

Big Stone Plant AQCS Project Update

South Dakota Public Utilities Commission

November 25, 2014





Plant quick facts

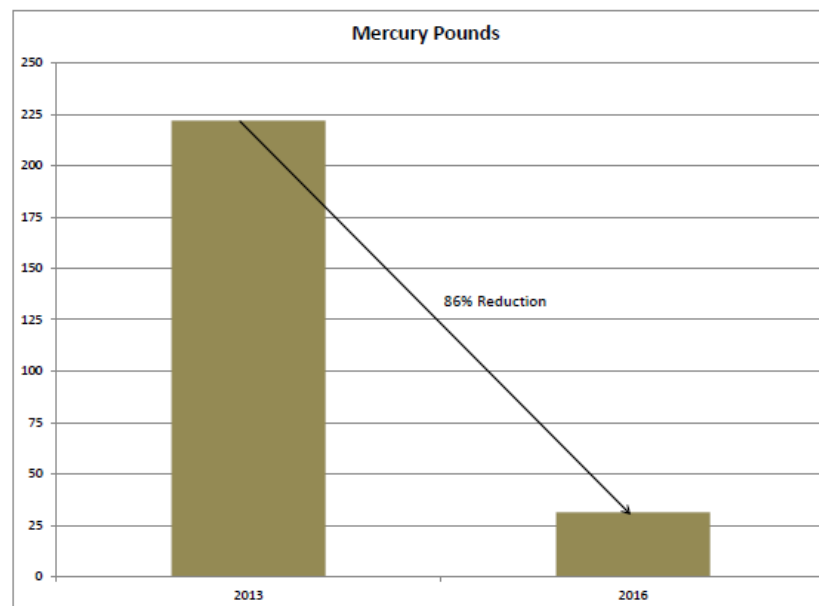
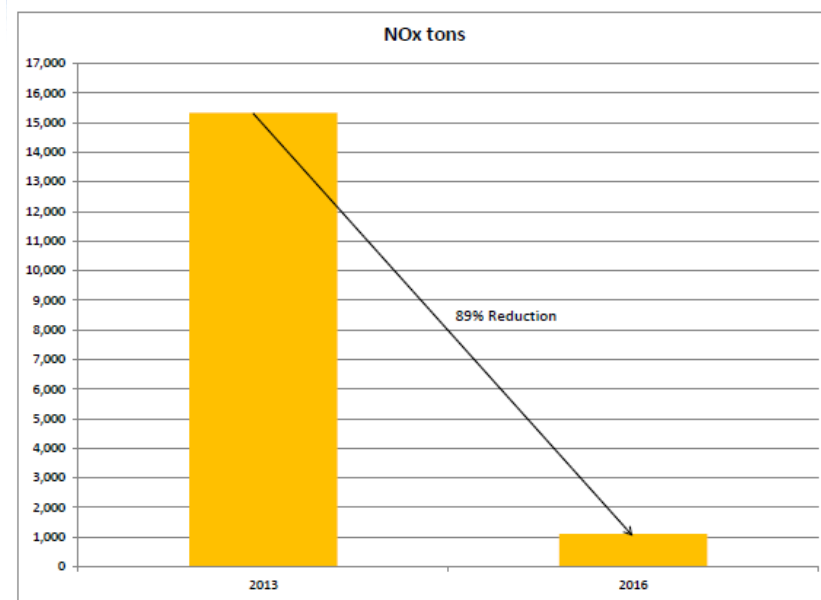
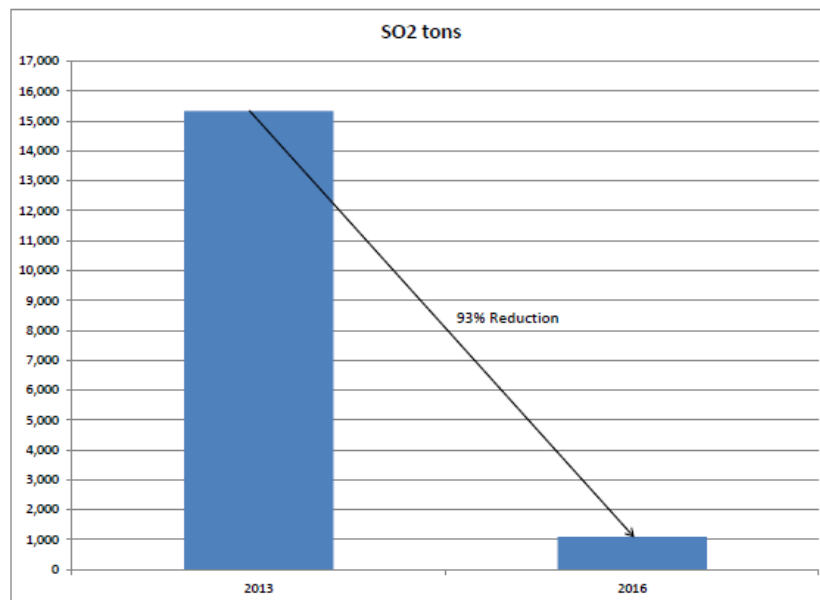
- Located by Big Stone City near Milbank, SD
- Jointly owned by:
 - Montana-Dakota Utilities Co. (22.7%)
 - NorthWestern Energy (23.4%)
 - Otter Tail Power Company, operating agent, (53.9%)
- Baseload resource for all three companies
 - Available around the clock
 - Serves 298,500 customers in Minnesota, North Dakota, South Dakota, and Montana
 - Has an excellent environmental compliance record

