Tampa Electric Company (TECO)
Coal Yard Mechanical, Electrical and Structural Assessment

Results from field review of the coal unloading equipment, structures and conveyors.

June 21, 2010

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EXECUTIVE SUMMARY

Stantec has been retained by Tampa Electric Company to provide a review of the equipment in the coal field at the Big Bend facility from the dock through conveyors L1 and L2 that bring the coal to the tripper deck in the power house.

One electrical, one mechanical and two structural engineers reviewed the coal handling equipment and structures during the week of May 3, 2010. This report is a high level review based on the field review, review of the 2003 study, and discussion with TECO employees.

The most dominate field review observation indicates the equipment and structure is experiencing aggressive corrosion due to the combination of salt air and coal dust. In general the equipment and structures need to be cleaned and painted to combat the corrosion. Numerous areas of steel plate, members, and connections need to be replaced in kind. A cleaning and painting program will significantly prolong the life of the existing and new equipment.

There is an ongoing program to provide electrical equipment upgrades and replacements. It is important that TECO continue with this program as much of the electrical gear is original equipment from the late 1960's, is obsolete, and could fail at any time. Replacement parts for obsolete equipment will be difficult to obtain.

In general the mechanical condition of the equipment is in fair to good condition. Repair by replacement of several of the conveyors and chutes have occurred. We have observed a general need for maintenance on gear boxes, conveyor heads, chutes and idler pulleys.

The structural integrity of buildings, transfer towers, conveyor galleries and equipment framing were evaluated during the week of May 3, 2010 as well as during a plant wide structural evaluation performed by Stantec (then Neill and Gunter) in the Fall of 2003. TECO has moved ahead with some of the recommendations from the 2003 report and has replaced or repaired deteriorated steel. However, not all recommendations have been completed. Some steel that was in need of cleaning and painting (flagged yellow) in 2003 has deteriorated to repair by replacement (flagged red).

The field review observed only one area where the structure was overstressed due to applied loads. The corrosion has not yet caused noticeable overloads to occur. However, numerous steel members are so badly corroded that replacements recommended in the report should be done as soon as possible. A further study can be developed that provides a more defined time table of replacements.

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The study examined the reclaim equipment. The south reclaimer has perfotmed better than the north reclaimer. At present the south recalimer requires electrical and controls upgrades (present systems are obsolete), and general cleaning, repair, maintenance and painting to combat the effects of corrosion, age and use. The north reclaimer has never worked as TECO expected. The system requires two pieces of equipment to work together, controlled by radio controls. A very limited number of these systems were produced and no longer are being produced. Attempting to coordinate the two pieces of equipment to work together as originally intended does not appear to be cost effective. In addition, the north reclaimer also requires electrical and controls upgrades (present systems are obsolete), and general cleaning, repair, maintenance and painting to combat the effects of corrosion, age and use

This report outlines by equipment component, the findings of the evaluation done during the week of May 3, 2010 by Stantec. For each equipment component a high level electrical, mechanical and structural evaluation is presented.

The last section presents anticipated upgrades presently being developed by TECO in the coal field that include:

Electrical power distribution

Controls upgrades

Stacker/reclaimer replacements

Blending bin building bypass

We recommend developing a program to upgrade the old equipment, beyond those listed above. We suggest a phased approach based on equipment condition and importance to the operations of the coal yard. The information in this report can be used as a base to develop the program. In the interim, if not already completed, the operations of the coal yard should be reviewed to determine the impact of equipment failure, and contingency plans developed, due to the age of the equipment and the difficulty in obtaining replacement parts.

SECTION 1: COAL UNLOADING DOCK

The dock is set up to receive coal from barges from various suppliers. The barges are different shapes and sizes and have different requirements for unloading.

Coal Unloading Dock

Conclusions:

1. Structural
   - Corrosion and sprawling need to be repaired before major problems develop.
   - Bumpers need to be repaired due to wear and use.
   - Minor damage to structure needs to be repaired.
2. Electrical
   - No items of note.
3. Mechanical
   - No mechanical equipment at dock level.
   - Rails are in good condition.

1.1 Electrical

A survey of the electrical equipment at the dock level noted the following:

1. No. 1 and No. 2 Winch D.C. Drives (these are constant tension mooring winches).

2. No. 1 Winch motor (30 HP, 1750 RPM D.C. Motor).

3. No. 2 Winch motor (30 HP, 1750 RPM D.C. Motor).

4. Two Barge Unloading Sump Motors and motor starters.

5. Barge Unloading Sump Control Panel.

6. 480V Panelboard at south end of dock.

7. 120/240V Panelboard and transformer at the south end of the dock.

8. D conveyor speed switch control panel.

9. 480V Panelboard at north end of dock.

10. 120/240V Panelboard and transformer at the north end of the dock.

11. The dock was originally equipped with a cathodic protection system to protect the pilings and underwater structure. This system has fallen into disrepair and no longer works. TECO has plans to install a new system in the near future.

12. Ground bonding jumpers between rails are being replaced at the rail splices as time permits. Equipment bonding jumpers are being installed as time permits to enhance the safety of the equipment.

13. No major deficiencies were noted at the coal unloading dock.

1.2 MECHANICAL

The rails that support the barge unloaders have been replaced and are in good condition. The evaluation of the equipment above the rails can be found in the appropriate following sections.

1.3 STRUCTURAL

The Unloading Dock was observed from within a boat provided by TECO and operated by a TECO employee. The observations were made at high tide so travel under the dock was not possible. However, Stantec was advised by TECO that they have recently inspected this area and also the piles and have found them to be in good condition.

In general, the waterside face of the Dock looked in good condition considering it has been in service for about 40 years. Most of the deterioration to the Dock is

along the face of the Dock where there has been contact with the Coal Barges while docking, as seen in pictures Dock-B and Dock-C.

At and near the waterline, the Dock and piles appear to be in good shape. There is some horizontal and spider cracking evident in the pile caps with some corrosion discoloration, as seen in Picture DOCK-A.

|PICTURE DOCK-A

This cracking and corrosion does not appear to be severe enough to cause sprawling of the concrete at this time. In general, there is minimal damage near the waterline due to impacts although some damage was observed, as seen in Pictures DOCK-B and DOCK-C that should be repaired.

PICTURE DOCK-B

PICTURE DOCK-C

The most damage observed was along the deck edge, as seen in Pictures DOCK-D thru DOCK-N, where bumper strips were installed to protect the edge from impacts from the barges. Over the course of time since the Dock was placed into service, these bumpers have been damaged and repaired/replaced. When the cushioning effect of the bumpers failed, much of the force of the barge bumping against the dock was transmitted into the edge of the deck causing damage to the deck. Additionally, the steel edge channel on the face of the deck has corroded and may not be performing as intended. These bumpers appear to have been added after the dock was constructed. They do not show up on the original construction drawings

The underside of the deck overhang at some of these bumpers has “popped” off causing exposure of the reinforcing and making it subject to corrosion. At these locations, the reinforcing bars need to be cleaned and the underside of the deck repaired to protect the reinforcing steel.

PICTURE DOCK-D

PICTURE DOCK-E

PICTURE DOCK-F

PICTURE DOCK-G

PICTURE DOCK-H

PICTURE DOCK-J

PICTURE DOCK-K

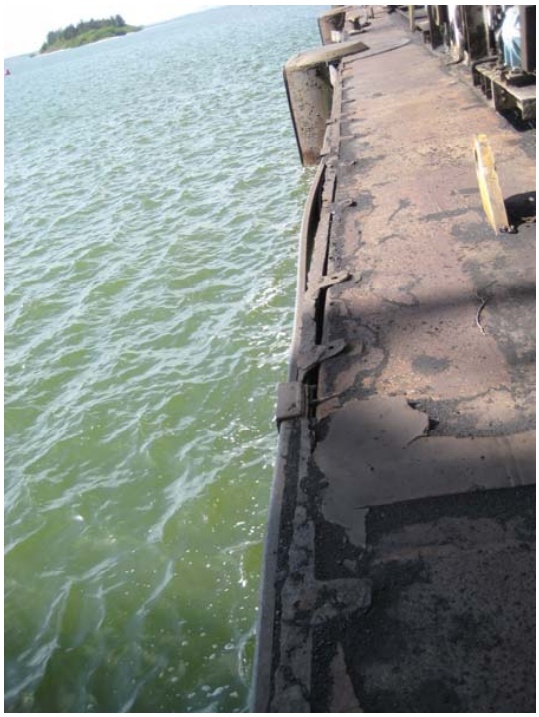
PICTURE DOCK-L

PICTURE DOCK-M

PICTURE DOCK-N

Some of the dock bumpers may not be performing as intended. In some instances, the attachment of the backing steel to the top of the deck has broken free and the bumpers are loose, as in Pictures DOCK-P and DOCK-R. Also, in some cases, the bumper surface has been removed or fallen off into the water below, as in Picture DOCK-S. Additionally, the backing steel is severely corroded in some cases, as seen in the pictures. In these locations, the bumper surface should be removed and the backing steel repaired/replaced. The

underside of the deck should be repaired, if necessary, before new bumper backing steel is installed.



PICTURE DOCK-P

PICTURE DOCK-R

PICTURE DOCK-S

Because of the damage received from impact, an alternate bumper system may be worth considering such as the type used in other locations along the dock, as seen in Picture DOCK-T.

PICTURE DOCK-T

Additionally, there has been some wear over the years along the top edge of the deck due to chains holding bumpers where the Tug ties up. The movement of these chains due to boat movement and wave action has caused the concrete to wear away as seen in Picture DOCK-U

PICTURE DOCK-U

One of the Winches used to pull the Barge in towards the dock has had the nuts on the anchor bolts corroded off, as seen in Pictures DOCK-V and DOCK-W. These nuts should be replaced, which may also include replacement of the through-bolts since there is minimal bolt projection remaining.

PICTURE DOCK-V

PICTURE DOCK-W

In general, as seen in Pictures DOCK-X thru DOCK-Z, the landside edge of the dock is also in good condition, in part because it does not see impacts from the barge but also because it is the sheltered side. Some minor cracking was observed as would be expected for a concrete structure of this age but is not a structural problem.

PICTURE DOCK-X

PICTURE DOCK-Y

PICTURE DOCK-Z

SECTION 2: DRAVO LADDER UNLOADER

The Dravo Ladder Unloader has a capacity rating of 4,000 tons per hour; however it does not have the ability to clean all the areas of the barge evenly. To completely unload coal, additional equipment is required to be placed in the container compartments to push coal to the clam shell. For this reason, the Peco Clamshell Unloader is preferred by the majority of the barge unloader operators.

Dravo Ladder Unloader

Conclusions:

1.0 Structural
- Corrosion due to coal dust needs to be repaired.
- Clean structure of coal dust.

2.0 Electrical
- Need to replace outdated equipment and controls, cables.

3.0 Mechanical
- General maintenance required.
- Wear items should be repaired.
- Corroded items need repair.

2.1 ELECTRICAL

Specific observations at the north unloader include:

1. There is a 1000kVA, 4160V delta – 480V delta transformer at the base of the Dravo unloader supplied from the 4160V cable reel. The transformer secondary cables have been redone and there is a Westinghouse DB50 air circuit breaker inside the support structure protecting the transformer secondary cables. This circuit breaker is approximately 50 years old so consideration should be given to replacement.

2. The 4160V power feeder to the North Unloader cable reel is routed in a cable tray parallel to the D1 conveyor. This cable tray is covered and has provided reasonable protection for the power cable. Consideration should be given to installing rigid conduit instead of cable tray for this important feeder cable.

3. The Hoist has a wound rotor induction motor and a dynamic breaking controller. The dynamic breaking controller (at the base of the structure) has a series of vacuum contactors which short rotor windings in sequence to control the hoist speed. The dynamic breaking controller was retrofitted with the vacuum contactors in about 2004.

4. There is a 480V 3-section Furnas motor control center (vintage 1990's) in good condition in the lower MCC area.

5. The travel D.C. Drive located in the lower MCC area controls the 10 D.C. travel motors which drive the unloader north/south on rails.

6. The upper MCC area is located in the vertical support structure about 2/3 of the way up the tube. This area contains a 6-section 480V Furnas™ MCC (vintage 1990's). This MCC provides for control of the ladder drives, C conveyor, and the Cantilever Hoists.

7. The operator cab was replaced within the last year because it was struck by a barge.
8. There is a Shepherd-Niles Hoist used for lowering a Bobcat earthmover into the container compartment of the barges. This hoist is fairly old but was inspected in 2009.

9. Several festoon cables going from the vertical support structure down to the A belt conveyor boom have caught on some handrails and pulled out. TECO has ordered two new cables and will replace these at the next available opportunity. Plans are being made to replace all the cables over time.

2.2 MECHANICAL

Conveyor B gearbox has an oil leak and is need of repair. The proximity of the gearbox to the digging head has resulted in significant coal dust buildup.

The hinged head end support of conveyor B, below, has corroded and is need of repair. Also the hinge point is in need of lubrication.

The rail wheel truck housings (bogies) on the water side at the north end need to be replaced. The housings are corroded from exposure to salt water.

The counterweight cable sheaves should undergo an annual ultrasound or radiograph inspection for cracks.

TECO reported the structural steel over the digging head was corroded. The digging head is shrouded and this steel is not accessible other than by crawling up A-Belt. In order to do this the equipment must be locked out. A separate inspection should be scheduled for this area.

Both A and B belt conveyors appear in good condition. They were both replaced in their entirety less than 5 years ago.

No nicks or cuts were observed in the counterweight cables. These were replaced in February of 2010.

2.3 STRUCTURAL

In general, the Tower section of the Unloader appears to be in good condition with corrosion in only a few areas.

During the On-site phase of this assessment, the Unloader was not operating. Consequently, it was not possible to observe the Unloader in operation and to note issues with moving components. Additionally, problems with wear of the Digging Head could not be observed due to cladding along the sides of the Digging Head beside Conveyor A.

However, the horizontal section of the Unloader, particularly the underside surfaces, and the areas on the water side, have significant corrosion.

At the time of the equipment walkdown, no drawings of the equipment were available for use and mark-up. In place of marking up drawings, photographs of the observations were taken. These are noted as Picture DLU-XXX.

At the payloader staging level, approximately 20 feet above the dock, a number of rivet heads were observed to be corroded, as seen in Picture DLU-A. These rivets are critical to the stability of the equipment. Rivets with missing or minimal heads should be removed, one at a time and replace with galvanized high strength A325 bolts of the same diameter. Additionally, this level should be cleaned of all coal accumulation and the metal cleaned and painted to minimize further corrosion. Some corrosion of the toe plate at this level was also observed. This toe plate should be repaired or replaced as required.

PICTURE DLU-A

Some corrosion within the Unloader Tower was noted on the east side of the tower at the 7th Level, as seen in Pictures DLU-B and DLU-C. This appears to be where guides for the counterweight were added and occurs in a number of locations. The new steel added in this area should be cleaned and painted to minimize further corrosion

PICTURE DLU-B

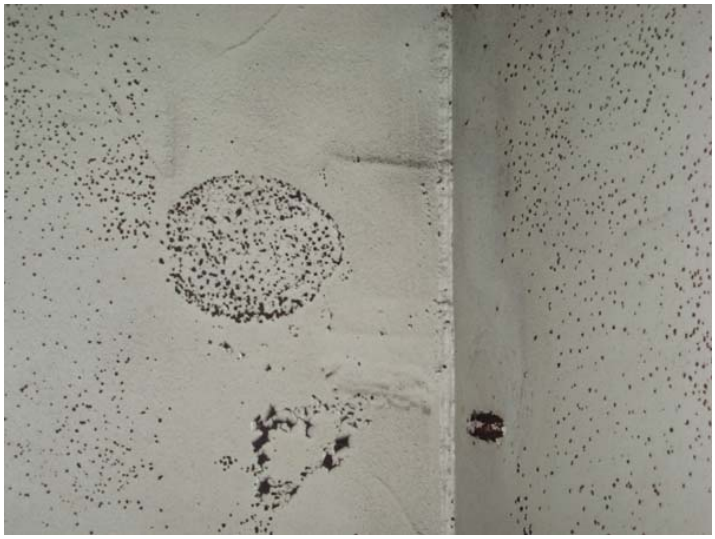
PICTURE DLU-C

The bolts at the various horizontal splice levels within the tower, in general, show no signs of corrosion, as seen in Pictures DLU-D and DLU-E.

PICTURE DLU-D

PICTURE DLU-E

Minor speckled-like corrosion was noted throughout the tower, such as seen in Picture DLU-F, but this is negligible.



PICTURE DLU-F

Some minor corrosion was noted in the northwest corner of the tower at the 13th Level, as seen in Pictures DLU-G and DLU-H, but this was of little concern.

PICTURE DLU-G

PICTURE DLU-H

There is some minor corrosion under the northeast sheave, as seen in Picture DLU-J. Cleaning and painting is recommended.

PICTURE DLU-J

There is a plate under the sheave at the southeast sheave that is not at the northeast sheave. In front of this plate, Picture DLU-K, there is negligible corrosion. Behind the plate, Picture DLU-L, there is corrosion similar to Picture DLU-J. Again, cleaning and painting is recommended.

PICTURE DLU-K

PICTURE DLU-L

Some minor corrosion under the southwest sheave at the Tower Sheave Platform was noted in Picture DLU-M. Cleaning and painting is recommended. The situation at the northwest sheave is similar.

PICTURE DLU-M

At the top of the stairs at the Tower Sheave Platform, as seen in Pictures DLU-N and DLU-P, the top flange of a beam supporting the stairs and a platform suspended below has corroded through the bottom flange. This is a safety issue and this beam needs repair/replacement as soon as possible.

