Omaha SAME Post
Monthly Meeting
10 July 2014

New Reclaim Tunnel at Coal Fired Plant

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Coal Fired Power Plant

- Generating capacity: 2,090 megawatts base load
- Commercial operations began in 1965 – 49 years old
- One of the most efficient power plants in US (BTU/kWh)
- Provides power for approximately 2,000,000 homes
- Requires 100 rail cars of coal daily for operations
- Can receive up to 200 rail cars of coal daily to maintain 30-45 day stockpile
- Equivalent to approximately 1,267 - 1.65MW wind turbines
- Equivalent to approximately 17,000 acres of PV panels
Aerial view of plant
Coal stackout system during construction
Coal operations near Tower #1
The Situation

- Two tunnel spans of 11.5-ft. diameter, 10 gauge corrugated metal pipe (CMP), 210-ft. long
- 8 ft. of soil and up to 70 ft. of coal above the CMP
- Additional load: 1 to 2 D-11 Bulldozers
- Deformation of CMP was noticed within 1 month after completion of construction as coal was stored above the tunnels
- Quickly became operational and safety concern
CMP tunnels began deforming shortly after commissioning.
Deformed Tunnel Shape at Worst Location
2-inch gap between CMP and concrete floor
The Perfect Storm

- An inexperienced contractor
- Owner not verifying qualifications of contractor
- An owner not paying attention during construction
- The fox guarding the henhouse
- Poor soil and subsurface conditions
- Poor weather conditions during construction
- A marginally suitable design
- Groundwater pH = 1.9
The Solution

• ZAPATA prepared a repair design for tunnels, but could not mitigate affects of 1.9 pH groundwater on CMP and cost to construct was estimated at $14M

• ZAPATA designed a new 700’ long reclaim system constructed at 45 degrees from existing Vault #1

• Estimated cost $14M

• New reclaim system included 3 cast-in-place concrete vaults, 6 SS hoppers, 6 vibratory feeders, single conveyor, ceramic-lined chute, 3 box-culvert tunnels, and 1 box culvert egress tunnel
10/13/09 – Required 1 month to remove enough coal from the site for construction could begin.
11/02/09 – Thunderstorms hinder construction progress.
11/03/09 – Mucking-out mud became a large part of the project.
11/09/09 – Installation of the crane road.
11/17/09 – Erosion of soil slopes before slope stabilization measures were installed.
11/17/09 – Barricades and additional drainage were installed to prevent migration of coal and water.
12/10/09 – Safety and slope stabilization measures being installed.
12/10/09 – Installation of auger-cast test pile #1.
12/13/09 – Installation of haul road constructed with coal.
12/17/09 – Cutting of 2 ft. thick concrete vault wall.
01/05/10 – Installation of permanent supports for vault tie-in opening.
01/12/10 – Completion of 541 auger cast piles and preparation for mud mats.
01/12/10 – Construction site in working coal yard.
01/26/10 – Egress tunnel grade beams, first concrete pour.
01/26/10 – Construction workers have a bad sense of humor.
01/26/10 – Tying vault 6 floor rebar.
01/26/10 – Rain continued to be an issue.
01/28/10 – First concrete pour for vault 6.
02/01/10 – Another weather related event.
02/07/10 – Cold weather concreting methods were initiated to maintain schedule.
02/15/10 – Vault 6 floor completed.
02/15/10 – Tunnel 5 box-culvert precast sections placed.
02/15/10 – Tunnel 5, first completed precast section.
03/08/10 – Erection of hopper openings prior to installation in vaults.
03/08/10 - Vault 5 wall forms being erected.
03/17/10 – Installation of cables trays and conduit.
03/16/10 – Overview of tunnel nearing completion.
03/25/10 – Installation of air cannon sleeves prior to pouring concrete.
03/25/10 – Vault 6 hoppers ready to be poured in place.
04/06/10 – Overview of tunnel nearing completion.
04/11/10 – Project as Seen from Google Earth.
05/12/10 – Backfilling around tunnel.
06/29/10 – Commissioning begins with first load of coal.
06/22/10 – Initial conveyor run in progress.
07/10/10 – Sheet pile and coal fence to protect Egress Tunnel opening.
08/02/10 – Existing tunnels were filled with coal and soil and abandoned in place.
The Results

• Construction was completed approximately one month ahead of schedule and under budget.

• 1 day was lost due to weather conditions.

• Approximately 90,000 hours were worked with one Band-Aid incident.
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Questions?

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