Environmental requirements

- Regional haze
 - Improve visibility in Class I areas
 - Requires installation of Best Available Retrofit Technology (BART) - see slide 5
- Mercury and Air Toxics Standards (MATS)
 - Reduce emissions of mercury, other toxins
 - Use activated carbon injection system (ACI)
 - Will reduce mercury more than 90 percent
 - Compliance by 2015

BART for Big Stone Plant

- Install a flue gas desulphurization system (FGD)
- Install a selective catalytic reduction system (SCR)
- Use baghouse for particulate control
- Reduce SO_2 and NO_x approximately 90 percent



Project execution

- Sargent & Lundy Design Engineer
- Otter Tail/Sargent & Lundy procurements
- Graycor – construction – target price
- Otter Tail Construction Management

Safety

	Hours	Recordable	Lost Time	Near Miss	First Aid
Graycor	1,154,301	3	0	10	13
Project Team & Cont.	91,553	0	0	0	0
Engineering	<u>164,223</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	1,410,007	3	0	10	13

- OSHA rate .43 (recordables), 0 lost time
- Zero Injury Safety Award for 2013, presented in October in Washington, D.C.

KPI goal 1.0 OSHA rate

Budget (total project)

- Original budget \$491M
- Budget as of 3/01/13 \$405M
- Budget as of 3/01/14 \$384M

Construction

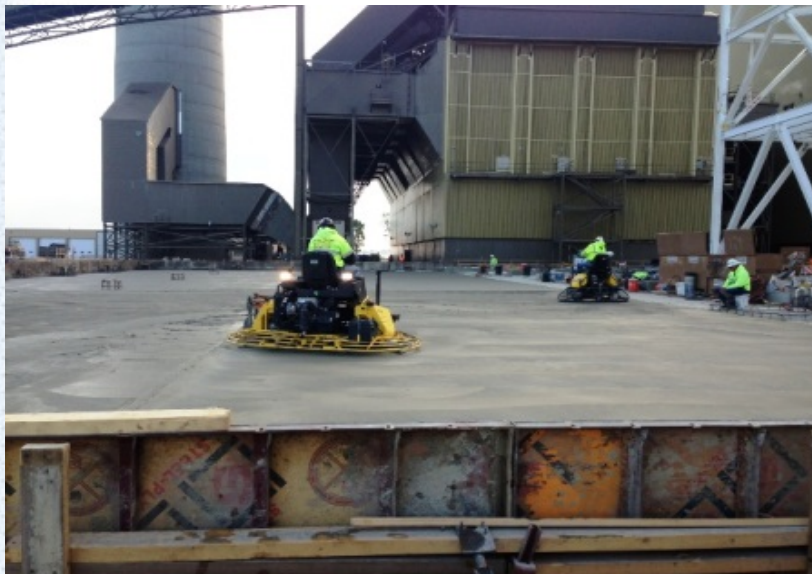
- Approximately 80% complete
- Staffing 425 Graycor employees
- Staffing 25 construction management/commissioning
- Commissioning effort started
- SCR – final assembly, piping, wiring, and insulation
- Scrubber – installing inlet ducts, and insulation
- Baghouse – piping, wiring, and insulation