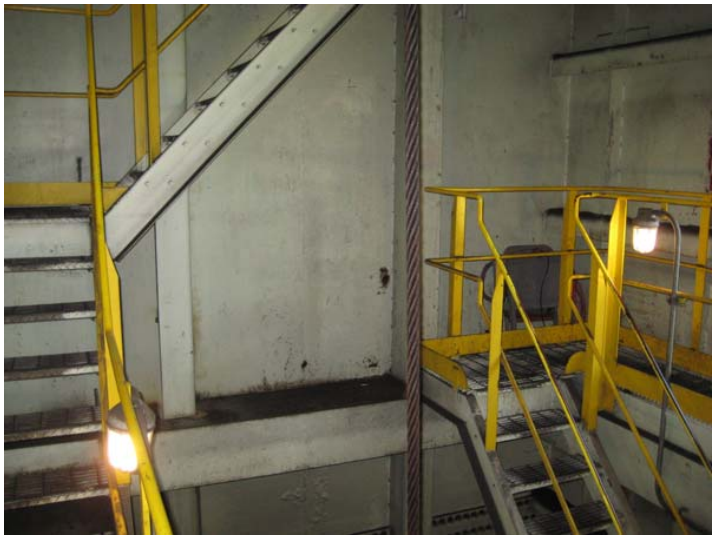
PICTURE DLU-N

PICTURE DLU-P

At bottom of these same stairs, as seen in Picture DLU-R, there is a hole thru the toe plate and additional corrosion of the stair stringers. The toe plate needs repair and the stringers need a general cleaning and repainting.

PICTURE DLU-R

Picture DLU-S shows the inside of the Tower with paint still in relatively good condition.



PICTURE DLU-S

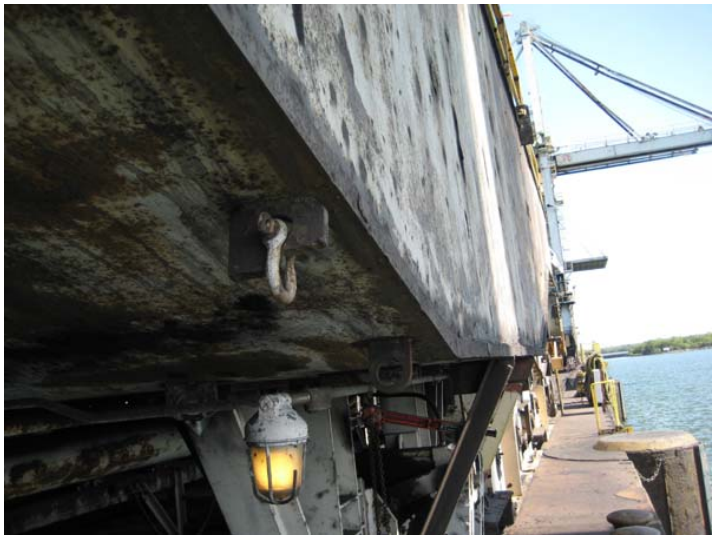
The underside of the horizontal section, seen in Pictures DLU-T, DLU-U and DLU-V, has corrosion of some members. Members need to be cleaned and painted or replaced depending upon condition once all rust and scale have been removed.

PICTURE DLU-T

PICTURE DLU-U

PICTURE DLU-V

Pictures DLU-W thru DLU-AB are along the waterside of the Outboard Travel Trucks showing corrosion of the framing beams and at the pins. Cleaning and painting is recommended. Again, depending upon condition once all rust and scale have been removed, some reinforcement or replacement of components may be required. Pins should be checked to insure they function as intended.



PICTURE DLU-W

PICTURE DLU-X

PICTURE DLU-Y

PICTURE DLU-Z

PICTURE DLU-AA

PICTURE DLU-AB

Pictures DLU-AC and DLU-AD are also along the waterside of the Outboard Travel Trucks showing corrosion of the framing beams and at the pins.

PICTURE DLU-AC

PICTURE DLU-AD

The vertical pipe braces for the Hopper, seen in Pictures DLU-AE and DLU-AF, show significant corrosion of the braces at the southwest corner and some at the northwest corner.

PICTURE DLU-AE

PICTURE DLU-AF

Accumulated coal in corners and on horizontal surfaces, seen in Pictures DLU-AG and DLU-AH, is creating corrosion problems throughout the lower levels of the exterior surfaces of the Unloader.

PICTURE DLU-AG

PICTURE DLU-AH

The plates in Pictures DLU-AJ and DLU-AK appear to be replacement plates. They should be cleaned and painted, along with the nuts, to minimize further corrosion.

PICTURE DLU-AJ

PICTURE DLU-AK

The bottom flange of a monorail between the cantilever arms of the Unloader is severely corroded, as seen in Pictures DLU-AL and DLU-AM. This beam should be repaired and painted or replaced before the monorail is used again.

PICTURE DLU-AL

PICTURE DLU-AM

The cantilever arms of the Unloader, Picture DLU-AN, are showing some signs of corrosion. They should be cleaned and inspected up close for the extent of the corrosion and repaired, if required, and repainted.

PICTURE DLU-AN

SECTION 3: PECO CLAMSHELL UNLOADER

The Peco Clamshell Unloader is installed at the south end of the dock and is rated at 2,500 tons per hour. This unloading rate makes it slower than the Dravo Ladder Unloader, but most operators favor the Peco Unloader because it is able to clean out the cargo hold in the barges more completely, additional equipment is not required, compared to the Dravo Unloader.

PECO Unloader (foreground)

Summary:

1. Structural
   - General cleaning of coal dust required.
   - Numerous steel members need to be replaced due to major corrosion.
   - Boom hangar shows distress from high wind event.
   - Booms need to be inspected thoroughly.
2. Electrical
   - Equipment in good condition.
3. Mechanical
   - General maintenance required.
   - Bogies need to be replaced.
   - Review boom alignment.
   - Inspect counterweight cables thoroughly.

3.1 ELECTRICAL

Observations of the Peco barge unloader include:

The transformer room near the lower elevation houses three large dry-type transformers:

a. Close Transformer: 4160V delta – 480/277V wye, 750 kVA
b. Hold Transformer: 4160V delta – 480/277V wye, 750 kVA
c. Travel Trolley Transformer: 4160V delta – 480/277V wye, 300 kVA

The 4160V power feeder to the Peco cable reel is routed in a cable tray parallel to the D1 conveyor. This cable tray is covered and has provided reasonable protection for the power cable. The junction box where the feeder cable connects to the flexible mining cable for traveling with the unloader has been damaged and bent by some collision. This box should be replaced to close up the raceway and protect from corrosion. Consideration should be given to installing rigid conduit instead of cable tray for this important feeder cable.

The operator cab (which was just replaced) has an Allen-Bradley Contrologix PLC with a Panelview operator interface graphic panel. This is part of a retrofit done in 2008.

The cable reel / electric room at the top of the structure has fluorescent lighting fixtures and the following equipment:

d. 2-section General Electric 8000 Line motor control center for auxiliaries.
e. Several unlabelled junction boxes.
f. Brake Control Panel (G.E. m/n 9T92C115G3).
g. 2-section General Electric 7700 Line motor control center for auxiliaries.
h. Two old General Electric D.C. Drive cabinets converted to tool storage.

There is a separate air conditioned room that was added to the north of the cable reel / electric room for a new Square D D.C. Drive line-up:

i. DC-5 Gantry Crane
j. DC-4 Feeder Drive
k. DC-3 Trolley Drive
l. DC-2 Close Drive Control / Power
m. DC-1 Hold Drive Control / Power
n. Master w/ Panelview Plus 1500
o. Boom Hoist motor starter and control panel.
p. Control power disconnect switch.

In general, the condition of the electrical equipment on the Peco Unloader was found to be good. The drive system and PLC system had been replaced and another upgrade to the drives was in the works. This important piece of equipment has been well maintained electrically over the years.

3.2 MECHANICAL

The rail wheel truck housings (bogies) on the water side need to be replaced. The housings are corroded from exposure to salt water.

The discharge chute work and skirt boards onto D conveyor are in good condition and appear relatively new.

The boom appears to be racked along the longitudinal axis. The turnbuckle supports for the boom may need to be adjusted. An alignment contractor should be hired to adjust the supports.

Some holes in the coal chute at the clamshell elevation were present and require patching.

The clamshell bucket and dribble pan have been replaced in the last 3 years and are in good condition.

The clamshell trolley mechanism has been replaced in the last 6 years and is in good condition.

There may be a nick in one of the counterweight cables. A deformity was noticed about 40 feet above the dock on one of the southerly cables. A closer inspection should be performed.

3.3 STRUCTURAL

The PECO Clamshell Unloader was observed during barge unloading operations. At that time it was observed that the Boom Hangers (Grasshopper Legs) exhibited a bouncing behavior as the clamshell filled and emptied. It is not known if this has been occurring since the equipment was placed in service. However, it was also observed that the inner hanger assemblies have a slight sag indicating that they may not be as tight as required.

At the time of the equipment walkdown, no drawings of the equipment were available for use and mark-up. In place of marking up drawings, photographs of the observations were taken. These are noted with the format Picture PCU - XXX.

A limited number of existing drawings of the PECO Clamshell Unloader were made available by TECO at the end of the on-site assessment phase of the project. These drawings were brought back to Stantec's office for use and reference. However, not all areas reviewed were covered by a drawing.

Reinforcement/repair plates were added at the corners of the vertical plates which were installed to support the drive motors during a drive train change, as seen in Picture PCU-A.

PICTURE PCU-A

Based on the observed installation, a square corner was cut in the vertical plate and the horizontal plate was brought in tight and welded. This square cut resulted in localized stress concentrations at the corner causing the crack. Setting the horizontal plate back ½" and providing a ½" radius corner in the vertical plate should eliminate this from occurring if any drive changes are made in the future.

Beneath the Transformer Building floor level, the connection of the horizontal members to the vertical members is showing some corrosion, as seen in Picture PCU-B. In this area, cleaning and painting should be adequate. Also, the connections of some of the horizontal floor framing members will need cleaning and repainting. Repair as required if cleaning reveals severe corrosion.

PICTURE PCU-B

Some handrail posts have corroded or nearly corroded completely thru and will need to be repaired in order to comply with OSHA requirements. Also, the toe plate for the platform beyond does not meet the OSHA 4" high minimum requirement. Some corrosion of the toe plate at this level was also observed. This toe plate should be repaired or replaced as required. See Picture PCU-C

PICTURE PCU-C

On top of the Transformer Building floor level at the northeast corner, the connection of the horizontal member to the vertical member is showing some extensive corrosion, in part because moisture is trapped and coal fines and dust can accumulate and create an acidic environment. Refer to Picture PCU-D.

PICTURE PCU-D

This is typical for most areas where the horizontal members connect to the vertical members and moisture and coal are trapped. In these areas, the stiffeners will need to be replaced, one at a time, as well as those fasteners that have corroded to the point the bolt head or nut is essentially gone. These

corroded bolts should be replaced, one at a time, with new, hot dip galvanized high strength bolts. Once this is complete, the area needs to be repainted and accumulated coal removed on a regular basis.

In Picture PCU-E, the handrail post has corroded free at the base due to trapped moisture and coal dust.

PICTURE PCU-E

Corrosion can be seen between gusset plates of pipe brace connection at northeast corner above Transformer level, as seen in Picture PCU-F. Clean and paint to minimize additional corrosion.

PICTURE PCU-F

Corrosion can be seen in Picture PCU-G at the northwest corner for main members and a Hopper support beam. This connection needs cleaning and painting with repairs, as necessary.

PICTURE PCU-G

Pictures PCU-H and PCU-J are at the northwest corner at Transformer Building level, similar to Picture PCU-D. Removal of coal and repair of the flanges as well as the stiffeners and fasteners will be required here followed by painting.

PICTURE PCU-H

PICTURE PCH-J

Accumulated coal at the southwest corner is seen in Picture PCU-K. Due to lack of access, the condition of the connection is unknown. However, based on other observations, considerable corrosion is expected. Clean, repair and paint as before.

PICTURE PCU-K

At the southwest corner at the Dribble Deck level, the build-up of coal and extensive corrosion of stiffeners and bolts and grating corrosion can be seen in Pictures PCU-L and PCU-M. Clean, repair and paint as before.

PICTURE PCU-L

PICTURE PCU-M

The situation is similar at the northwest corner, as seen in Pictures PCU-N and PCU-P with conditions similar to those at southwest corner.

PICTURE PCU-N

PICTURE PCU-P

Pictures PCU-R thru PCU-AC show the steel on the underside of the Machine House, as seen from the top of the Operator's Cab, showing varying degrees of corrosion. However, most can be addressed with cleaning and repainting.

Should cleaning reveal a considerable loss of section, repair or replacement will be required.

PICTURE PCU-R

PICTURE PCU-S

PICTURE PCU-T

PICTURE PCU-U

PICTURE PCU-V

PICTURE PCU-W

PICTURE PCU-X

PICTURE PCU-Y

PICTURE PCU-Z

PICTURE PCU-AA

PICTURE PCU-AB

PICTURE PCU-AC

The south upper Boom Hanger assembly sags more than the north upper Boom Hanger resulting from some distress during a high wind event in the past. The booms show some corrosion due to exposure, as seen in Picture PCU-AD.

PICTURE PCU-AD

The condition of the booms at the pins is not known since these were not easily accessible. These hanger assemblies including the pins should be inspected for wear and the hanger assemblies tightened to reduce the sag in the assemblies. The inner hanger assemblies should be addressed similarly.

The top surfaces of the Hinged Boom Assembly show varying degrees of corrosion, as seen in Pictures PCU-AE and PCU-AF, but, because this area is well above the levels where coal can accumulate, the corrosion is not severe and only cleaning and painting should be necessary.

PICTURE PCU-AE

PICTURE PCU-AF

Some corrosion was observed at the Machinery Room level at the connections between the main horizontal and vertical members. Refer to Picture PCU-AG. In general, this did not appear to be too severe and cleaning and painting is recommended. Again, depending upon the condition of the bolts, these fasteners may need to be replaced.

PICTURE PCU-AG

Also, some of the other connections and horizontal surfaces show some signs of corrosion, as seen in Picture PCH-AH. However, unless corrosion is severe, cleaning and painting should be sufficient.

PICTURE PCH-AH

The sill of the Transformer Room shows signs of corrosion, as seen in Picture PCU-AJ and PCU-AK although this does not appear to be severe and cleaning and painting should be adequate.

PICTURE PCU-AH

PICTURE PCU-AK

Where the pipe braces connect to the underside of the horizontal framing above the Transformer Room, corrosion is evident, as seen in Pictures PCH-AL and PCU-AM. However, cleaning and painting should be adequate.

PICTURE PCU-AL

PICTURE PCU-AM

The corrosion of the outboard Travel Trucks is seen in Pictures PCU-AN and PCU-AP. The trucks will need cleaning and painting and possibly repairs should cleaning show significant loss of metal.

PICTURE PCU-AN

PICTURE PCU-AP

Additional corrosion of the outboard Travel Trucks is seen in Pictures PCU-AR, PCU-AS, PCU-AT and PCU-AU. The trucks will need cleaning and painting and possibly repairs should cleaning show significant loss of metal.

PICTURE PCU-AR

PICTURE PCU-AS

PICTURE PCU-AT

PICTURE PCU-AU

The Travel Trucks on the Hopper are less corroded, as seen in Picture PCU-AV, but will require cleaning and painting to minimize further corrosion.

PICTURE PCU-AV

The underside of the Hopper support structure has varying degrees of corrosion. At some locations, cleaning and painting may be all that is required.

PICTURE PCU-AW

In other areas, as seen in Pictures PCU-AX thru PCU-BF, the underside of the Hopper support structure will require considerable cleaning and painting, and repair of members that have lost significant section due to corrosion will be necessary. This will become more evident once the rust and loose material have been removed back to solid metal.

PICTURE PCU-AX

PICTURE PCU-AY

PICTURE PCU-AZ

PICTURE PCU-BA

PICTURE PCU-BB

PICTURE PCU-BC

PICTURE PCU-BD

PICTURE PCU-BE

PICTURE PCU-BF

SECTION 4: CONVEYOR D1

Conveyor D receives coal from the barge unloaders (Dravo and Peco) and transports the coal to conveyor E1 at T1.

Summary:

1. Structural
   - Grating no longer supported properly at edges.
   - Conveyor frame and steel framing corroded and need repair.
   - Support legs not attached to foundation.
2. Electrical
   - N/A
3. Mechanical
   - Conveyor head frames require repair.
   - Idler pulley at head frame needs replacement.
   - Repair conveyor deck plates.

4.1 ELECTRICAL

Electrical discussion is with T1 transfer tower section 5

4.2 MECHANICAL

The frame at the head end has corroded through and separated from the head pulley support structure. Also there is an idler near the head pulley that needs to be replaced due to corrosion.

SECTION 4: CONVEYOR D1

Conveyor D receives coal from the barge unloaders (Dravo and Peco) and transports the coal to conveyor E1 at T1.

Summary:

1. Structural
   - Grating no longer supported properly at edges.
   - Conveyor frame and steel framing corroded and need repair.
   - Support legs not attached to foundation.
2. Electrical
   - N/A
3. Mechanical
   - Conveyor head frames require repair.
   - Idler pulley at head frame needs replacement.
   - Repair conveyor deck plates.

4.1 ELECTRICAL

Electrical discussion is with T1 transfer tower section 5

4.2 MECHANICAL

The frame at the head end has corroded through and separated from the head pulley support structure. Also there is an idler near the head pulley that needs to be replaced due to corrosion.

Several of the conveyor deck plates have corroded through allowing coal to spill on the return belt. These should be replaced on the elevated portions of the conveyor as a minimum to prevent coal from falling on personnel and to facilitate cleanup.

4.3 STRUCTURAL

Note: Items identified as C-1, C-2, etc. refer to annotated drawings at end of this section.

Conveyor D1 is in the process of being replaced in sections.

The following items were observed in the inclined section near Transfer Tower T1:

Continental Conveyor Drawing W–615-E–58-A

C-1 Along the inclined portion of the conveyor, there is corrosion through some of the conveyor frame members as seen in Pictures CONV-D1-A thru CONV-D1-G. Additionally some of the grating is corroded to the point that the bearing bars are no longer being supported.

