



South Dakota 111(d) Forum: Review of EPA's Building Block 1

Sioux Falls, SD

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Big Stone Plant Manager**



Big Stone Plant Mission Statement:

The Big Stone Plant exists to safely generate electricity reliably, economically, and in an environmentally responsible manner.

Big Stone Plant is Co-owned by:

Otter Tail Power Company 53.9% (Operating agent)

NorthWestern Energy 23.4%

Montana-Dakota Utilities Co. 22.7%



Big Stone AQCS Project update:

- Safety: 1,000,000+ hours work, 0 lost-time injuries, 3 recordable incidents, OSHA rate 0.6
- Budget: Original budget \$491M
Current budget \$384M
- Schedule: On track for summer 2015 start-up
- Construction: 55% complete, approximately 425 workers on site



Building Block 1:

EPA Base:

2012 SD Coal CO2 Intensity (lb/MWh)	2030 SD Coal CO2 Intensity with 6% HRI
2,266	2,130

EPA cites a Sargent and Lundy report that a 2% improvement can be made through plant upgrades, including four “higher cost” projects:

- Economizer Replacement
- Air Preheater Improvements
- Combined VFD and Fan
- Turbine Overhaul

(Citation: EPA GHG Abatement Measures TSD page 2-35)

EPA believes that 4% improvement can be found through best operating practices, such as:

- Turning off unneeded pumps at reduced load
- Installing digital control systems
- More frequent tuning of existing control systems
- Earlier like-kind replacement of worn components

(Citation: Fed Register page 34860)



Plant Improvements

- Improvements are made to minimize costs for our customers
- Capital improvement projects
 - Turbine replacements: Low Pressure Turbine 1996 and High/Intermediate Pressure Turbine 2005
 - Control system replacement: 1996, 2012
 - Air preheater adjustable sealing system: 1994
 - Condenser retubing
 - Routine air heater basket and seal replacement
 - New ID fans with VFD and economizer replacement will occur in conjunction with the 2015 AQCS project

