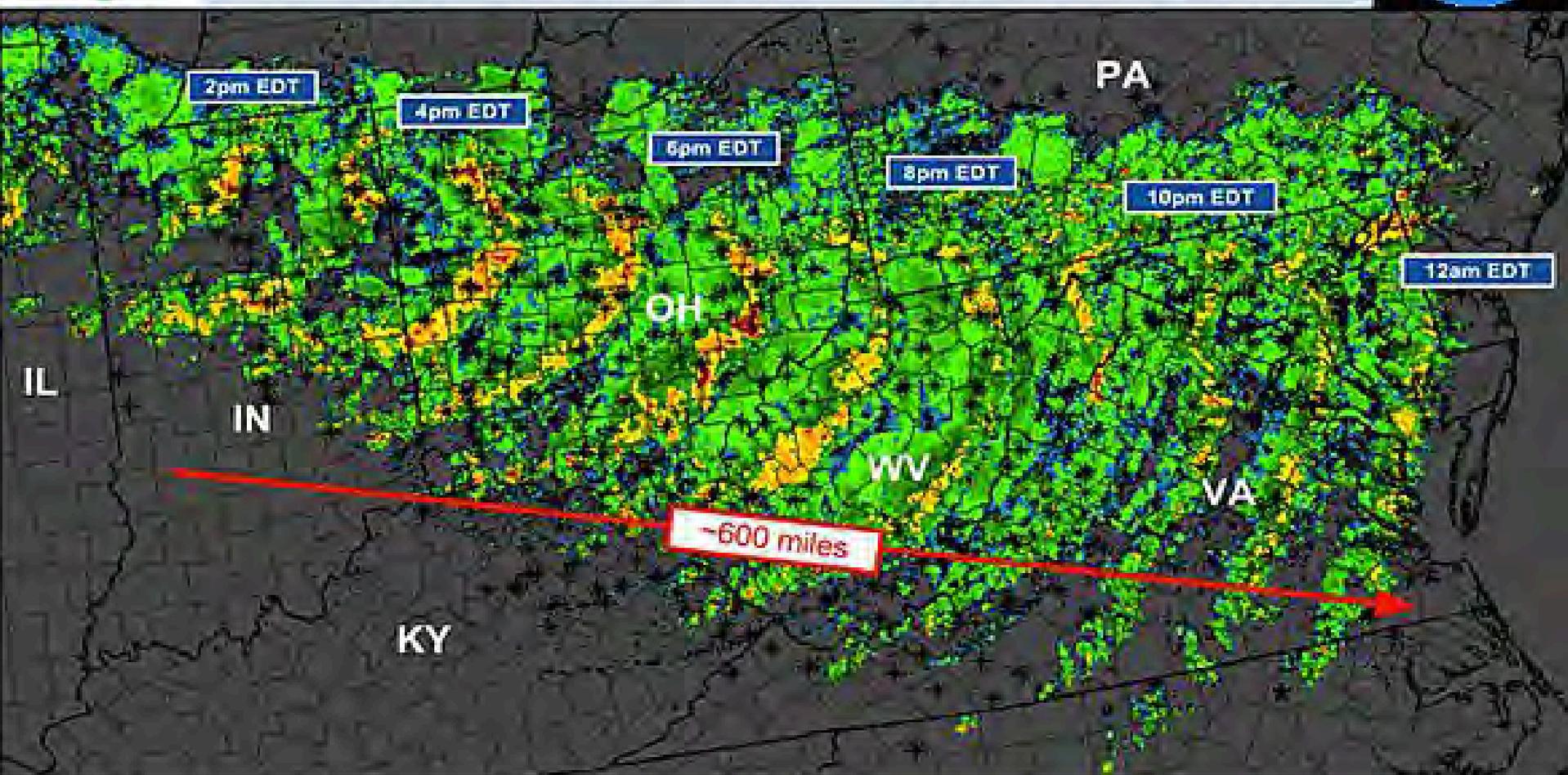
HURRICANE SANDY



25 Oct 2012 17:50 GMT / 25 Oct 2012 01:50 PM EDT



June 29, 2012 Midwest to East Coast Derecho
Radar Imagery Composite Summary 18-04 UTC
~600 miles in 10 hours / Average Speed ~60 mph



Over 500 preliminary thunderstorm wind reports indicated by *
Peak wind gusts 80-100mph. Millions w/o power.