PICTURE CONV-D1-A

PICTURE CONV-DI-B

PICTURE CONV-D1-C

PICTURE CONV-D1-D

PICTURE CONV-D1-E

PICTURE CONV-D1-F

PICTURE CONV-D1-G

C-2 It was also observed that some sections of the grating are spanning in one direction and others are spanning perpendicular to them as seen previously in Picture CONV-D1-C.

C-3 The bottoms of the legs at a number of locations are not supported on the deck of the dock structure as can be seen in Pictures CONV-D1-H thru CONV-D1-K or the grout under the base plate has deteriorated. The base plates should be cleaned, painted and re-grouted. Replacement of anchor bolts and/or base plates may be required after cleaning if it is determined that the corrosion is significant.

PICTURE CONV-D1-H

PICTURE CONV-D1-J

PICTURE CONV-D1-K

Continental Conveyor Drawing W–615-E–60-A

C-1 Many of the structural members of the Take-up Tower show a lot of corrosion such as deterioration at connections (Pictures CONV-D1-L thru CONV-D1-N),

PICTURE CONV-D1-L

PICTURE CONV-D1-M

PICTURE CONV-D1-N

Extensive corrosion at the bottoms of the columns and their base plates (Pictures CONV-D1-P thru CONV-D1-T),

PICTURE CONV-D1-P

PICTURE CONV-D1-R

holes thru the webs of the columns (Pictures CONV-D1-R, CONV-D1-S, CONV-D1-U, CONV-D1-V and CONV-D1-W),

PICTURE CONV-D1-S

PICTURE CONV-D1-T

PICTURE CONV-D1-U

PICTURE CONV-D1-V

and loss of section of members (Pictures CONV-D1-W and CONV-D1-X).

PICTURE CONV-D1-W

PICTURE CONV-D1-X

SECTION 5: TRANSFER TOWER T1

The T1 transfer tower is located on the south end of the barge unloading dock. It is where coal coming off the barge unloading D1 conveyor is transferred onto the E1 conveyor.

T1 Transfer Tower

Summary:

1. Structural
   - Clean structure of coal duct.
   - Replace corroded members
2. Electrical
   - Equipment is good condition
3. Mechanical
   - Chute corrosion noted and patching and painting recommended.

5.1 ELECTRICAL

All electrical connections to the dock are routed through the T1 structure. Specific equipment located at the T1 structure includes:

Display Mode selector cabinet (associated with coal blending display?)

Camera Cabinet (camera monitors the E1 conveyor).

D1 conveyor motor (250 HP, 1800 RPM, 4000V).

Electric Hoist.

4160V disconnect switch and receptacle for barge power.

600A, 4160V disconnect switch for the Peco barge unloader.

600A, 4160V disconnect switch for the Dravo barge unloader.

Magnetic separator at the D-E transfer hopper.

No major electrical deficiencies were noted at the T1 structure.

5.2 MECHANICAL

The chute work between conveyor D1 and conveyor E1 is corrode and should be patched and painted to prevent further corrosion that will lead to replacement.

5.3 STRUCTURAL

Note: Items identified as C-1, C-2, etc. refer to annotated drawings at end of this section.

Continental Conveyor and Equipment Co. Drawing E-73-A-0

C-1 & 2	Floor beams have localized moderate delamination in the top and bottom flange. Recommend cutting out damaged section and replacing in kind.
C-3	Horizontal brace has severe corrosion. Recommend replacement in kind.
C-4	Strut between columns has severe corrosion and delamination. Recommend replacement in kind.
C-5	Vertical brace has severe corrosion and delamination. Recommend replacement in kind.

SECTION 6: CONVEYOR E1

Conveyor E1 transports coal from conveyor D on the dock in T1 to conveyor Y in T2.

Summary:

1. Structural
   - Clean structure of coal dust.
   - Replace corroded members and paint.
2. Electrical
   - N/A
3. Mechanical
   - Replace old tail section.
   - Clean area and inspect conveyor support legs.

6.1 ELECTRICAL

Electrical discussion is with T2 transfer tower section 7

6.2 MECHANICAL

Conveyor tail support legs are buried in 12" of coal and could not be inspected. It appears a portion of the tail section has been replaced. The remainder of the tail section should be replaced as well as cleaning and painting of the remaining frame and head chute.

6.3 STRUCTURAL

Note: Items identified as C-1, C-2, etc. refer to annotated drawings at end of this section.

Continental Conveyor and Equipment Co. Drawing E24-A

C-1 Double angle vertical braces in truss have moderate to severe corrosion between the angles. Recommend cleaning and painting or possibly replacing with a new WT with similar properties.

C-2 Members of the bottom chord have moderate to severe corrosion and delamination. Recommend cleaning, inspection, repairs as required and painting to prevent further damage.

C-3 Members of the bottom chord have severe corrosion. Recommend replacement in kind.

C-4 All members at this connection have severe corrosion. Recommend disassembling this area, replacing corroded sections with identical sections and painting to prevent future damage.

SECTION 7: TRANSFER TOWER T2

The T2 Transfer House accepts coal from the barge unloading dock via E1 conveyor and transfers it either onto the F conveyor to transfer it to the South Stacker or onto the Y and Z conveyors to transfer the coal to the north stacker.

T2 Transfer Tower

Summary

1. Structural
   - Replace corroded members and connections.
   - Clean coal dust and paint.
2. Electrical
   - Replace 4160V switch gear.
   - Place MCCs.
   - Replace PLC.
   - Remove out of service equipment.
3. Mechanical
   - Fire protection line spraying fire protection panel.

7.1 ELECTRICAL

Equipment noted on the top floor elevation includes:

1. E1 Conveyor Motor (200 HP, 1800 RPM, 4000V)

2. 4160V Westinghouse Ampgard™ Switchgear Assembly in an outdoor enclosure containing motor controllers for D1, E1, and Z Conveyors, and a switch for the Dravo Bucket Unloader. This assembly has a large amount of rust evident on the enclosure that has been repaired with sheet metal already. The mechanical interlocks for the door housing the Dravo Bucket Unloader switch has failed so that the live 4160V switch can be accessed while it is energized. This switchgear should be replaced.

5kV Switchgear at T2

3. 480V Cutler-Hammer Unitrol™ 3-section motor control center in a NEMA 4x stainless steel enclosure. This MCC is over 25 years old and should be replaced because the steel enclosure has rusted through.

480V MCC at T2

4. Modicon™ 584 PLC Cabinet ICYH-PCT2. This stainless steel cabinet houses an obsolete model of Modicon PLC that controls the conveyors in the T2 transfer tower. This PLC needs replacement due to it being obsolete.

5. Fire Protection Cabinet A888-M649 for conveyors E1 and Z.

Fire Suppression Cabinet at T2

6. 500kVA, 4160V delta – 480V delta Square D dry type transformer in NEMA 3R enclosure. The louvers on this enclosure were modified presumably because rain was dripping on the transformer windings.

500kVA Transformer at T2

Equipment noted on the intermediate floor elevation includes:

1. Blending Display Control Panel. This panel looks to be less than 5 years old and operates a large digital display that the mobile equipment operator uses to gauge how much coal to push onto the blending conveyor feeding the F conveyor going to the south Stacker/Reclaimer.

2. Control Panel that appears to be original equipment. This appears to be out of service (replaced by the Modicon PLC system). If it is indeed out of service, it should be demolished. If there are live circuits, then they should be eliminated when the controls are next upgraded.

3. 4160V Square D Switchgear Assembly in an outdoor enclosure containing switches for selecting the power source from 111W or 117E. A load-side switch feeds the motor controllers for D1, E1, and Z Conveyors, the Dravo Bucket Unloader, and the 500kVA transformer on the top elevation. This switchgear appears to be in relatively good condition. A third source of power from the new rail unloading conveyor system was added to improve electrical power availability at the dock.


5kV Switchgear at T2 mid-level

4. Battery compartment (believe to be part of the Fire Suppression System).

5. T2 Transfer Building Fire Suppression Control Panel for E1 and Z conveyors.

6. Electrical Room with rusted out door, two control panels (CS2-1 and CS2-2) and a 4-section outdoor Cutler-Hammer Unitrol™ MCC. The control panels appear to be converted to j-boxes during the Modicon PLC installation. The MCC is about 25 years old and has some corrosion in its steel enclosure.

Equipment noted on the ground floor elevation includes:

1. 120/240V power panel 1PCH2.

2. Lighting Panel with lighting contactor.

3. Junction box padlocked shut. Could be for fire protection system.

4. Fire Protection system riser flow switches.

5. 4160V Switchgear containing a 600A switch that feeds the Peco Clamshell Unloader. This switch has a note that it is broken and power must be switched back in the powerhouse (circuit 111E) if maintenance is required on the Peco Clamshell Unloader.

PECO Disconnect in T2 (not working)

6. 4160V General Electric switchgear that is out of service and abandoned in place.

5kV Switchgear at base of T2 (gear on right is dead)

Light fixtures appear to be in working order. They are ~150W metal-halide fixtures. About half the lamps were burning (photocell(s) not working).

7.2 MECHANICAL

A pinhole leak in a 4" fire protection line is spraying a fire protection panel at the ground elevation.

7.3 STRUCTURAL

Note: Items identified as C-1, C-2, etc. refer to annotated drawings at end of this section.

Continental Conveyor and Equipment Co. Drawing E-73-A-0

C-1 Horizontal brace and gusset plate have severe corrosion and metal loss. Recommend replacing brace and gusset plate in kind. See included photo TTWR-T2-J.

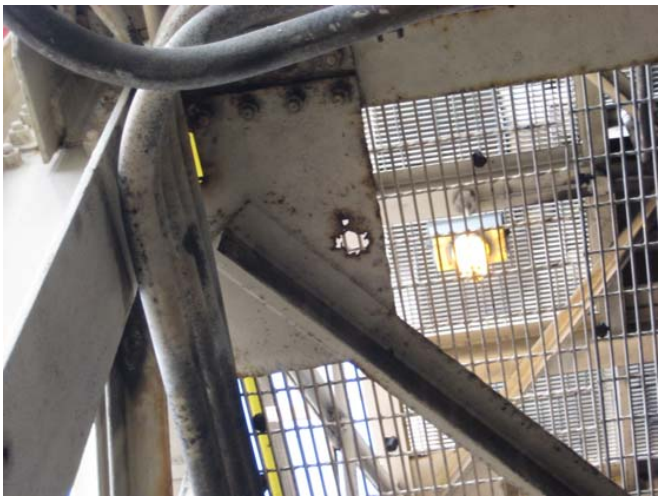
PICTURE TTWR-T2-J

C-2 Horizontal brace and gusset plate have severe corrosion and metal loss. Recommend replacing brace and gusset plate in kind. See included photo TTWR-T2-J.

C-3 Top flange of floor beam has severe corrosion and metal loss. Recommend cutting out deteriorating section of flange and welding in new plate. Ensure beam is unloaded prior to cutting out damaged section. Alternatively the beam could be replaced in kind. See included photo TTWR-T2-F.

PICTURE TTWR-T2-F

C-4 Gusset plate has developed holes near horizontal brace connection. Recommend grinding hole back to sound metal and welding a patch over hole. Weld should be at plate and though hole to ensure moisture cannot get between the two. See included photo TTWR-T2-K.



PICTURE TTWR-T2-K

C-5 Floor beam has developed holes in web and flange. Recommend grinding holes in web back to sound metal and welding a patch over hole. Weld should be at plate and though hole to ensure moisture cannot get between the two. The flange could be cut out back to sound metal and plate welded back in to replace flange. Ensure beam is unloaded prior to cutting out damaged section. See included photos TTWR-T2-G and TTWR-T2_H.

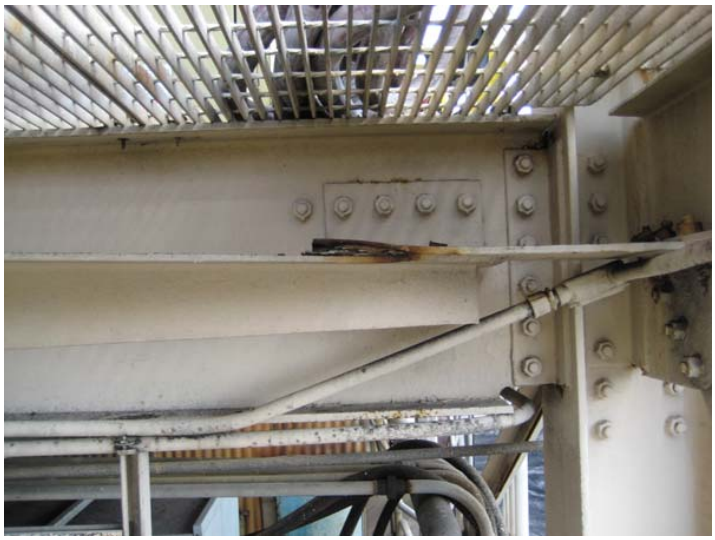
PICTURE TTWR-T2-G

PICTURE TTWR-T2-H

C-6 Floor beam has severe metal loss at North connection. Recommend replacement in kind. See included photo TTWR-T2-D.

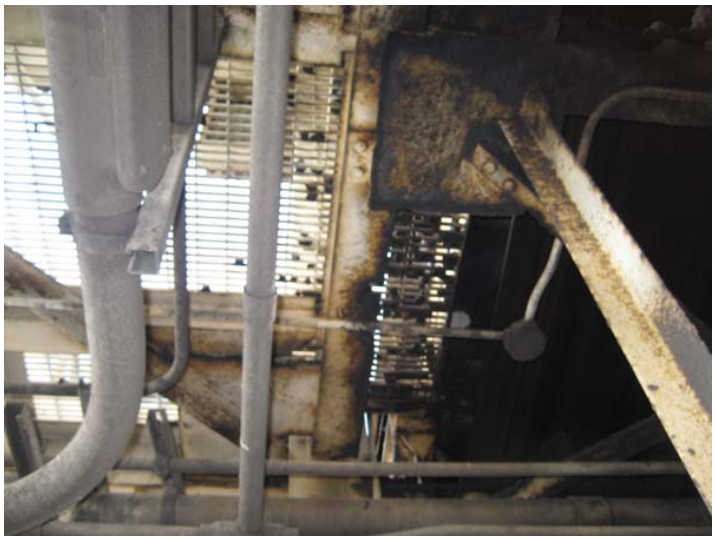
PICTURE TTWR-T2-D

C-7 There is delamination between the horizontal brace and the gusset plate and the connection has begun to pry apart. Area should be cleaned and seal welded to prevent moisture from getting between the two. See included photo TTWR-T2-C.



PICTURE TTWR-T2-C

C-8	Floor beam has delamination of the top flange and should be cleaned and painted to prevent further damage.
C-9	Floor beam has delamination of the bottom flange and should be cleaned and painted to prevent further damage.
C-10	Floor beam has severe rot. Recommend placement in kind.
C-11	Top and bottom flange of the floor beam has moderate delamination and metal loss. Recommend cleaning and inspection prior to painting to prevent further damage.
C-12	Bottom flange of floor beam has severe corrosion and metal loss. Recommend cutting out deteriorating section of flange and welding in new plate. Ensure beam is unloaded prior to cutting out damaged section. Alternatively the beam could be replaced in kind. See included photo TTWR-T2-E.



PICTURE TTWR-T2-E

C-13	Horizontal brace has severe delamination and metal loss. Recommend replacement in kind.
C-14	Horizontal brace has severe delamination and metal loss. Recommend replacement in kind.
C-15	Floor beam has moderate delamination and rot. Recommend grinding holes in web back to sound metal and welding a patch over hole. Weld should be at plate and though hole to ensure moisture cannot get between the two. The flange could be cut out back to sound metal and plate welded back in to replace flange. Ensure beam is unloaded prior to cutting out damaged section. Alternatively the beam could be replaced in kind.
C-16	Floor beam has severe delamination and metal loss. Recommend replacement in kind.
C-17	Horizontal brace has severe delamination and metal loss. Recommend replacement in kind.
C-18	Horizontal brace has severe delamination and metal loss. Recommend replacement in kind.

Continental Conveyor and Equipment Co. Drawing E-74-A

C-19 Monorail support brace has severe rot. Recommend replacement in kind. See included photo TTWR-T2-B.

PICTURE TTWR-T2-B

C-20 Monorail support brace has severe rot. Recommend replacement in kind. See included photo TTWR-T2-B.

C-21 thru 34 Double angle horizontal braces in bottom chord of roof trusses have pitting and moderate to severe corrosion between the angles. Recommend cleaning and painting or possibly replacing with a new WT with similar properties.

C-35 Double angle vertical truss brace has delamination at intersection of the braces. Recommend cleaning and seal welding to keep out moisture. Alternatively the beam could be replaced in kind. See included photo TTWR-T2-A.

PICTURE TTWR-T2-A

C-36 Bottom chord of roof truss has moderate pitting and corrosion. Recommend cleaning and painting to prevent further damage.

Continental Conveyor and Equipment Co. Drawing E-75-A

C-37 Brace has been upgraded to red from the previous assessment done in 2003. Brace has severe rot and metal loss. Recommend replacing damaged section of brace in kind.

C-38 Section of vertical brace is rotten. Recommend replacing damaged section in kind.

C-39 Intersection of vertical braces has moderate corrosion. Recommend cleaning and painting to prevent further damage.

C-40 Vertical brace has moderate corrosion at a previous repair. Recommend cleaning and painting to prevent further damage.

C-41 Strut between columns has moderate corrosion and a small amount of metal loss. Recommend cleaning and painting to prevent further damage.

C-42 Connection of vertical brace to gusset plate has rotten free and brace is no longer taking load. Recommend replacing gusset plant and field welding existing braces to new gusset plate. See included photo TTWR-T2-L.

PICTURE TTWR-T2-L

C-43 Strut between columns has moderate corrosion and a small amount of metal loss. Recommend cleaning and painting to prevent further damage.

C-44 & 45 Vertical brace has moderate corrosion at a previous repair. Recommend cleaning and painting to prevent further damage.

