

Astoria Peaker Power Station – Astoria, SD  
Submitted by: Fagen Inc.

Fagen, Inc., General Contractor, and GCC, Concrete Supplier, teamed up for the 250 MW gas-fired power plant located in Astoria, SD. This power plant includes an exhaust stack which is 60' in diameter and 135' tall. It has a fast start and can reach 250 MW in 10 minutes. Barnhardt was the heavy hauler for the 450,000-pound turbine and the 650,000-pound generator for this project. The turbine came in by rail to Arlington, SD and from there, a 300' truck & trailer with 200 wheels delivered the turbine and generator to Astoria Project site. The large green filter house on the very top of the structure has to be immaculately clean. Any debris left inside the duct can ruin the turbine generator.

This project had several challenges. There were additional requisites on this project that required the turbine and generator equipment supplier MHPS to sign off on each embed and anchor bolt prior to concrete placement. There was a total of 220 embeds in the generator foundation and the anchor bolt/ embed tolerance was 1mm.

In addition to standard slump, air and water cement ratio test requirements that GCC monitored both at the plant and on site, strict concrete temperature monitoring was also required. Sensors were placed in the middle of the columns and 3" from the top of the concrete where concrete was greater than 5' thick. The middle of the concrete could not be 35 degrees different from the top sensor. Fagen poured the generator/ turbine foundation in January; double layered blankets were installed to protect temperatures but at times the blankets had to be removed to reduce the concrete temperature.

The turbine and generator foundations had #13 = 1-5/8" diameter rebar with required placement of 6" on center. This was a huge obstacle due to the massive amount of rebar installed within the area making proper vibration of the concrete hard to achieve. Risk of voids or honeycombs were high as well as the risk of damage with vibrators getting hung up in the rebar.

The site also had a large amount of underground water with poor soil conditions. This required placement of 400 auger cast piles. The 80' auger cast piles were needed prior to any foundations being placed. One duct bank was 300' long with 76 conduits in it while other duct banks had 50 conduits in them and there was a total of 13 duct banks. The ground stabilization concrete amounted to over 2000 cubic yards itself.

As you can see from the pictures, we had very successful pours and the project met or exceeded all requirements.