2013-08-21 Steel erection CFB, WA/PL



2014-08-27 Plant southwest view, WA/PL, CFB, S SCR



2013-08-17 Concrete finishing on baghouse



2014-08-29 CFB & baghouse top view



2013-08-23 North SCR



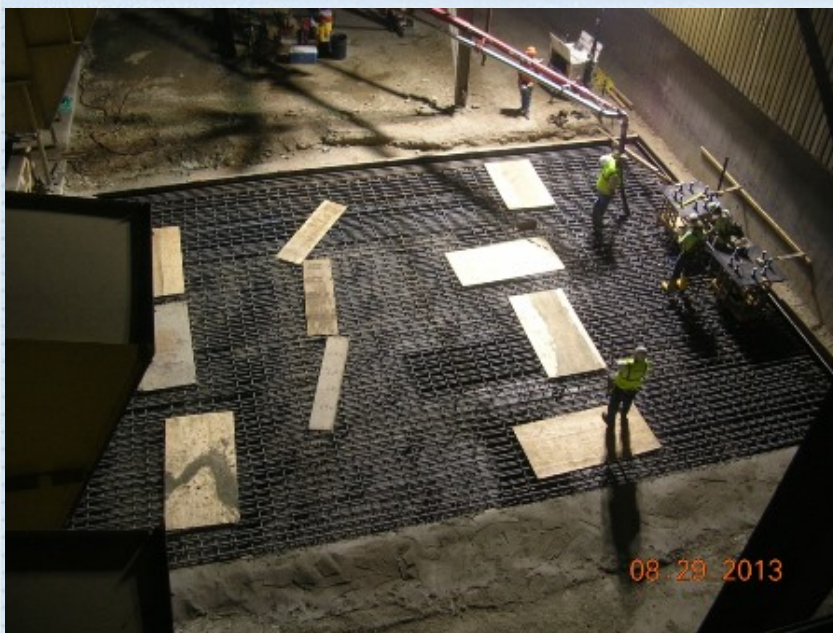
2014-08-27 North SCR



2013-10-01 Ammonia foundation formwork



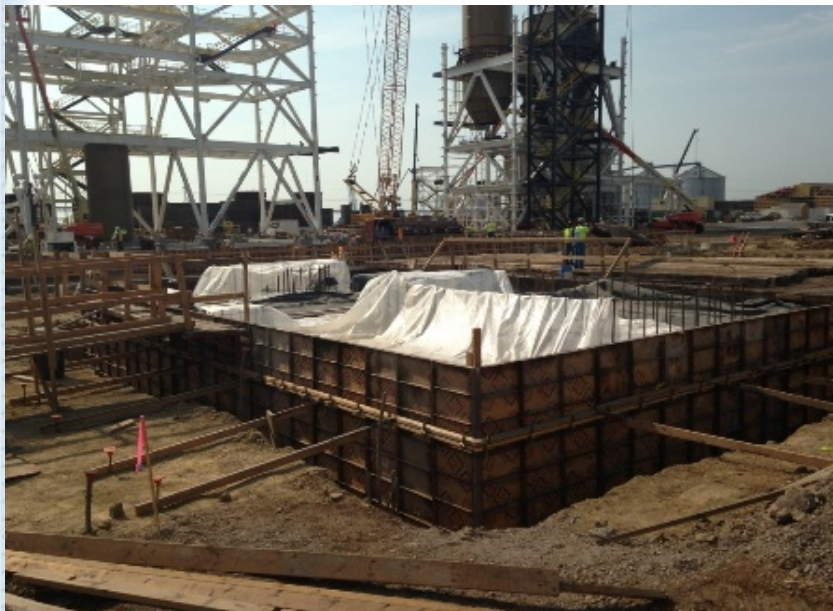
2014-07-03 Ammonia system



2013-08-29 Center SCR concrete placement



2014-08-20 Center SCR grating install



2013-08-23 ID fan 1A foundation



2014-08-20 ID fan 1B



2014-08-15 Scrubber outlet transition elbow T2, heaviest lift



2014-08-29 ID fan duct support steel – Notice IW on top beam!



2014-05-14 Setting aux boiler stack



2014-05-18 Installing new DC MCC



Winter of 1975



2013-10-01 Aerial shot



2014-08-15 Aerial shot



2014-08-15 Aerial shot



2014-10-15 Aerial photo

Timeline 2015

- March 1 – June 9 Tie-in outage
 - AQCS tie-in
 - \$50M AQCS boiler work
 - Turbine generator inspection
 - Normal outage work
 - Other capital projects
- June 9 – Sept. 30 Start-up – tuning – testing
- October 1 Commercial operation date

Remaining work

- Demo: existing baghouse, ash silo, ID fans
- Site restoration
- Units of property
- Project closeout