Continental Conveyor and Equipment Co. Drawing E-76-A

C-46 Column has thinning of the flanges near the top of base plate. Recommend cleaning and painting the lower 3'-0" of column and base plate to prevent further damage.

C-47 Column has thinning of the flanges near the top of grating. Recommend cleaning and painting the column 2'-0" either side of floor to prevent further damage.

C-48 Vertical brace has moderate metal loss. Recommend cleaning and painting to prevent further damage.

C-49 Strut between columns has moderate corrosion and a small amount of metal loss. Recommend cleaning and painting to prevent further damage.

C-50 Column has thinning of the flanges near the top of grating. Recommend cleaning and painting the column 2'-0" either side of floor to prevent further damage.

C-51	Vertical bracing has moderate corrosion between the angles. Recommend cleaning and painting to prevent further damage.
C-52 & 53	Vertical bracing has moderate corrosion between the angles and at gusset plate. Recommend cleaning and painting to prevent further damage.

SECTION 8: CONVEYOR F1

Conveyor F1 transports coal from conveyor Z in T2 to conveyor J1 in T3. It also serves the south stacker/reclaim (Dravo).

Summary:

1. Structural
   - Replace missing grout at column base plates.
   - Clean structure of coal dust.
   - Replace/repair horizontal frame work at horizontal pulley.
2. Electrical
   - No major problems noted.
3. Mechanical
   - Miscellaneous safety, maintenance, and operational items noted.

8.1 ELECTRICAL

The cable tray running along the conveyor is bent and missing some covers but no major problems were noted.

8.2 MECHANICAL

Conveyor F has been replaced within the last five years due to severe corrosion. Mechanically the conveyor is in relatively sound condition. The conveyor was running during the walk down and in general there was only one noisy idler. The bearing is gone in the last idler at the head of conveyor F1. The idler roller is riding on the shaft.

Idler Roller on Shaft

Corroded idler supports are present at the head end. It appears that newer black supports are okay while older red supports show signs of corrosion. The newer black frames also have sealed bearings versus Zerk fitting which will reduce maintenance costs.

Guarding should be added around the penetration through the head chute between the head pulley and bearing housing opposite the drive side.

Penetration at Head Chute

A traveling magnet over the head end of conveyor F1 continuously removes tramp metal from the coal. It drops the metal down a chute into a bin. The bin was full during the walk down. The bin must be kept emptied to prevent plugging the cute and carryover of tramp metal into the fuel.

8.3 STRUCTURAL

Note: Items identified as C-1, C-2, etc. refer to annotated drawings at end of this section.

The following observations were made:

C-1 The grout beneath the base plates of the frame supporting the tail end of Conveyor F1 has disappeared over time as can be seen in Pictures CONV – F1 – A and CONV – F1 – B. Additionally, as can be seen in Picture CONV – F1 – C, the condition of the anchor bolts and nuts is poor. The bottom of the columns and their base plates should be cleaned and painted and repaired, as necessary. The underside of the base plates should be cleaned of any coal and the grout should be replaced. The anchor bolts should be cleaned and painted and the nuts replaced, if possible; otherwise a new means of anchorage will be required.

PICTURE CONV–F1–A

PICTURE CONV–F1–B

PICTURE CONV–F1–C

C-2 A beam spanning between Transfer Tower T-2 columns with web horizontal has filled with coal to nearly the tips of the flanges, as can be seen in Pictures CONV-F1-D, CONV-F1-E and CONV-F1-F. This beam supports a walkway at the tail end of Conveyor F1 and also braces Conveyor F1. This beam needs to be cleaned of coal and painted and repaired as necessary. If it is going to be continued to be used, it is recommended that a plate be added to

the top of the beam to eliminate coal accumulation and minimize further corrosion.

PICTURE CONV-F1-D

PICTURE CONV-F1-E

PICTURE CONV-F1-F

Continental Conveyor Drawing W-615-E-37-A

C-1 Much of the bottoms of the columns for the Conveyor F1 Take-up Enclosure are embedded in coal, as seen in Pictures CONV-F1-G AND CONV-F1-H. At other locations this had led to significant corrosion at the bottom of the columns and to the anchor bolts and nuts. The coal should be removed from around the bottoms of the columns and kept clear of the bottoms of the columns. The columns should then be cleaned and painted and repairs made to the columns and anchor bolts as necessary.

PICTURE CONV–F1-G

PICTURE CONV-F1-H

C-2 The framework supporting the horizontal pulley for the Conveyor F1 Take-up is extremely corroded as seen in Pictures CONV-F1-J and CONV-F1-K. This framing will need cleaning and paint, at the least, and possibly repairs if cleaning back to solid metal exposes significant loss of section of the members.

PICTURE CONV-F1-J

PICTURE CONV-F1-K

SECTION 9: SOUTH STACKER/RECLAIMER (DRAVO)

The south stacker/reclaimer was part of the original coal yard installation in 1964 and is to this day the heart of the coal handling system. It has outperformed the newer north coal yard stacker/reclaimer and is essential in supplying enough coal to satisfy the demand of units 1 – 4. The south stacker/reclaimer is used heavily at night. Days are reserved for maintenance and for catching up with production as necessary.

Though the south reclaimer continues to supply the units with coal and continues to outperform the north reclaimer, the age of the equipment indicates that replacement over repair is a realistic option. Consequently, a budget quote was solicited from both Metso and Tenova for replacement of both stacker reclaimers (north and south- see section 16) in 2007 of 6,250,000 Euros. For this assessment, we contacted Tenova and Metso to review their pricing. Tenova responded with an increase to 7,800,000 Euro ($10,000,000 U.S.) for two machines, equipment only. Metso replied with a price of $11M U.S. for two machines. Details are attached in the Section 28, Future Upgrades.

South Stacker/Reclaimer

Summary:

1. Structural
   - Damage observed is due to corrosion.
   - Cleaning, replacement, repair, and painting of steel framing are recommended as detailed in structural section.

2. Electrical
   - Electrical equipment is maintained and operable, but is outdated.
   - Recommend developing a five year replacement plan for electrical equipment.
3. Mechanical
   - Repair, replacement, and painting are recommended.
   - The operator cab is recommended to be replaced due to corrosion induced holes in the floor.

9.1 ELECTRICAL

Conditions noted were as follows:

At the base of the south stacker/reclaimer is a control cable reel and a 4160V cable reel which accepts incoming power from a mining cable routed in tray along the F conveyor. The cable reel feeds a 4160V delta – 480V delta, 500 kVA transformer that supplies 480V power to a small air conditioned electrical room located on the west side of the carriage. This small electrical room contains:

a. Slew Drive Control cabinet with General Electric D.C. Drives and a Quantum™ PLC in it.
b. 480V 4-section Westinghouse Type W motor control center with a 400A main breaker. This MCC provides power to lighting, gantry leveling controller, boom swing controller, bypass gate, traversing feed slew drive, power and control cable reels.
c. Tower Travel control cabinet that have been retrofitted with a Square D Altivar 71 V.F. Drive.
d. Lighting Transformer and panelboard.
e. Dravo Leveling controller cabinet.

Also at the base of the south stacker/reclaimer is a lube unit that supplies grease to the moving parts on the lower end of the machine.

There are two slew drive motors used to position a turret that the stacker/reclaimer boom is attached to.

Four A.C. traversing drive motors with brakes on each track.

There is an electrical room at the base of the stacker/reclaimer boom. This electrical room houses a 480V 6-section Westinghouse Type W motor control center that appears to be about to fall over. There is not adequate working clearance in front of this MCC. A MCC replacement project or NEC working clearance project should be considered for this area. The MCC supplies power to:

f. Bucket Wheel Starter.
g. G1 Conveyor.

h. Load Chute Hoist.
i. Boom conveyor relays.
j. Rectox for Boom conveyor brake.
k. Upper House Vent Pan.
l. Probe Hoist.
m. Boom Hoist.
n. Relay Panel.

Also in the electrical room at the base of the stacker/reclaimer boom:

o. Lighting panelboard.
p. Bypass Gate Relay Panel (empty).
q. Lighting contactor for rotating structure.
r. Mercury Vapor Lighting Fixture contactor.
s. Unlabelled disconnect switch.

On the boom level at the top end of the turret, there is a lube unit that supplies grease to the boom hoist cables and sheaves.

The boom conveyor drive motor is 200HP, 1800 RPM, 460V with brake.

Bucket Wheel drive motor (150 HP, 1200 RPM, 460V).

There is a junction box that has been added near the end of the boom to splice cables going to the operator cab. The cab has most likely been replaced due to damage. The cab has 7 multi-conductor tray cables going to it.

Boom Hoist motor (60 HP, 1800 RPM, 460V with brake).

Except for the 480V 6-section Westinghouse Type W motor control center noted to be replaced above, the equipment is operable and maintained, but is outdated. We recommend TECO develop a replacement program to be implemented over the next five years.

9.2 MECHANICAL

The reclaim chute to F conveyor needs replacement. The steel is corroded with holes.

The chute to the stack out conveyor is corroded and needs to be sandblasted and painted.

The operator cab floor is corroded badly, with holes in several spots. It needs to be replaced.

There is a significant amount of coal present on the first level that presents tripping hazards and should be cleaned.

9.3 STRUCTURAL

Note: Items identified as C-1, C-2, etc. refer to annotated drawings at end of this section.

Dravo Drawing 325044

C-1 & 2	Toe plate is missing from both sides of walkway. Recommend installing new toe plate.
C-3 thru 5	Top flange of channel has severe metal loss and rot. Recommend replacement in kind.
C-6	Beam has moderate metal loss and corrosion. Recommend cleaning, inspection to determine full extent of damage, repair if necessary and then painting to prevent further damage.
C-7 & 8	Beams have mild corrosion and mild metal loss of top and bottom flange. Recommend cleaning and painting to prevent further damage.
C-9 & 10	Gusset plates attached to top of beam have moderate to severe rot. Recommend repairing with plates or replacement in kind.
C-11 & 11a	Beams have moderate metal loss and severe delamination of the top flange. Recommend cleaning top flanges back to sound metal and cover plating. Alternatively it may be simpler to replace in kind.

Dravo Drawing 325048

C-12	Channel connection to superstructure has rotted away. This area of the platform is very bouncy. Recommend closing off platform until channel can be replaced. See included photo DSR-D.

PICTURE DSR-D

Dravo Drawing 325049

C-13 Members marked in yellow have moderate corrosion and metal loss. Recommend cleaning and painting to prevent further damage.

C-14 Members marked in red have severe corrosion and metal loss. Much of the metal loss are at the end connections. Recommend replacing braces and gusset plates at all locations.

C-15 Expanded metal grating is rotting at support. Recommend replacing grating.

C-15a Braces have considerable metal loss. Recommend replacement in kind.

Dravo Drawing 325054

C-16 Beam has holes in the web and delamination of the bottom flange. Recommend grinding holes in web back to sound metal and welding a patch over hole. Weld should be at plate and through hole to ensure moisture cannot get between the two. Also recommend grinding away rotten steel at the bottom flange and cover plating. Beam may require temporary support.

C-17 Beam has severe metal loss and rot on bottom flange at connection. See included photo DSR-C. Recommend replacement in kind.

PICTURE DSR-C

C-18 Beam has severe metal loss and rot in the bottom flange at midspan. See included photo DSR-B. Recommend grinding bottom flange back to sound metal or cutting out damaged section and either cover plating or installing new plate for bottom flange. Beam may require temporary support. Alternative recommendation would be replacement in kind.

PICTURE DSR-B

C-19 Beam has considerable delamination and metal loss of the top flange. Recommend grinding top flange back to sound metal or cutting out damaged section and either cover plating or installing new plate for top flange. Beam may require temporary support. Alternative recommendation would be replacement in kind.

C-20 Beam has several areas of severe corrosion. Recommend cleaning, inspection to determine extent of damage, repairing with cover plates as required and painting to prevent further damage.

C-21 Vertical leg of angle brace has severe rot. See included photo DSR-A. Recommend cutting out bad section and replacing with same steel shape.

PICTURE DSR-A

C-22 thru 26 Toe plate is missing or has rotten away. Recommend installing new toe plate.

Dravo Drawing 325858

C-27 The bottom chord member has a large hole in the web at the top of the stairs going down to the tensioner platform. The horizontal brace connection is breaking free from the web at this location as well. Recommend cover plating the web on both sides and replacing horizontal gusset plate the braces frame into.

C-28 Horizontal member going from bottom chord to bottom chord has moderate to severe corrosion in the web at midspan. Recommend

cleaning, inspection to determine extent of damage, repair with plates if required and then painting to protect from further damage.

Dravo Drawing 325862

C-29 The bottom chord member has a large hole in the web at the top of the stairs going down to the tensioner platform. The horizontal brace connection is breaking free from the web at this location as well. Recommend cover plating the web on both sides and replacing horizontal gusset plate the braces frame into.

C-30 Horizontal members going from bottom chord to bottom chord has moderate to severe corrosion in the web. Recommend cleaning, inspection to determine extent of damage, repair with plates if required and then painting to protect from further damage.

C-31 & 32 Horizontal members going from bottom chord to bottom chord has severe corrosion and rot at either side of horizontal x-brace. Recommend replacement in kind.

C-33 Horizontal member going from bottom chord to bottom chord has severe corrosion in the top flange. Recommend cleaning, inspection to determine extent of damage, repair with plates or replace in kind if required and then painting to protect from further damage.

Dravo Drawing 325863

C-34 & 36 The bottom chord member has sever metal loss in the bottom flange. Recommend replacing bottom flange with a plate of similar dimensional properties and painting to prevent further damage. Alternatively the beam could be replaced in kind.

C-35 The horizontal brace in the bottom chord member has severe rot and metal loss in the flanges. Recommend replacement in kind.

General comments:

The platform supports at the lube oil station are rotten. Recommend replacement in kind.

Several conveyor supports have substantial metal loss. Recommend replacement in kind.

There appear to be some sag in the bottom chord beyond the tensioner platform brace on the opposite side from the operator cab. This may be from fatigue or previous damage. Recommend future monitoring to make sure it does not worsen.

The top flanges of the tensioner platform brace top chord are starting to get moderate thinning on the inboard sides. Recommend removing conveyor housekeeping plate below conveyor and painting top chord to prevent further damage and reinstalling housekeeping plate.

SECTION 10: TRANSFER TOWER T3

The T3 transfer tower is located at the east end of the F conveyor. Coal is conveyed from the south coal yard to the T3 transfer tower where it is transferred onto the J1 conveyor and then into the blending building.

T3 Transfer Tower

Summary:

1. Structural
   - The structure has deteriorated noticeably based on the study done six years ago.
   - There are a number of areas where the steel needs to be replaced and repaired.
   - Cleaning the structure of coal duct will reduce the corrosion and corresponding damage.
2. Electrical
   - The power system for the coal yard passes through this structure. The power distribution equipment is corroded and needs replacement.
   - The TECO project to replace the equipment is recommended to be done soon to limit problems for the entire yard.
3. Mechanical
   - The chute work between F1 and J1 need to be cleaned and painted.

10.1 ELECTRICAL

Power for the south coal yard including the barge unloading docks is routed through the T3 structure. There are some splices in the power cables that feed the south coal yard, so it is probable that some cable repairs have been made in the past at the T3 location.

Specific observations of the T3 structure include:

At the ground floor elevation there are:

a. Six 3-phase, 600V disconnect switches (unlabelled, rusted out, not in service?) which are in very poor condition.
b. A junction box labeled 'No Washing – High Voltage'.
c. Fiberglass junction box (unlabelled) with connections to a 1kVA transformer.
d. Several broken conduits
e. A galvanized steel junction box with no cover that is full of coal dust.
f. Junction box at the fire protection riser with conduit routed to the riser flow switches.
g. Ductbank riser in the southeast corner of the structure. This ductbank originates in the Powerhouse and several of the conduits have broken off below grade.
h. Large cast aluminum junction box on the south face of the T3 structure (only a few years old). This junction box has 2 large tray cables (1 incoming from the ductbank at the southeast corner, and 1 outgoing to the junction box on the north side of the F conveyor labeled "Normal"). A 4" conduit out of the box goes west along the F conveyor. This large box appears to be a repair of a 4160V cable.

At the 1st floor elevation there are:

i. Two unlabelled 480V motor starters (out of service).
j. Painted steel control cabinet CS3-1 containing terminal strips which was once the original control panel. Since the installation of the Modicon PLC, this control panel is used as a junction box. There is a lot of rust on the door and it will not close all the way.
k. 4160V Westinghouse Ampgard™ switchgear lineup in an outdoor enclosure for: South Stacker/Reclaimer, F conveyor. This switchgear is old and poor condition.

5kV Switchgear at T3

l. F conveyor motor (600 HP, 1800 RPM, 4000V, 8210Z Frame).
m. Stearns Magnetic Separator control cabinet
n. Stearns Magnetic Separator with discharge chute to ground on east side of T3 structure.
o. 4160V, 600A, Transfer Switch for selecting either 111W (normal) or 117E (reserve) power circuit. The load-side of this switch feeds a 112.5kVA, oil filled, 4160V delta - 480V delta transformer (which is corroded and the enclosure is crumbling), and the Amgard switchgear for the south stacker/reclaimer and F conveyor.

112.5kVA Transformer at T3

p. Modicon PLC cabinet 1YCH-PCT3.
q. Lighting fixtures which are very dirty but mostly intact.
r. J1 conveyor which has a large amount of corrosion. The three level cable tray on the east side of the conveyor is nearly empty.

The T3 transfer house contains the heart of the coal yard power distribution system. Much of the distribution equipment at the T3 house is corroded and in need of replacement. The same is true of the conduit, cables and cable tray. A

project is planned to upgrade the power distribution to the coal yard which should address many of the deficiencies.

10.2 MECHANICAL

The chute work between conveyor F1 and J1 should be cleaned and painted to prevent further corrosion that will lead to replacement.

10.3 STRUCTURAL

Note: Items identified as M1, M4, C-1, C-2, etc. refer to annotated drawings at end of this section.