Summary Map by G. Carbin
NWS/Storm Prediction Center

FPL Cut 1,700 Utility Jobs

AEP cut 2400 jobs; Buyout offer made to workers in W.Va. and 10 other states

Progress and Duke offered buyouts

Customer Satisfaction with Electric Utility Companies Declines

Jul. 17, 2012 | T&D World Magazine

Restructuring vs. Reliability

A Tale of Declining Standards

By

Whitfield Russell Sedina Eric

Stephen Flanagan Geneva Graham Looker

For electricity in US, rising costs but service in decline

Beginning in the 1950s, the reliability of the American electrical grid increased steadily until leveling off in the 1990s. “Despite the higher levels of spending over the past decade,” says the AP in its report, “service is getting no better, and evidence is mounting that it may be getting worse.”

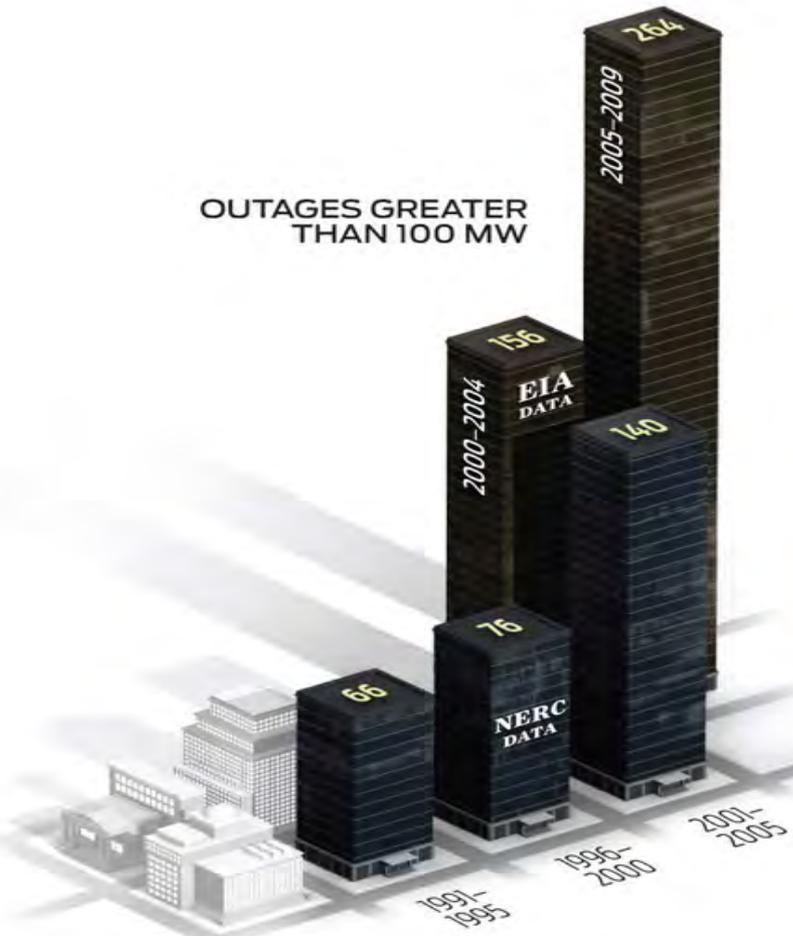
Real Time Distribution Analysis for Electric Utilities

Declining reliability – Declining generation reserves, growing customer demand, restructuring wholesale power markets, and an old, inadequate bulk Transmission system have resulted in declining reliability with the worst kind of outages-system wide outages sometimes spanning several states that may last for many hours or even days and weeks at a time.

U.S. Electrical Grid Gets Less Reliable

- Since 1995, outages have steadily increased as R&D steadily declined
- By S. Massoud Amin
- Posted 30 Dec 2010 | 13:53 GMT

OUTAGES GREATER THAN 100 MW



OUTAGES AFFECTING MORE THAN 50 000 CUSTOMERS