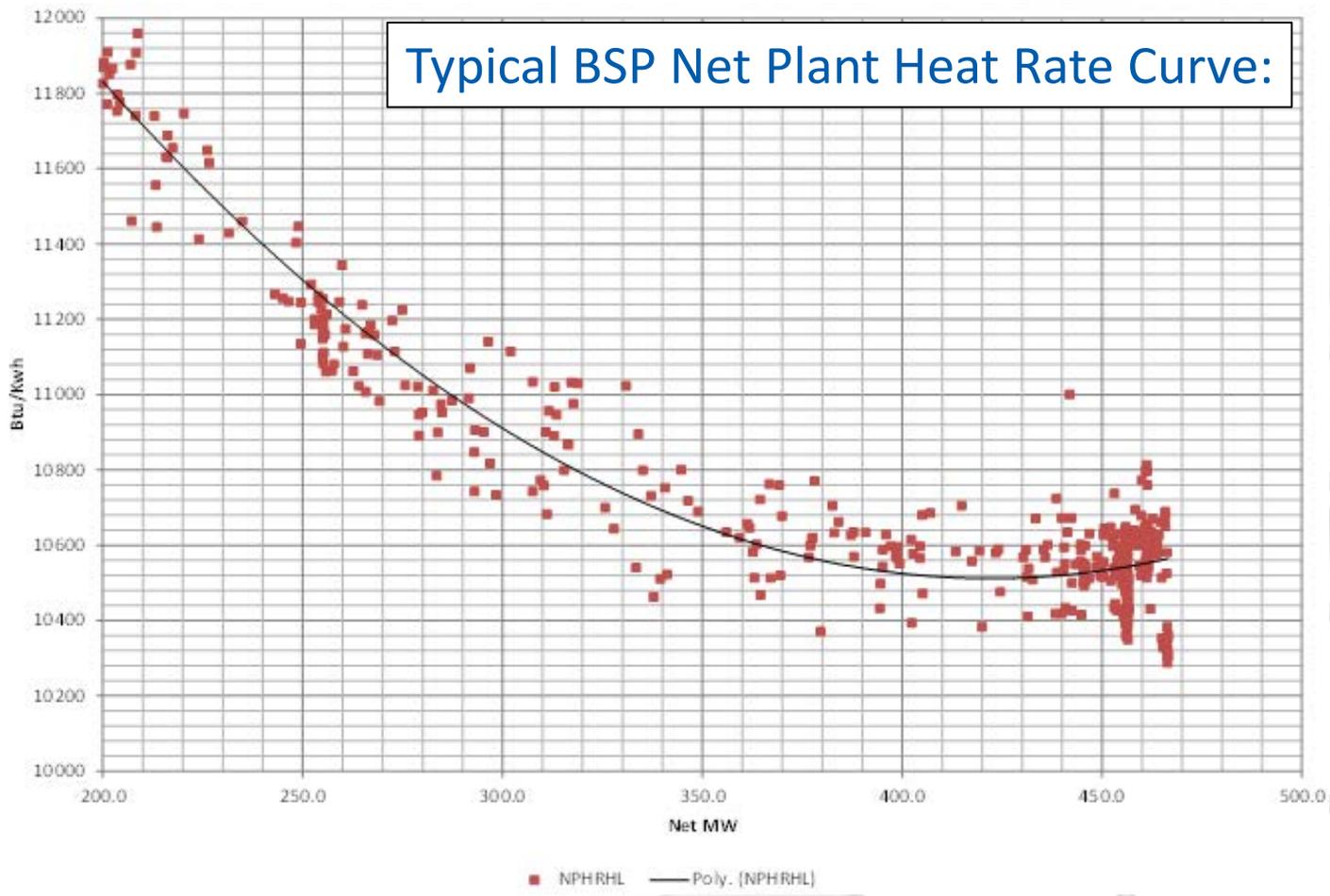


Plant Improvements

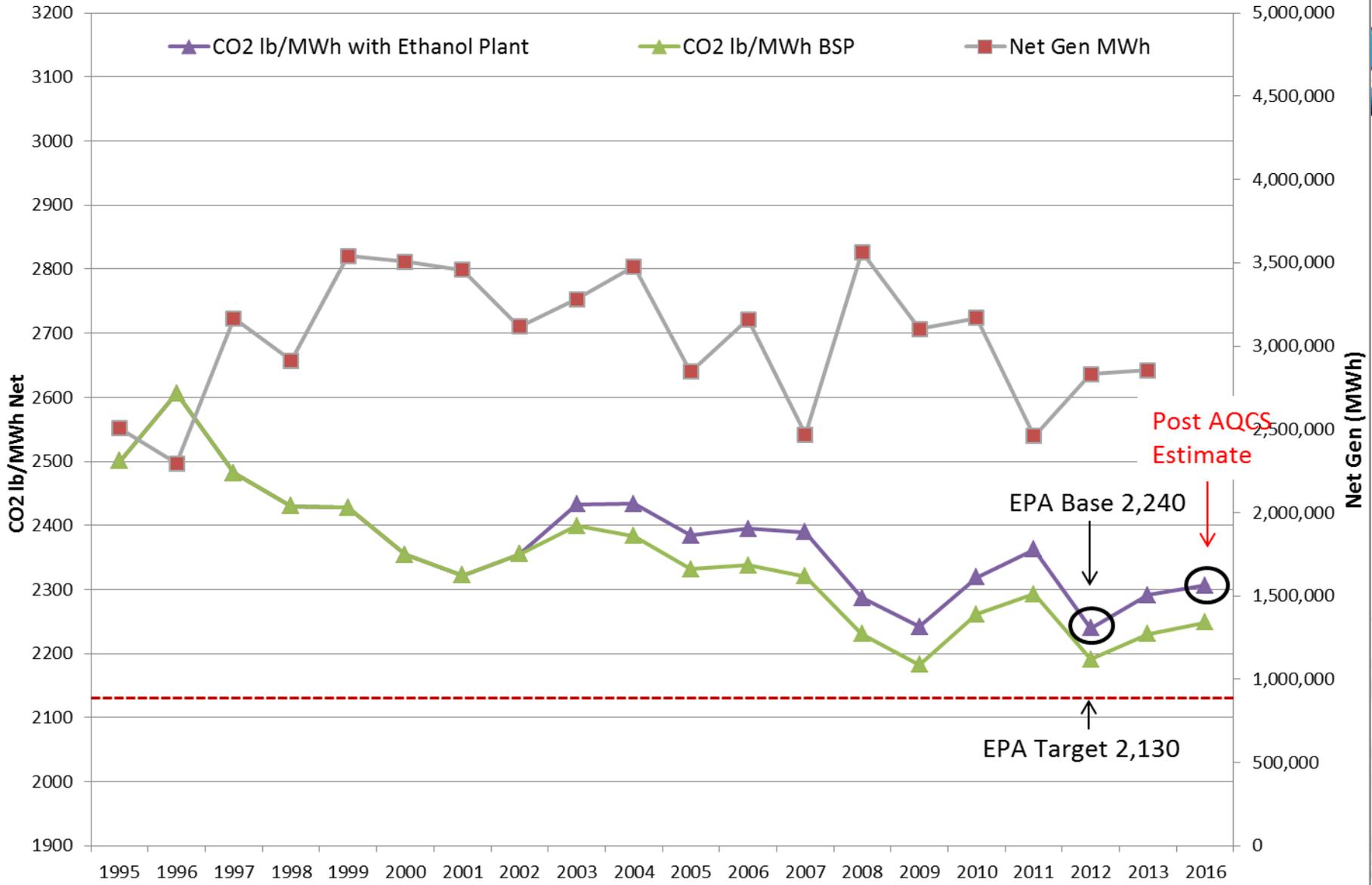
- Operational practices
 - Fuel switch: 1995 switch from lignite to western subbituminous
 - Cleaning outages
 - Boiler high-pressure water wash and/or explosive cleaning
 - Air preheater high-pressure water wash
 - Condenser tube cleaning (high-pressure water or chemical)
 - Turbine chemical cleaning



$$\text{Net Plant Heat Rate} = \frac{\text{Energy in (Fuel Btu's)}}{\text{Net Generation (kwh's of Energy Generated Minus Station Service)}}$$



Big Stone Plant Net Generation and CO2 lb/MWh (net) since 1995





Big Stone Plant Position – Building Block 1

- EPA’s application of building block 1 to South Dakota is technically infeasible.
- Big Stone Plant – the one coal-fired EGU in South Dakota – has already performed (or is in the process of performing) the large heat rate improvement projects available.
- Big Stone Plant has a proud history of using “best operating practices” to already optimize net plant heat rate.
- Big Stone Plant is investing nearly \$400 million to install pollution control equipment in 2015 to comply with EPA’s Regional Haze Rule, which will add significant station service (approximately 8 MW), and therefore negatively impact heat rate.



Thank you