In general, Transfer Tower T3 appears to be in a more deteriorated condition as compared to the previous assessment, except where repairs have been made.

Continental Conveyor Drawing W-615-E-79-A

M-1 Brace previously noted as missing has not been replaced. It should be replaced in kind.

M-4 This brace has not been repaired/replaced as previously recommended. This brace is between Column Lines 1 and 1.5 on Column Line A, not between 1.5 and 2 as previously noted. This corrosion can be seen in Pictures TTWR-T3-A and is behind some electrical panels.

PICTURE TTWR-T3-A

C-1 The bottoms of stair stringers are embedded in coal which has caused extensive corrosion as seen in Picture TTWR-T3-B. Additionally, the inboard handrail has corroded free of its support. Coal needs to be cleaned away from the bottom of the stairs and the stringers and handrail repaired.

PICTURE TTWR-T3-B

C-2 The bottom of Column A-1 is severely corroded, as seen in Picture TTWR-T3-C, with a large hole thru the web and significant lose of the flanges. Additionally, the anchor bolt nuts have nearly corroded away. The gusset plate and vertical bracing members framing into this column are also quite corroded. Column needs to be repaired at the bottom and the anchor bolt nuts replaced, if possible. If the nuts cannot be replaced, new anchor bolts will need to be installed or some other means of anchorage will need to be used.

PICTURE TTWR-T3-C

C-3 The bottom of Column A-1.5 is similar as seen in Picture TTWR-T3-D. The anchor rod nuts are corroded as are the column flanges. Also, the gusset plates and the vertical bracing are similarly corroded. This column will need to be repaired similar to Column A-1.

PICTURE TTWR-T3-D

C-4 The vertical double angle member connecting the horizontal tension tie connecting Columns A-1.5 and A-2 near the bottom of the columns is missing. This member needs to be replaced.

C-5 At Column B-2, the framing connection at the first level above grade, as seen in Picture TTWR-T3-E, needs cleaning and painting and possibly repairs once the rust has been removed.

PICTURE TTWR-T3-E

C-6 Some of the under stair bracing, as seen in Picture TTWR-T3-F, has corroded severely and needs to be replaced.

PICTURE TTW3-T3-F

C-7 The bottom of Column A-2 is severely corroded with holes through the web and loss of flange section, as seen in Pictures TTWR-T3-G and TTWR-T3-H. Additionally, anchor bolt nuts have corroded away. Column bottom needs to be repaired and cleaned and painted and anchor bolts repaired and new nuts installed, if possible. Otherwise a new anchorage system will be required.

PICTURE TTWR-T3-G

PICTURE TTWR-T3-H

C-8 The bottom of Column B-2 as seen in Pictures TTWR-T3-J and TTWR-T3-K. Column bottom needs to be repaired and cleaned and painted and anchor bolts repaired and new nuts installed, if possible. Otherwise a new anchorage system will be required.

PICTURE TTWR-T3-J

PICTURE TTWR-T3-K

C-9 The bottom of Column C-2 as seen in Picture TTWR-T3-L. Column bottom needs to be cleaned and painted and anchor bolts repaired and new nuts installed, if possible. Otherwise a new anchorage system will be required.

TTWR-T3-L

C-10 The bottom of Column D-2 as seen in Pictures TTWR-T3-M and TTWR-T3-N. Column base needs to be cleaned and painted and anchor bolts repaired and new nuts installed, if possible. Otherwise a new anchorage system will be required. Vertical brace and gusset also need cleaning and painting/repair as applicable.

TTWR-T3-M

TTWR-T3-N

C-11 The bottom of Column D-1.5 is seen in Picture TTWR-T3-P. Column base needs to be cleaned and painted and anchor bolts repaired and new nuts installed, if possible. Otherwise a new anchorage system will be required. Vertical braces and gussets also need cleaning and painting/repair as required.

TTWR-T3-P

C-12 The bottom of Column D-1 is in fair condition, as seen in Picture TTWR-T3-R, although it will need cleaning and painting. The anchor bolts appear to also be in fair condition. Anchor bolt nuts need to be replaced since they are losing their corners.

TTWR-T3-R

C-13 The cross tie at grade between columns C-1 and D-1 is severely corroded as seen in Picture TTWR-T3-S. Tie needs to be repaired or replaced.

TTWR-T3-S

C-14 The bottom of Column B-1, as seen in Pictures TTWR-T3-T and TTWR-T3-U, is in poor condition. Corrosion is severe and column bottom needs to be repaired and cleaned and painted and anchor bolts repaired and new nuts installed, if possible. Otherwise a new anchorage system will be required.

TTWR-T3-T

TTWR-T3-U

C-15 At Column B-1 at the first framing level on the east side of the column there is considerable corrosion of the column and the beam framing in including the connection, as seen in Picture TTWR-T3-V This will require repair and cleaning and painting.

TTWR-T3-V

Pictures TTWR-T3-W, TTWR-T3-X, TTWR-T3-Y AND TTWR-T3-Z show the general condition of the roof framing and monorails. In general, the framing looks in fair condition needing only to be cleaned and painted. However, should cleaning back to solid metal indicate significant loss of metal, repairs will be required before painting. 3 of the monorails, as seen in Pictures TTWR-T3-X and TTWR-T3-Y show some more severe corrosion. These should be cleaned back to solid metal and examined closer to determine if they are still in serviceable condition. If it is determined that the corrosion is to severe, replacement is recommended.

PICTURE TTWR-T3-W

PICTURE TTWR-T3-X

PICTURE TTWR-T3-Y

PICTURE TTWR-T3-Z

Pictures TTWR-T3-AA, TTWR-T3-AB and TTWR-T3-AC show the general condition of the floor framing systems. Coal accumulation on the grating surfaces and the presence of moisture have lead to corrosion of the grating and the support steel in many areas. The grating surfaces should be kept free of coal and the corroded areas cleaned and painted to minimize further corrosion. Should cleaning of the members back to solid metal expose significant corrosion, repairs or replacement will be required.

PICTURE TTWR-T3-AA

PICTURE TTWR-T3-AB

PICTURE TTWR-T3-AC

McNally-Pittsburg Drawing E-5437-135

C-1 Framing supporting Conveyor J1 has severe corrosion as seen in Picture TTWR-T3-AD. Framing needs cleaning and painting/repair as required.

PICTURE TTWR-T3-AD

SECTION 11: CONVEYOR J1

Conveyor J1 transports coal from conveyor F in T3 to the inlet of the old screen body in T6

Summary:

1. Structural
   - The conveyor support truss chords and cross members required repair.
2. Electrical
   - N/A
3. Mechanical
   - Idler maintenance is required.
   - Cleaning and painting of head chute and frame.
   - Need to dribble chute and belt cleaner to prevent coal build up.

11.1 ELECTRICAL

Electrical components for conveyor J1 are within transfer tower T3 and are discussed in section 10.

11.2 MECHANICAL

Approximately 40% of the impact idlers at the tail section are not turning indicating failed bearings or adjustments are required.

The entire conveyor frame and head chute needs sandblasting and painting. The conveyor deck plates are corroded and require replacement. It may be easier and more cost effective to replace the entire conveyor since it is relatively short.

The conveyor drive gearbox is noisy under load. Further investigation should be done to identify the cause and repair or replace.

The belt cleaner location at the head end along with the dribble chute needs to be redesigned in order to eliminate the coal buildup on the grating and stairs of T6.

11.3 STRUCTURAL

Note: Items identified as C-1, C-2, etc. refer to annotated drawings at end of this section.

McNally Pittsburg Drawing E-5437-130

C-1 Tops chords of conveyor support truss have uneven metal loss of the top flange. The flanges inboard towards the conveyor have lost approximately half their thickness. Recommend cover plating the top flange. There will be difficulties getting good contact between cover plate and top flange, as well as, solid metal to weld to due to the unevenness of the top flange.

C-2 The bottom chord cross member is rotten. Recommend replacing in kind.

C-3 The bottom chord cross member is rotten. Recommend replacing in kind.

C-4 Chord cross members both in the horizontal and vertical are rotten. Recommend replacing in kind.

C-5 Reference designation not used.

C-6 Chord cross members both in the horizontal and vertical are rotten. Recommend replacing in kind.

C-7 Chord cross members both in the horizontal and vertical are rotten. Recommend replacing in kind.

C-8 Chord cross members both in the horizontal and vertical are rotten. Recommend replacing in kind.

McNally Pittsburg Drawing E-5437-120

C-9 Horizontal member and gusset plates at each end are rotten. Recommend replacement in kind.

SECTION 12: CONVEYOR Y

Conveyor Y transports coal from conveyor E in T2 to conveyor Z.

Summary:

1. Structural
   - Replace or repair corroded steel framing.
   - Clean area of coal dust to prevent accelerated corrosion.
2. Electrical
   - N/A
3. Mechanical
   - Repair or replace tail section support legs.
   - Chute cleaning, repair, and painting required.

12.1 ELECTRICAL

Electrical components for conveyor Y are within transfer tower T2 and are discussed in section 7.

12.2 MECHANICAL

The tail section support legs are corroded through and require repair.

The chute work at the tail end of conveyor Y is severely corrode and should be repaired or replaced to reduce dusting.

A shear gate or lumpbreaker roll should be installed to protect the conduits downstream of the loading area on Y conveyor. These conduits have been bent.

Part of the dust curtain at the head end of the conveyor is missing and should be replaced.

12.3 STRUCTURAL

Note: Items identified as M-1, M-2, C-1, C-2, etc. refer to annotated drawings at end of this section.

The observations previously noted are unchanged except the corrosion has progressed.

Continental Conveyor Drawing W-615-E42-A

M-1 The horizontal ties between the tail end support posts has significant corrosion as can be seen in Picture CONV-Y-A and should be replaced. Additionally, as seen in Pictures CONV-Y-B the base plates are severely corroded and the anchor bolt nuts have almost completely corroded away. The base plates should be cleaned and repaired, if necessary, and the anchor rod nuts replaced or the anchor rods replaced if there is too much section loss.

PICTURE CONV-Y-A

PICTURE CONV-Y-B

M-2 Similar to M-1 above

C-1 The double angle support legs for Conveyor Y are separating due to the corrosion forming between the angles as seen in Pictures CONV-Y-D, CONV-Y-E AND CONV-Y-F. These legs should be removed and replaced with WT-sections to eliminate the corrosion between the angles.

PICTURE CONV-Y-D

PICTURE CONV-Y-E

PICTURE CONV-Y-F

Continental Conveyor Drawing W-615-E43-A

C-1 The bottoms of the stair stringers on the west side of Conveyor Y have corroded severely, as seen in Picture CONV-Y-G and need to be repaired.

PICTURE CONV-Y-G

SECTION 13: CONVEYOR Z (FORMERLY RADIAL STACKER)

Conveyor Z transports coal from conveyor Y to conveyor P in T4.

Summary:

1. Structural
   - Accelerated corrosion continues due to coal dust accumulation.
   - Replacement and repair of steel framing is required in a number of areas.
   - Cleaning the structure of coal dust will reduce speed of corrosion.
2. Electrical
   - No serious deficiencies noted.
3. Mechanical
   - Conveyor deck plates need to be replaced.

13.1 ELECTRICAL

The Z conveyor is driven by a 350 HP, 1800 RPM, 4000V motor. The conveyor gallery is illuminated by 150W metal-halide explosion proof fixtures mounted on stanchions attached to the handrails. No serious electrical deficiencies were noted with the Z conveyor installation.

13.2 MECHANICAL

The conveyor deck plates are severely rotted out. The deck plates prevent coal from falling onto the return belt and entering the tail pulley nip causing damage. Either the deck plates should be replaced or a V-plow belt scrapper should be installed ahead of the tail pulley on the return belt.

13.3 STRUCTURAL

Note: Items identified as C-1, C-2, etc. refer to annotated drawings at end of this section.

The corrosion noted in the previous study has continued to progress.

Continental Conveyor Drawing W-615-E44-A

C-1 At the Drive Platform, there is some loss of section of some horizontal members, as seen in Picture CONV-Z-A.

PICTURE CONV-Z-A

C-2 At the Drive Platform, there is some loss of section of some horizontal members, as seen in Pictures CONV-Z-B and CONV-Z-C.

PICTURE CONV-Z-B

PICTURE CONV-Z-C

C-3 The grating support is separating from the walkway stringers, as seen in Pictures CONV-Z-D thru CONV-Z-H. The presence of coal on the inclined walkway also makes walking up the incline difficult. At times the coal tends to roll under foot. Even though you try not to step on it, at some locations it can't be avoided.

PICTURE CONV-Z-D

PICTURE CONV-Z-E

PICTURE CONV-Z-F

PICTURE CONV-Z-G

PICTURE CONV-Z-H

C-4 There is no toe plate under the first tread, as seen in Picture CONV-Z-J.

PICTURE CONV-Z-J

C-5 In Picture CONV-Z-K, it can be seen that the handrail has corroded free of the walkway.

PICTURE CONV-Z-K

C-6 Toe plate is not secured and has pulled away from the walkway, as seen in Picture CONV-Z-L. The gap between the toe plate and the grating exceeds OSHA requirements at many locations.

PICTURE CONV-Z-L

The handrail needs to be re-secured to the walkway at all locations where it has separated and the toe plate brought back to within OSHA maximum clearances from the grating. The coal should also be removed from the grating and the walkways maintained free of coal

Continental Conveyor Drawing W-615-E45-A

In the previous assessment, the conveyor trusses bottom chord horizontal bracing was noted as being Yellow indicating that cleaning and painting was required. In this assessment, numerous members were observed to have corroded to the point that there is little or no section remaining.

C-1 There is considerable loss of section in the bottom chord brace members and the vertical sway frames between the trusses, as can be seen in Pictures CONV-Z-M thru CONV-Z-P.

PICTURE CONV-Z-M

PICTURE CONV-Z-N

PICTURE CONV-Z-P

C-2 Considerable loss of section in the bottom chord brace members and the vertical sway frames between the trusses can be seen in Pictures CONV-Z-R thru CONV-Z-T.

PICTURE CONV-Z-R

PICTURE CONV-Z-S

PICTURE CONV-Z-T

These members should be replaced in order to maintain the stability of the conveyor.

The spill pans placed on top of the top chord members have corroded thru in a number of locations and this is also affecting the condition of the top chords of the conveyor trusses.

C-3 Accumulation of coal on spill pan subjected to moisture has lead to corrosion causing holes in the spill pan. Corrosion of the top chord is also evident, as seen in Picture CONV-Z-U.

PICTURE CONV-Z-U

C-4 Accumulation of coal subjected to moisture is corroding the top flange of the truss and also the bolts in the splice connection. In some instances the nuts are no longer hexagonal but are becoming more rounded. Refer to Pictures CONV-Z-V thru CONV-Z-Y.

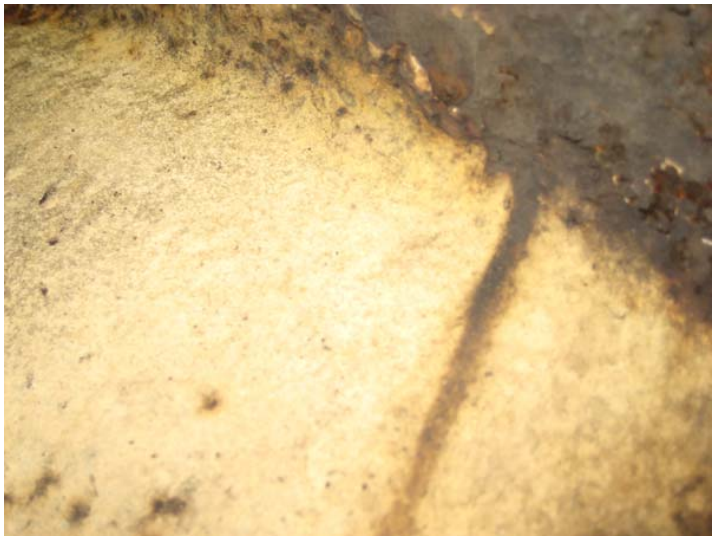
PICTURE CONV-Z-V

PICTURE CONV-Z-W

PICTURE CONV-Z-X

PICTURE CONV-Z-Y

C-5 The undersides of the top flanges are also corroding where moisture is seeping between the plate and the top flange as seen in Picture CONV-Z-Z.



PICTURE CONV-Z-Z

C-6 Bolt head on underside of beam flange showing excessive corrosion of both the bolt and the flange, as seen in Picture CONV-Z-AA

PICTURE CONV-Z-AA

C-7 Beam flange to web intersection, as seen in Picture CONV-Z-AB showing excessive corrosion.

PICTURE CONV-Z-AB

C-8 Typical truss top chord splice showing corrosion of plates and fasteners at both the top and bottom flanges of the top chord, Pictures CONV-Z-AC thru CONV-Z-AF.

PICTURE CONV-Z-AC

PICTURE CONV-Z-AD

PICTURE CONV-Z-AE

PICTURE CONV-Z-AF

Continental Conveyor Drawing W-615-E48-A

At the bottom of the pivot bent, there are some missing bolt heads on the inside surfaces of the gusset plates at the location of Detail 2 on the drawing on the west end. These may have fractured off when the conveyor overturned previously. This bent also needs some cleaning and painting.

Continental Conveyor Drawing W-615-E49-A

Pictures CONV-Z-J, CONV-Z-K and CONV-Z-L discussed previously are along the west walkway and stairs also shown on this drawing.

It was noted while climbing this conveyor that conveyor had a slight but noticeably sway during a very light breeze. This may be due, in part, to the loss of section of the cross members which may be allowing the conveyor to twist slightly. These repairs should be made so that the entire conveyor does not fail in a strong wind event.

SECTION 14: TRANSFER TOWER T4

The T4 transfer tower is located at the west end of the P conveyor. Coal is conveyed from the Z conveyor onto P conveyor within T4.

Summary:

1. Structural
   - The main framing is in good condition
   - Personnel access stairs, grating, and steel support framing requires repair and replacement due to corrosion induced by coal dust.
   - Cleaning of coal duct from structure is recommended.
2. Electrical
   - Miscellaneous items to be fixed such as conduit, duct bank, and light photo-cells.
3. Mechanical
   - Repair tiles at discharge chute.

14.1 ELECTRICAL

T4 contains:

1. A proximity switch to detect when someone climbs up/down the ladder at the top elevation.

2. Electrodes for lightning protection (presumably because this is one of the highest structures in the area.

3. Lighting fixtures with photocell control (note: photocell not working because all the lights were on).

4. Chute plug detector.

5. 1000W flood lighting fixtures.

6. Modicon PLC cabinet. This painted steel enclosure has lots of corrosion.

PLC Cabinet 1CYH-PCT4

7. Lighting transformer and panelboard with a small amount of corrosion.

8. 400A, 600V, 3-phase, NEMA 4X stainless steel safety disconnect without label. This may feed a maintenance building to the north.

9. Junction box 1CY11-JBP04 mounted on P conveyor.

10. Lots of conduits broken and unsupported.

Ductbank at T4 with broken conduits

11. The most important issue noted at the T4 tower is the obsolete PLC system in operation and a number of corroded/broken conduits and ductbanks.

14.2 MECHANICAL

The discharge chute at the head end of Z conveyor is a new stainless steel chute with tile lining. There has been some damage to the tiles.

14.3 STRUCTURAL

Note: Items identified as C-1, C-2, etc. refer to annotated drawings at end of this section.

In general, Transfer Tower T4 appears to be in fair condition with some exceptions.

The original observations appear to be the same

McNally-Pittsburg Drawing E5437-101

C-1 The grounding lead at the Column N-11(southeast corner) is disconnected, as seen in Picture TTWR-T4-A.

PICTURE TTWR-T4-A

C-2 The stairs at the bottom of the tower are embedded in a pile of coal. The bottom of the stair stringers is corroded completely through, as seen in Pictures TTWR-T4-B and TTWR-T4-C. The coal needs to be cleared away from the stair to provide a safe walking surface and the stringers repaired and cleaned and painted or replaced.

PICTURE TTWR-T4-B

PICTURE TTWR-T4-C

C-3 The toe plate has corroded free at the first landing level on both sides of the landing, as seen in Pictures TTWR-T4-D and TTWR-T4-E. The toe plates need to be reattached to the platform and cleaned and painted as necessary.

PICTURE TTWR-T4-D

PICTURE TTWR-T4-E

C-4 The bottom flange of the beam on the west side of the landing has severe corrosion, as seen in Picture TTWR-T4-F. This needs to be repaired or the member replaced if, after cleaning, it is determined that the corrosion is too severe and the member is not salvageable.

PICTURE TTWR-T4-F

McNally-Pittsburg Drawing E5437-102

C-1 At a number of locations where coal is allowed to accumulate at the edges of the platforms, the top flange of the support steel has corroded significant. In some instances the corrosion has wrapped around and started corrosion of the underside of the top flange, as seen in Pictures TTWR-T4-G and TTWR-T4-H. The coal should be removed and not allowed to accumulate. Also, the beam flange should be cleaned and repaired as necessary and then painted.

PICTURE TTWR-T4-G

PICTURE TTWR-T4-H

C-2 Where the toe plate is a bent plate welded to the underside of the top flange, moisture has seeped between the plate and the top flange causing corrosion. In some instances, such as at the stair landing seen in Picture TTWR-T4-J, the toe plate has corroded free or almost free. The plate should be reattached and painted and coal should not be allowed to accumulate.

PICTURE TTWR-T4-J

McNally-Pittsburg Drawing E5437-106

C-1 The ladder from the top of Conveyor Z to the top of Transfer Tower T-4 does not appear to comply with OSHA requirements. The toe plate directly below the ladder, as seen in Picture TTWR-T4-K provides a tripping hazard for anyone using the ladder. Also, the ladder itself should be over the grating of the lower platform, not beyond it. The ladder should be extended out over the lower platform or the toe plate removed and a landing behind the ladder added that complies with OSHA regulations.

PICTURE TTWR-T4-K

General

At some locations, the bearing bars of the grating have corroded to the point that they are no longer providing end support for the grating, as seen in Picture TTWR-T4-L. In these instances, the grating needs to be replaced, preferably with galvanized grating.

PICTURE TTWR-T4-L

SECTION 15: P CONVEYOR

The P conveyor runs eastward from the T4 transfer tower to transport coal to the north stacker/reclaimer or transport coal from the north stacker/reclaimer to the T5 transfer tower.

Summary:

1. Structural
   - New structure installed in the past 5 years. No deterioration noted.
2. Electrical
   - New systems installed in the past 5 years.
   - Miscellaneous maintenance required.
3. Mechanical
   - Maintenance required.
   - Belt has a severe slash along length and should be reviewed/monitored.

15.1 ELECTRICAL

Observations noted are:

1. There is a 480V mining cable for feeding a portable reclaim conveyor. This cable is routed in a cable tray on the north side of the P conveyor and is fed from MCC MCH-1.
2. Some of the lighting fixtures mounted to the base of the conveyor are falling down.
3. The pullcord safety switch housings are rusty.
4. Some of the conduit running along the P conveyor is unsupported and broken.

Conduits on north of P conveyor

15.2 MECHANICAL

P conveyor has been replaced in the last 5 years. The tail section is showing signs of corrosion on the frame and skirt boards and should be repaired and repainted.

Platforms along P conveyor should be fitted with handrails and toe plates to comply with OSHA requirements.

A fire protection line alongside the conveyor is severely pitted and should be painted to slow down the corrosion.

The low speed shaft on the conveyor drive gearbox has a severe leak and should be repaired.

An idler 150 feet from the tail is seized.

The belt has a severe slash along its length.

15.3 STRUCTURAL

A structural assessment was not performed due to the recent replacement of this equipment.

SECTION 16: NORTH STACKER/RECLAIMER (MINTEC/WL-50)

The north stacker/reclaimer was installed in 1982 and has never performed as well as the south stacker/reclaimer. This is due to the fact that the reclaim operation is dependent on a mobile reclaimer designed to load coal onto the stacker boom. Radio controls are installed to insure that the reclaimer and stacker are synchronized. However, the controls are not precise enough to keep the two pieces of equipment synchronized. As a result, the flow of coal form the WL50 to the boom varies enough to overload and under load the boom, causing gaps in flow, coal spilling, etc. Only a limited number of these types of systems were sold because of lack of adequate performance. The operation has never been as good as the south stacker/reclaimer.

Replacement of both reclaimers (north and south – see Section 9) has been considered by TECO. A budget quote was solicited from both Metso and Tenova for replacement of both stacker reclaimers (north and south) in 2007 of 6,250,000 Euros. For this assessment, we contacted Tenova and Metso to review their pricing. Tenova responded with an increase to 7,800,000 Euro ($10,000,000 U.S.) for two machines, equipment only. Metso replied with a price of $11M U.S. for two machines. Details are attached in the Section 28, Future Upgrades.

Summary:

1. Structural
   - A number of steel framing members have failed due to corrosion and should be replaced in kind. No over load failure was noted.
   - There are many corroded beams, plates, connections, etc. that should be cleaned, repaired, and painted.
   - Cleaning the steel of coal dust is recommended.
2. Electrical
   - In general, the north stacker reclaimer has been maintained with some control system upgrades over the years. The PLC is fairly modern and appeared to be in working order.
3. Mechanical
   - Conveyor deck plates need to be replaced.
   - Reclaim chute needs to be replaced.

16.1 ELECTRICAL

Observations of the north stacker/reclaimer include:

There are two control stations at grade mounted to the equipment frames for stacker boom, slew, and traverse. These control stations must not be needed because the pushbutton operators have all broken off.

There is a lube unit at the base of the stacker.

There is a 12’ x 20’ electrical enclosure at the base of the stacker/reclaimer housing the majority of controls on the machine:

a. 8-section Square D motor control center

Elect Room in North Stacker/Reclaimer

b. 3-section MCC for stacker boom and conveyor
c. 4160V switchgear for transformer feeder and WL-50 prime mover (prime mover disconnect is out of service).
d. Control Chief m/n MDR-8410 radio control unit.
e. ProWorx™ NxT PLC programming station.
f. Quantum™ PLC processor and I/O rack.

North Stacker Reclaimer Quantum™ PLC

g. G2 conveyor brake contactor.
h. Falk Control Panel (for lube unit?)
i. Slew brake cabinet.
j. Boom drag tilt switch control cabinet.
k. Upper stacker boom E-stop control cabinet.
l. Lower stacker boom auto-travel control cabinet.
m. Small Square D V.S. drive.

The electrical enclosure is air conditioned by a Bard DX unit (m/n P1136A2) mounted on the roof (~ 10 ton).

1000kVA, 4160V delta – 480V delta transformer getting power from the 4160V cable reel at the base of the machine.

North Stacker/Reclaimer Cable Reel

Two – G2 conveyor motors (150 HP, 1800 RPM, 4000V)

Modicon PLC I/O cabinet on top of the stacker/reclaimer.

Operators control shack with benchboard type panel with pushbuttons/selector switches.

In general, the north stacker reclaimer has been maintained with some control system upgrades over the years. The PLC is fairly modern and appeared to be in working order.

16.2 MECHANICAL

The stacker conveyor deck plates are rotted away and should be replaced to prevent coal from dropping out and possibly hitting someone.

The reclaim chute is severely corroded as is the support steel and will need to be replaced.

16.3 STRUCTURAL

Note: Items identified as C-1, C-2, etc. refer to annotated drawings at end of this section.

Mintec/International Drawing 195132-13

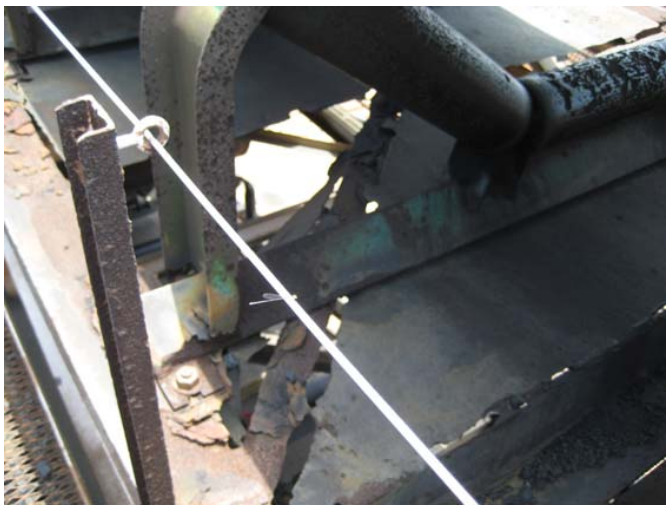
C-1 & 2 Tops chords of conveyor support truss have uneven metal loss of the top flange. The flanges inboard towards the conveyor have lost approximately half their thickness. See included photo MSR-AC. Recommend cover plating the top flange. There will be difficulties getting good contact between cover plate and top flange, as well as, solid metal to weld to due to the unevenness of the top flange.

PICTURE MSR-AC

C-3 & 4 Horizontal brace C-3 has broken free from connection and C-4 has broken at mid-span. See included photo MSR-AA, MSR-E and MSR-G. Recommend replacement in kind. In general all other horizontal braces in the top chord have moderate metal loss and should be cleaned and inspected prior to painting to prevent further damage.

PICTURE MSR-AA

PICTURE MSR-E



PICTURE MSR-G

C-5 Horizontal brace is rotten. See included photo MSR-AB. Recommend replacement in kind.

PICTURE MSR-AB

Mintec/International Drawing 195132-15

C-6 Vertical brace has been bent out of plane. Recommend replacement in kind.

C-7 Brace has broken free from connection and is bent out of plane. Recommend replacement in kind.

C-8 Horizontal cross member has several holes in web. See included photo MSR-Z. Recommend replacement in kind.

PICTURE MSR-Z

Mintec/International Drawing 195132-18

C-9 All members framing into the gusset have severe corrosion and moderate to severe metal loss. See included photo MSR-W. Recommend replacing rotten members back to sound steel or replacement in kind.

PICTURE MSR-W

C-10 Gusset plate is completely rotten. See included photo MSR-R. Recommend replacing gusset and re-attaching vertical angle.

PICTURE MSR-R

C-11 Members that make up the wheel frame have severe corrosion and metal loss. See included photos MSR-U and MSR-V. Recommend replacing all rotted members and painting to prevent further damage.

PICTURE MSR-U

PICTURE MSR-V

C-12 Members that make up the wheel frame have severe corrosion and metal loss. See included photos MSR-S and MSR-T. Recommend replacing all rotted members and painting to prevent further damage.

PICTURE MSR-S

PICTURE MSR-T

Mintec/International Drawing 195132-19

C-13 & 14 Tops chords of conveyor support truss have uneven metal loss of the top flange. The flanges inboard towards the conveyor have lost approximately half their thickness. Recommend cover plating the top flange. There will be difficulties getting good contact between cover plate and top flange, as well as, solid metal to weld to due to the unevenness of the top flange. See included photo MSR-F.

PICTURE MSR-F

C-15 All the members in the tail section of the trailer have severe corrosion and moderate metal loss. See included photo MSR-A, MSR-B and MSR-C.

Recommend replacing and repairing all members. Paint after repair to prevent further damage.

PICTURE MSR-A

PICTURE MSR-B

PICTURE MSR-C

C-16 There is a large hole in the cover that allows coal to spill onto grating which creates a tripping hazard and heavily loads grating. See included photo MSR-H. Recommend putting a plate over hole to prevent coal from spilling out.

PICTURE MSR-H

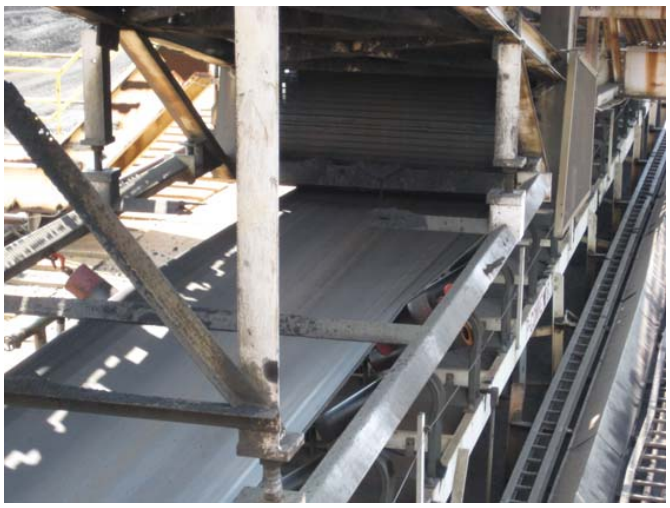
C-17 Vertical brace has large portion of stem rotten. See included photo MSR-J. Recommend replacement in kind.

PICTURE MSR-J

C-18 thru 20:

Vertical braces and cross member have severe corrosion and are rotten. See thru 20included photos MSR-M and MSR-N. Recommend replacement in kind.

PICTURE MSR-M



PICTURE MSR-N

C-21 & 22:

Vertical brace and plates that make up pin connection have severe corrosion and are rotten. See included photos MSR-P and MSR-Q. Recommend replacing vertical brace in kind and cleaning, inspection of plate prior to painting.

PICTURE MSR-P

PICTURE MSR-Q

C-23 & 24:

Horizontal braces have moderate to severe metal loss at connection. Recommend placement in kind.

C-25 thru 28:

All members have severe corrosion and moderate to severe metal loss at connection. Recommend placement in kind.

C-29 & 30:

Platforms have been damaged and bent. See included photo MSR-D. Recommend replacing bent section of platform in kind.

PICTURE MSR-D

SECTION 17 - TRANSFER TOWER T5

The T5 transfer tower is located at the east end of the P conveyor. Coal is conveyed from the north coal yard to the T5 transfer tower where it is transferred onto the J2 conveyor and then into the blending building.

Summary:

1. Structural
   - Repairs have been made based on previous study.
   - Items not repaired identified by previous study have seen additional corrosion.
   - Cleaning the steel of coal dust is recommended.
2. Electrical
   - Minimal equipment.
   - Repair of conveyor gearbox recommended.
3. Mechanical
   - Repair of conveyor gearbox recommended.

1.1 ELECTRICAL

Observations at the T5 transfer house include:

1. P conveyor motor (600 HP, 1800 RPM). Power for this motor is from the blending building.

2. Modicon PLC cabinet 1CYH-PCT5. The P conveyor gearbox is leaking oil and slinging it onto the front of the PLC cabinet. Conveyor gearbox should be repaired.

PLC Cabinet 1CYH-PCT5

3. Lighting Panel (cover open and covered with oil). Clean and close cover.
4. P conveyor test pushbutton station in a NEMA 4X box.
5. Lighting fixtures are all working.
6. Stearns magnetic separator control box.
7. Stearns magnetic separator (dumps to ground via chute).
8. Magnetic Separator #9 start/stop pushbutton station.

1.2 MECHANICAL

The leaking oil from the P conveyor gearbox should be cleaned up.

1.3 STRUCTURAL

In general, Transfer Tower T5 appears to be in a more deteriorated condition as compared to the previous assessment, except where repairs have been made.

McNally- Pittsburg Drawing E-5437-114

M-1 has been repaired

M-2 has been repaired

M-3 has been repaired

M-4 unchanged but additional corrosion was noted at the opposite end of the beam at the top flange

McNally- Pittsburg Drawing E-5437-116

M-1 has been repaired

M-2	has been repaired
M-3	unchanged – toe PL is separating from the top flange of the beam
M-4	has been repaired
M-5	has been repaired
M-6	has been repaired
M-7	has been repaired
M-8	has been repaired

McNally- Pittsburg Drawing E-5437-117

Roofing material is in poor condition and should be replaced.

SECTION 18: CONVEYOR J2

Conveyor J2 transports coal from conveyor P in T5 to the inlet of the old screen body in T6.

Summary:

1. Structural
   - Several truss top chord and cross chord members have failed due to corrosion and should be repaired and replaced in kind. No over load failure was noted.
   - Truss bottom chord members are corroded and should be cleaned, re-inspected, and painted.
   - Cleaning the steel of coal dust is recommended.
2. Electrical
   - N/A
3. Mechanical
   - Corrosion not as bad on J2 as on J1.
   - Head chute needs to be repaired or replaced.

18.1 ELECTRICAL

Electrical components for conveyor J2 are within transfer tower T3 and are discussed in section 10.

18.2 MECHANICAL

J2 did not appear to be as corroded as J1 probably due to less use. J2 does share the same design flaw as J1 with the dribble chute and belt cleaner in that excessive spillage occurs.

If not replaced, the head chute on J2 should be patched and painted as there are large gaps that will contribute to dusting.

18.3 STRUCTURAL

Note: Items identified as C-1, C-2, etc. refer to annotated drawings at end of this section.

McNally Pittsburg Drawing E-5437-118

C-1 Tops chords of conveyor support truss have uneven metal loss of the top flange. The flanges inboard towards the conveyor have lost approximately half their thickness. Recommend cover plating the top flange. There will be difficulties getting good contact between cover plate and top flange, as well as, solid metal to weld to due to the unevenness of the top flange.

C-2 Chord cross members both in the horizontal and vertical are rotten. Recommend replacing in kind.

C-3 Horizontal member at bottom chord has moderate delamination and should be cleaned and inspected prior to painting.

C-4 Top of bent at location where trusses frame into the bent has severe corrosion. Should be cleaned and inspected prior to painting.

C-5 Horizontal member at bottom chord has moderate delamination and should be cleaned and inspected prior to painting.

C-6 Horizontal member at bottom chord has moderate delamination and should be cleaned and inspected prior to painting.

C-7 Platform outriggers along conveyor have moderate to severe corrosion and should be cleaned and painted to prevent further damage

McNally Pittsburg Drawing E-5437-120

C-8 Web at base of column has a 3”x6”+/- hole and should be cover plated or replaced. See included photo Conv-J2-A.

PICTURE Conv-J2-A

C-9 Base of column has severe corrosion and should be cleaned and inspected prior to painting.

C-10 Brace has been hit and damaged. Recommend replacing in kind.

C-11 Horizontal member and gusset plates at each end are rotten. Recommend replacement in kind.

C-12 Vertical braces have moderate corrosion and should be cleaned and painted.

SECTION 19 – TRANSFER TOWER T6 (SCREEN HOUSE)

The T6 Transfer House accepts coal from the north yard on J2 conveyor and from the south yard on J1 conveyor and transfers it onto the Q1 and Q2 conveyors which transport the coal to the blending bins. The T6 transfer house used to contain vibrating screens for screening the coal; however, the screens have been removed and stainless grizzly bars welded in place. The grizzlies now remove rocks and large chunks of coal.

Summary:

1. Structural
   - Items identified in the previous study need to be addressed. Corrosion has continued on these items.
   - Cleaning the steel of coal dust and re-inspection is recommended.
2. Electrical
   - Existing electrical equipment is old and in need of repair/replacement
3. Mechanical
   - Dust shield between conveyors would help reduce spillage .
   - Old screen bodies should be cleaned and painted.

1.1 ELECTRICAL

Observations of the T6 building include:

1. At the top floor elevation:
   a. J1 conveyor tilt switch control box (Thermo Electron m/n 20-38).
   b. Zone 17 & 18 (J1, J2 conveyors) Fire Suppression Panel.
   c. J1 conveyor start/stop pushbuttons.
   d. J1 conveyor motor (300 HP, 1800 RPM, 4000V, TEFC)
   e. J2 conveyor start/stop pushbuttons.
   f. J2 conveyor motor (300 HP, 1800 RPM, 4000V, TEFC)
   g. No lights were on at this level.
2. The 4th floor elevation had two light fixtures on and nothing else of note.
3. The 3rd floor elevation:
   a. Modicon PLC cabinet 1CYH-PCT6 (lots of corrosion).
   b. Lighting panelboard ILAF-LPT6
   c. Q conveyor Zones Z9 & Z10 Fire Suppression Panel
   d. G1 vibrating screen start/stop pushbuttons (screen motor has been removed).
   e. G2 vibrating screen start/stop pushbuttons (screen motor has been removed).
   f. All the lights at this level except 2 were out.
4. The 2nd floor elevation contains the beginning of the Q1 and Q2 conveyor gallery and lots of spilled coal. The Q1 conveyor belt run-off switch has an actuator arm broken on the south side.
5. The cable tray supports at the bottom of the Q1 conveyor have failed.
6. The cable tray on the Q1 conveyor gallery has no cover.
7. The ground floor has a junction box for the fire protection riser flow switches.
8. In general, the T6 transfer tower is in need of refurbishment in terms of control stations needing legend plates and labels, conduit needing replacement, and lighting that needs to be repaired/replaced. There is not much electrical equipment at the T6 tower, but what is there is old and need of repair.

1.2 MECHANICAL

The old screen bodies should be cleaned and painted. A dust seal installed between the J1/J2 conveyor chutes and screen inlet would aid in the spillage and dusting issues in this structure.

1.3 STRUCTURAL

The observations previously noted for Transfer Tower T6 (Screen House) are essentially unchanged except that the corrosion has progressed.

Note: Items identified as C-1, C-2, etc. refer to annotated drawings at end of this section.

The following new observations were made:

McNally-Pittsburg Drawing E-5437-121

C-1 At Column E-6, at El 22' – 0", the W10 framing in from the west is extremely corroded, as seen in Picture TTWR-T6-A. This member needs to be cleaned of all loose material back to solid metal to determine if it can be painted or if repairs are required before painting.

TTWR-T6-A

C-2 At Column E-6, at El 22' – 0", the W10 framing in from the north is corroded as is the gusset plate and brace above, as seen in Picture TTWR-T6-B. These members need to be cleaned of all loose material back to solid metal to determine if they need only painting or if repairs are required before painting.

PICTURE TTWR-T6-B

McNally-Pittsburg Drawing E-5437-124

C-1 At Column G-8, at El 22' – 0", the W10's framing in from the south and the north are extremely corroded, as seen in Pictures TTWR-T6-C and TTWR-T6-D. These members need to be cleaned of all loose material back to solid metal to determine if they can be painted or if repairs are required before painting.

PICTURE TTWR-T6-C

PICTURE TTWR-T6-D

C-2 Midway between Columns G-8 and H-8 at El 22' – 0", as seen in Picture TTWR-T6-E, the W10 is extremely corroded at the intersections of the braces. This member needs to be cleaned of all loose material back to solid metal to determine if it can be painted or if repairs are required before painting.

PICTURE TTWR-T6-E

Additionally, Pictures TTWR-T6-F and TTWR-T6-G are examples of the condition that the floor framing is in below the grating floor, in part due to the accumulation of coal on the grating mixing with moisture due to rain or humidity.

PICTURE TTWR-T6-F

PICTURE TTWR-T6-G

SECTION 20 – CONVEYORS Q1/Q2

Q1 and Q2 conveyors transport coal from the grizzly screen discharges in T6 to the tripper belt conveyors R1 and R2 in the blending bins building.

Q2 Conveyor

Summary:

1. Structural
   - Bottom chord cross members need to be replaced.
   - Anchor bolts need to be cleaned, painted, and monintored.
2. Electrical
   - See Section 21
3. Mechanical
   - Conveyor deck plates need to be replaced.
   - Q1 gearbox is leaking oil.

1.1 ELECTRICAL

Electrical components for conveyors Q1 and Q2 are within the blend bin building and are discussed section 21.

1.2 MECHANICAL

Both Q1 and Q2 conveyors frames require replacement of conveyor deck plates and painting of conveyor frames.

Q1 gearbox is leaking oil.

1.3 STRUCTURAL

Note: Items identified as C-1, C-2, etc. refer to annotated drawings at end of this section.

McNally Pittsburg Drawing E-5437-139

C-1 Bottom chord WT cross member has severe metal loss and rot. Recommend replacement in kind.

C-2 Bottom chord WT cross member has severe metal loss and rot. Recommend replacement in kind.

C-3 Bottom chord WT cross member has severe metal loss and rot. Recommend replacement in kind.

C-4 Bottom chord WT cross member has severe metal loss and rot. Recommend replacement in kind.

C-5 Bottom chord WT cross member has severe metal loss and rot. Recommend replacement in kind.

McNally Pittsburg Drawing E-5437-141

C-6 Bottom chord WT cross member has severe metal loss and rot. Recommend replacement in kind.

McNally Pittsburg Drawing E-5437-143

C-7	Anchor bolts between bottom of chair and top of base plate have moderate metal loss and severe corrosion. Anchor bolts should be cleaned and paint and monitored for further damage.
C-8	Anchor bolts between bottom of chair and top of base plate have moderate metal loss and severe corrosion. Anchor bolts should be cleaned and paint and monitored for further damage.

SECTION 21 – BLENDING BINS

Coal from conveyors Q1 and Q2 is dumped onto conveyors R1 and R2 that are traveling tripper conveyors. The trippers are positioned over one of several bins. The bins discharge into gravimetric feeders at ground level onto conveyors T1 and T2. The coal field control room is also located in the blending bin building on the third level.

Summary:

1. Structural
   - The column bases and support frames of the Gravimetric Feeders are corroded and require cleaning and some replacement.
2. Electrical
   - In general, the electrical equipment is in good condition. Some cleaning of coal dust is recommended.
3. Mechanical
   - R1 gearbox is leaking oil.

1.1 ELECTRICAL

Observations noted in the blending building include:

1. On the 4th floor stairtower, there is a Zone 5, 6, 7, 8, 9, 10 Fire Suppression System Panel.

2. The R1 conveyor (east) (250 HP, 1800 RPM, 460V) runs north accepting coal from the Q1 inclined conveyor (south).
3. The R2 conveyor (west) (250 HP, 1800 RPM, 460V) runs north accepting coal from the Q2 inclined conveyor (north).
4. R1 and R2 are tripper conveyors for dumping into the blend bin of choice.
5. The north end of the 4th floor has a Zone 5, 6, 7, 8 Fire Suppression Cabinet with discharge pushbuttons.
6. There are blending bin ventilation fans just below the roof line (one for each bin).
7. The equipment in the blending building is newer and in better condition than that in the coal yard. Even so, there is lots of coal dust coating most of everything.
8. Q1 conveyor motor (600 HP, 1800 RPM, 4000V).
9. Q2 conveyor motor (600 HP, 1800 RPM, 4000V).
10. Dust Collector (13,500 CFM) has a ~100 HP, 460V motor.
11. The conduit on the 4th floor (above the blending bins) has been installed to meet explosion-proof installation requirements.
12. There is a major cable tray riser area on the southeast corner of the 4th floor near the stairtower. All cables in this tray exit into rigid galvanized steel conduit for the explosion-proof installation.
13. The control room and office complex is on the 3rd floor. The main control panel is interfaced to the PLC and has a mimic process diagram on the face of the panel for display and annunciation.
14. The 2nd floor elevation contains an electrical room for the area. The following equipment was noted:
    a. I-COP-JB-A Communication Cabinet.
    b. B06 Communication Cabinet.
    c. ILAF-LPB1 Lighting Panelboard.
    d. ILAS-PPB4 Lighting Panelboard.
    e. ILAF-LPB2 Lighting Panelboard.
    f. ILAF-LPB3 Lighting Panelboard.
    g. 1CYH-MCCBB1 8-section Siemens-Allis 480V MCC
    h. 4ANN-CAB-1, Bay 7 – Annunciator Termination Cabinet.
    i. Unlabelled terminal strip panel.
    j. Westinghouse Ampgard 4160V Line-up 1CYH-MSTR2 (fed from 143W or 141E:

1CYH-SR1 North Stacker (400A FDR)

1CYH-US2 480V Substation

1CYH-CNV661 Conveyor Q2

1CYH-CNV641 Conveyor J2

1CYH-CNV681 Conveyor T2

1CYH-CRH881 Crusher #2

1CYH-CNV601 Conveyor P

SPARE

5kV MCC 1CYH-MSTR1

k. Westinghouse Ampgard 4160V Line-up 1CYH-MSTR1 (fed from 141E or 143W:

SPARE (152W-A)

1CYH-US1 480V Substation (152W-B)

1CYH-CNV261 Conveyor Q1 (153W-A)

1CYH-CNV241 Conveyor J1 (153W-B)

1CYH-CNV461 Conveyor T1 (154W-A)

1CYH-CRH481 Crusher #1 (154W-B)

SPARE (155W-A)

FUTURE (155W-B)

5kV MCC 1CYH-MSTR1

l. 600A, 480V Manual Transfer Switch: EMERG: US1, NORMAL: US2 (for gravity feeders and T7 MCC.

m. 1CYH-US2 4160V delta – 480V delta, 1000kVA Unit Substation:

    1CYH-CNV901 Conveyor W2

    1CYH-CNV681 Conveyor R2

    1CYH-MCCT7 & 1CYH Gravity Feeders 741, 761, 781, 801, 821, 841

n. Interface Junction Box

o. 1CYH-JB34.

p. 1CYH-US1 4160V delta – 480V delta, 1000kVA Unit Substation:

    1CYH-CNV501 Conveyor W1

    1CYH-CNV281 Conveyor R1

    1CYH-MCCBB1 & 1CYH Gravity Feeders 341, 361, 381, 401, 421, 441

    Future (Electrically Operated).

    Polk Transloader.

    Spare (Electrically Operated).

    Future (Manually Operated).

q. 1CYH-USTST Test Cabinet.

r. Fire Protection System Battery Backup 1 & 2.

s. Unlabelled Junction Box.

t. 1CYH-WZ749 Gravity Feeder Reliance V.S. Drive S1B
u. 1CYH-WZ769 Gravity Feeder Reliance V.S. Drive S2B
v. 1CYH-WZ789 Gravity Feeder Reliance V.S. Drive S3B
w. 1CYH-WZ809 Gravity Feeder Reliance V.S. Drive S4B
x. 1CYH-WZ829 Gravity Feeder Reliance V.S. Drive S5B
y. 1CYH-WZ849 Gravity Feeder Reliance V.S. Drive S6B
z. 1CYH-WZ349 Gravity Feeder Reliance V.S. Drive S1A
aa. 1CYH-WZ369 Gravity Feeder Reliance V.S. Drive S2A
bb. 1CYH-WZ389 Gravity Feeder Reliance V.S. Drive S3A
cc. 1CYH-WZ409 Gravity Feeder Reliance V.S. Drive S4A
dd. 1CYH-WZ429 Gravity Feeder Reliance V.S. Drive S5A
ee. 1CYH-WZ449 Gravity Feeder Reliance V.S. Drive S6A

15. On the ground floor elevation:
    a. A grounding electrode at the southeast building column has broken off.
    b. The Fire Protection System riser north of the stairtower has a valve limit switch that needs to be reconnected. It appears that the valve was replaced, but the electrical has not been reconnected yet.
    c. There is a pad mounted transformer on the east of the Blending Building. This transformer is unlabelled but appears to power the maintenance building across the street. There is revenue metering attached to this transformer.
    d. The gravimetric feeders S6A and S6B feed the Polk Unloading Building.
    e. The west side of T conveyor has coal covering the cable trays and on the ground. The east side is clear. This is because TECO was part of the way through their daily routine of washing down the equipment.
    f. There is a conveyor support grounding conductor CADweld™ broken at the S3A feeder.
    g. The vertical tray riser at the southwest corner of the building is a mess. Cables need to be placed back in the tray and tied down to the ladder rungs. Near this tray, there is a coil of cables cut off and lying on the ground in a wet coal pile.

In general, the condition of the electrical equipment is good. Some cleaning of coal dust is required.

1.2 MECHANICAL

The R1 conveyor gearbox on the tripper floor is leaking oil.

1.3 STRUCTURAL

Note: Items identified as C-1, C-2, etc. refer to annotated drawings at end of this section.

Stone and Webster Drawing 11473-FS-25A-8

C-1 Support frames for the Gravimetric Feeders have severe corrosion at the column bases. Clean and paint to protect from further damage. The vertical angle braces have severe corrosion and metal loss at connections to columns. Many braces should be replaced in kind and others require cleaning and painting.

Stone and Webster Drawing 11473-FS-25M-4

C-2 Vertical braces have a small amount of metal loss, de-lamination and corrosion. Clean and paint to protect from further damage.

C-3 Vertical brace and gusset plate has severe metal loss and corrosion. Recommend replacing lower 3'-0" of brace and gusset plate.

SECTION 22: CONVEYORS T1/T2

The T1 and T2 conveyors transfer coal from the blending building to the transfer tower T7 crusher house. The conveyors and trusses are corroded and in very bad condition. For this reason, TECO will replace these two conveyors in 2010. Barricade tape prevented entering the conveyor walkway between the conveyors.

Summary:

1. Structural
   - Significant corrosion and replacement of numerous members required.
   - There are many corroded beams, plates, connections, etc. that should be cleaned, repaired, and painted.
   - Cleaning the steel of coal dust is recommended.
2. Electrical
   - In general conduit and trays are in good condition.
   - Some miscellaneous items need to be addressed.
3. Mechanical
   - Conveyor head frames need to be replaced.
   - Damaged conveyor covers between gravimetric feeders should be replaced.
   - Several areas of cleaning and painting.

22.1 ELECTRICAL

There are 3 levels of 18” cable tray on the west side of the conveyor gallery leaving the blending building going south toward the T7 Crusher House. The condition of this tray is

good and the unistrut supports are in good shape. The top tray level should be covered to keep coal from collecting in it. Some of the power cables in this tray consist of three single conductors without a ground conductor.

There is a 'tee' in the 18" cable tray along the T conveyor gallery that routes cables into the K Feeder building. Many of these cables need to be tied down to the tray ladders. There is a vertical riser in that many of these cables are unsupported. The L conveyors above have been spilling a lot of coal onto the cable tray in this area.

22.2 MECHANICAL

The conveyor head frames are severely corroded and should be replaced as part of the project to replace the trusses.

Several impact idlers under the gravimetric feeders have been replaced with standard idlers. If these idlers wear prematurely the impact idlers or impact beds should be installed.

There are damaged conveyor covers between gravimetric feeders that should either be removed or replaced.

The conveyor frame within the blending bin building requires cleaning and painting.

22.3 STRUCTURAL

Note: Items identified as C-1, C-2, etc. refer to annotated drawings at end of this section.

T1 Conveyor - McNally Pittsburg Drawing E-5437-306

C-1 Bottom chord Angle cross member is rotten. Recommend replacement in kind.

C-2 Vertical brace is rotten. Recommend replacement in kind.

C-3 Horizontal top chord brace is rotten. Recommend replacement in kind.

C-4 Horizontal top chord brace is rotten. Recommend replacement in kind.

C-5 Horizontal top chord brace is rotten. Recommend replacement in kind.

C-6 Horizontal top chord brace is rotten. Recommend replacement in kind.

C-7 Horizontal top chord brace is rotten. Recommend replacement in kind.

C-8 Platform steel is sound, but has heavy corrosion and should be cleaned and inspected prior to painting to prevent further damage.

C-15 Bottom chord member has moderate delamination at the top flange and should be cleaned and painted to prevent further damage.

T1 Conveyor - McNally Pittsburg Drawing E-5437-307

C-9 South anchor rod has lost approximately 25% of its original diameter. Recommend cleaning and painting and ongoing monitoring for further metal loss.

C-10 Entire bent has moderate corrosion and should be cleaned and painted to prevent further damage.

C-11 Anchor bolts have moderate corrosion and metal loss and should be cleaned and painted to prevent further damage.

C-12 Anchor bolts have moderate corrosion and metal loss and should be cleaned and painted to prevent further damage.

C-13 Plates that make up the conveyor support seat have moderate to severe metal loss. Recommend replacement in kind.

C-14 Plates that make up the conveyor support seat are rotten and do not provide adequate support. Recommend replacing entire assembly in a timely manner.

Evaluation of Conveyor T1 supports below Blending Bins. (No Drawings Available)

<u>West Side</u>

Five (5) support legs and base plates require replacement due to severe corrosion and metal loss.

One (1) support leg has broken free from base plate and both should be replaced in kind.

Six (6) support legs and base plates should be cleaned, repaired and painted to prevent further damage.

East Side

One (1) support leg and base plate require replacement due to severe corrosion and metal loss.

Two (2) support legs have broken free from base plates and both should be replaced in kind.

Three (3) support legs and base plates should be cleaned, repaired and painted to prevent further damage.

T2 Conveyor - McNally Pittsburg Drawing E-5437-306

C-1 Bottom chord member has moderate delamination at the top flange and should be cleaned and painted to prevent further damage.

Evaluation of Conveyor T2 supports below Blending Bins. (No Drawings Available)

West Side

Two (2) support legs and base plates require replacement due to severe corrosion and metal loss.

One (1) support leg has broken free from base plate and both should be replaced in kind.

Five (5) support legs and base plates should be cleaned, repaired and painted to prevent further damage.

East Side

One (1) support leg has broken free from base plate and both should be replaced in kind.

Six (6) support legs and base plates should be cleaned, repaired and painted to prevent further damage.

SECTION 23 – TRANSFER TOWER T7 (CRUSHER BUILDING)

The T7 transfer tower supports the head end of T1 and T2 conveyors at the fifth and top level. On the second floor of T7 are two crushers, one per line to crush coal for Unit 4. Unit 4 was offline during the investigation and therefore the crushers were not operating. Chute work and flop gates within T7 can divert coal to any of three locations:

1. Directly to conveyor W at grade.
2. To the crusher and onto conveyor W
3. Onto conveyor U for emergency stack out.

Transfer Tower T7

Summary:

1. Structural
   - Numerous beams and braces need to be replaced in kind due to corrosion. No over load failure was noted.
   - One platform has a hole in the floor platform. Repair hole or remove platform is recommended.
   - Numerous braces and beams require cleaning, repair, and painting.

2. Electrical
   - In general, the north stacker reclaimer has been maintained with some control system upgrades over the years. The PLC is fairly modern and appeared to be in working order.
3. Mechanical

- A number of chutes need to be replaced.
- A number of chutes need to be cleaned and painted.
- Reclaim chute needs ot be replaced.

1.1 ELECTRICAL

The following observations were made:

1. On the top floor elevation, the steel and equipment was relatively clean and without signs of corrosion. This is because the coal dust tends to accumulate at the lower elevations. Equipment on the top floor includes:
   a. T1 Conveyor motor (300 HP, 1800 RPM, 4000V, 509LL Frame)
   b. T1 conveyor start/stop pushbutton station
   c. T1 tilt switch
   d. T2 Conveyor motor (300 HP, 1800 RPM, 4000V, 509LL Frame)
   e. T2 conveyor start/stop pushbutton station
   f. T2 tilt switch
   g. Crusher Dust Collector Fan, Motor, and start/stop station.
   h. Crusher Dust Collector Rotary Airlock and start/stop station.
   i. T1 & T2 conveyor (Zone 11 & 12) Fire Suppression System.
   j. T1 and T2 Conveyor Sampling System Control Cabinet (out of service).

Sampling System Controls

   k. 1CYH-MCCT7 4-section 480V Siemens-Allis MCC in stainless enclosure (feeds W1 and W2 conveyors).

1CYH-MCCT7

l. ILAF-LPT7 Lighting panelboard in NEMA 4X enclosure.

m. 1CYH-PCT7 Modicon PLC cabinet.

PLC Cabinet 1CYH-PCT7

2. On the 3rd floor elevation, the rigid galvanized steel conduit exiting the motor control center and control panels above are visibly evident. They are in relatively good condition, although the ones that are out of service should be removed. Other equipment on the 3rd floor elevation includes:

   a. Lighting fixtures are for the most part in service.

   b. Most of the electrical equipment at this elevation consists of conduit banks and junction boxes.

   c. Power cables for the T conveyor motors and crushers originate in the blending building and come up the T1 and T2 conveyor gallery in cable tray, then transition to rigid galvanized steel conduit in the T7 building.

   d. The crusher feed chutes have tilt switches to detect pluggage.

3. Conditions observed on the 2nd floor elevation includes:

   a. Crusher start/stop pushbutton stations

   b. Rexa Electraulic Actuator controls flop gate to bypass the crusher (west).

c. Manual flop gate to select either W1 conveyor or U conveyor to dump onto ground (this flop gate was help in place with a come-along.

d. Rexa Electraulic Actuator controls flop gate to bypass the crusher (east).

e. Manual flop gate to select either W2 conveyor or U conveyor to dump onto the ground.

f. There is a large accumulation of coal dust and resulting conveyor corrosion at this level.

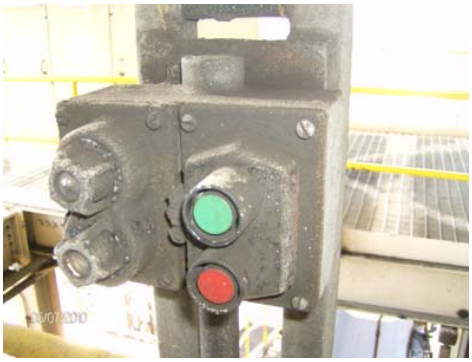
4. Conditions observed on the 1st floor elevation (crusher level) includes:

a. Abandoned J-Box in the northeast corner.

b. East Crusher Motor (800 HP, 600 RPM, 4000V).

c. East Crusher Lube Oil Unit (Auto Lube #2).

d. East Crusher start/stop pushbutton station. This pushbutton station is similar to all of the others in that legends or nameplates are either illegible or not existing.



Pushbutton Station (typical)

e. West Crusher (#1) Motor (800 HP, 600 RPM, 4000V).

f. West Crusher Lube Oil Unit (Auto Lube #2).

g. West Crusher start/stop pushbutton station.

h. Kone 2T Crane & disconnect switch to service crusher rotors.

i. T7 Crusher House (U, W1, and W2 Conveyor) Fire Suppression System.

j. U Conveyor motor (100 HP, 1800 RPM, 460V).

k. Small platform below the 1st floor has two pushbutton stations labeled “REJECT”.

5. Conditions observed on the ground floor elevation:

   a. W1 conveyor has a large junction box at the tail end of the conveyor to collect pullcord switches and speed switches and route these signals up the W1 conveyor gallery. From this large box, there is a large conduit back to the Modicon PLC cabinet at the top level.

W1 Conveyor (tail end)

   b. W2 conveyor has a similar arrangement.

In general electrical equipment is in good condition. Several miscellaneous items are recommended to be addressed.

1.2 MECHANICAL

The head chutes on T1 and T2 at the fifth level are severely corroded and should be replaced.

The Rotoclone on the T1 head chute is corroded and should be replaced.

The carbon steel chute work between the fourth and fifth floors should be cleaned and painted.

The coal chutes between the third and fourth levels are severely corroded and holes worn through where the diverter gates contact the inside of the chutes. Depending on the condition of the diverter gates, the chutes at this elevation should either be repaired or replaced.

The chute work below the second floor that feeds the crushers is corroded and is in need of repair and painting.

The housing for the crushers are corroded. The internals could not be inspected. However two new crushers have been purchased to replace the existing crushers.

Coal Crushers ready for installation

The coal chutes to conveyor U on the second floor are corroded and require replacement.

The coal chutes from the third floor passing through the second floor to the W conveyors are in average condition. Painting is recommended.

The coal chutes from the crushers to the W conveyors on the ground floor are in good shape. The bypass conveyors around the crushers from the second floor to the W conveyors require some patching and painting.

1.3 STRUCTURAL

Note: Items identified as C-1, C-2, etc. refer to annotated drawings at end of this section.

McNally Pittsburg Drawing E-5437-309

C-1	A 2x4 is currently being used as a top rail for the handrail in this location. 2x4 should be replaced with TECO standard metal handrail.
C-2 & 3	Beam has moderate delamination of the bottom flange. Beam should be cleaned, inspected and painted to prevent further damage.

McNally Pittsburg Drawing E-5437-310

C-4 & 5	Toe plate has severe corrosion and rot. Replace in kind.
C-6	A large portion of the toe plate for this floor elevation has moderate corrosion and should be cleaned, inspected and painted to prevent further damage.
C-7	Beam has severe delamination and metal loss of the bottom flange. Replace in kind.
C-8 thru 10	Beam has moderate delamination of the bottom flange. Beam should be cleaned, inspected and painted to prevent further damage.
C-11 & 12	All the steel in shaded area is covered with coal dust and appears to have a substantial amount of corrosion and a small amount of metal loss. This area should be cleaned and closely inspected for any major damage. After determination that the area is adequate, the area should be painted to prevent further damage.

McNally Pittsburg Drawing E-5437-311

C-13	A large portion of the toe plate for this floor elevation has moderate corrosion and should be cleaned, inspected and painted to prevent further damage.
C-14 & 15	Toe plate has severe corrosion and rot. Replace in kind.
C-16	Beam has a small amount of metal loss at the top flange. Recommend cleaning and inspection prior to painting to prevent further damage.
C-17	All the steel in shaded area is covered with coal dust and appears to have a small amount of delamination. This area should be cleaned and closely inspected for any major damage. After determination that the area is adequate, the area should be painted to prevent further damage.
C-18	Platform has a large unprotected hole in the center. The platform appears to be abandoned. Recommend taking down platform or remove ladder to prevent access to platform.

C-19 thru 22 Horizontal braces have severe rot and metal loss. Recommend replacing in kind.

C-23 Toe plate has severe corrosion and rot. Recommend replacing in kind.

McNally Pittsburg Drawing E-5437-312

C-24 & 25 Horizontal brace has broken free from connection. Recommend replacing gusset plates and brace in kind.

C-26 Toe plate has severe corrosion and rot. Recommend replacing in kind.

C-27 Beam has severe corrosion. Recommend replacing in kind.

C-28 Toe plate has severe corrosion and rot. Recommend replacing in kind.

C-29 Beam has moderate metal loss and severe corrosion. Recommend replacing in kind.

C-30 Beam has moderate to severe corrosion. Recommend cleaning and inspection prior to painting to prevent further damage.

C-31 Beam has moderate metal loss and severe corrosion. Recommend replacing in kind.

C-32 All the steel in shaded area is covered with coal dust and appears to have a small amount of delamination and possible metal loss. This area should be cleaned and closely inspected for any major damage. After determination that the area is adequate, the area should be painted to prevent further damage.

McNally Pittsburg Drawing E-5437-313

C-33 & 34 Base of column and base plate have a small amount of corrosion and metal loss. Recommend cleaning and painting 36” of column, including base plate and anchor bolts.

McNally Pittsburg Drawing E-5437-315

C-35 Base of column and base plate have a small amount of corrosion and metal loss. Recommend cleaning and painting 36” of column, including base plate and anchor bolts.

C-36	Column has thinning of the flanges near the top of grating. Recommend cleaning and painting the column 2'-0" either side of floor to prevent further damage.
C-37	Beam has small to moderate metal loss and delamination of the top and bottom flange. Recommend replacing in kind.
C-38	Vertical brace has severe corrosion. Recommend cleaning and painting to prevent further damage.
C-39	Base of column and base plate have a small amount of corrosion and metal loss. Recommend cleaning and painting 36" of column, including base plate and anchor bolts.
C-40	Vertical brace has moderate metal loss on the outstanding leg of angle. Recommend cleaning and painting to prevent further damage.

McNally Pittsburg Drawing E-5437-321

C-41 & 42	Vertical brace and gusset plate have a small amount of metal loss. Recommend cleaning and painting to prevent further damage.

TECO Drawing 11473-FS-9XA

C-43	Beam has approximately (10) ¾" diameter holes in the web and the bottom flange has moderate delamination. Recommend replacing in kind.
C-44 thru 51	Members and gusset plates have moderate delamination. Recommend cleaning and painting to prevent further damage.
C-52	The entire platform is beginning to get a small amount of delamination. There is also a fair amount of coal dust built up in the web and on the flange of all the beams. This area should be cleaned and closely inspected for any major damage. After determination that the area is adequate, the area should be painted to prevent further damage.

SECTION 24 – CONVEYOR U

Conveyor U is a bypass conveyor that can take coal from conveyors T1 or T2 and either dump it on the ground to the west side of T7 or into a waiting truck. The conveyor is rarely used but if a batch of wet coal is discovered it will be loaded into a truck and returned to the coal field. Access to the conveyor mid section and head could not be made due to nesting Osprey.

Conveyor U

Summary:

1. Structural
   - No change form original assessment done in 2003. Please refer to previous study report for details.
2. Electrical
   - N/A
3. Mechanical
   - See below.

1.1 ELECTRICAL

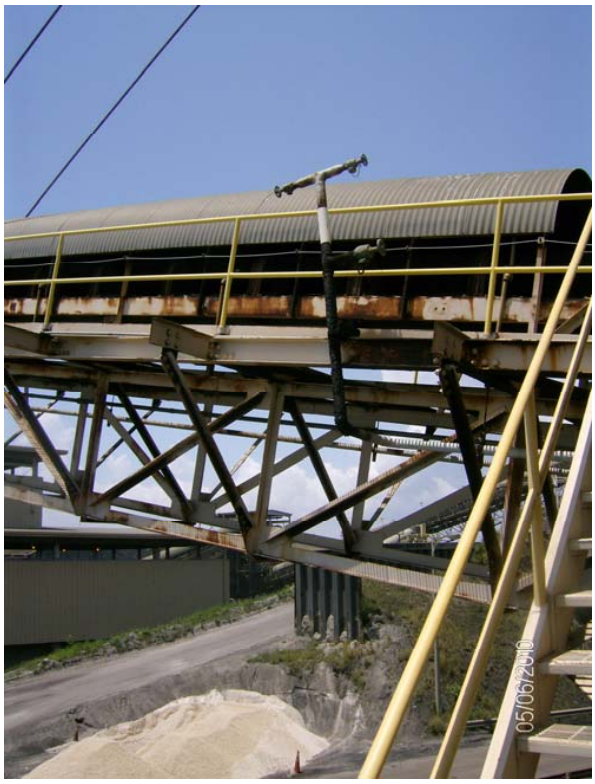
Electrical components for conveyor U are within transfer tower T7 and are discussed in section 23.

1.2 MECHANICAL

The tail end leg support angles require replacement.

The conveyor deck plates are corroded.

The conveyor frame and support steel should be cleaned and painted.



The belt scraper on the belt return near the tail pulley should be adjusted or replaced.

1.3 STRUCTURAL

See comments from original assessment done in 2003. The steel damage has not progressed beyond this original assessment.

SECTION 25 – CONVEYORS W1/W2

The W conveyors move coal from the ground floor of transfer tower T7 (Crusher Building) to the K - Feeder structure where fly ash or reclaimed coal can be introduced into the fuel.

Summary:

1. Structural
   - Numerous beams and braces need to be replaced in kind due to corrosion. No over load failure was noted.
   - Numerous braces and beams require cleaning, repair, and painting.
   - Several connections require cleaning and painting to stop corrosion.

2. Electrical
   - N/A – See Sections 23 and 28.

3. Mechanical
   - A second means of egress should be provided from the head end of conveyors W1 and W2.
   - Conveyor deck plates need to be cleaned and painted. At the exit to T7 the deck plates need to be replaced.

1.1 ELECTRICAL

Electrical components for conveyors W1 and W2 are within transfer tower T7 discussed in section 23 and the K-Feeder structure discussed in section 26.

1.2 MECHANICAL

The conveyor deck plates and conveyor frame are in fair condition inside of T7 and should be cleaned and painted.

Once the conveyor exits T7 the deck plates are either corroded or gone all the way to the conveyor head and should be replaced. This will prevent coal from dropping off the belt.

On conveyor W1 the coal has packed in the void between the deck plate and conveyor plate and should be cleaned out.

Conveyor W1 on the water side (southwest) has corroded support legs and idler supports along the truss mid-span and should be replaced.

The entire W1 conveyor should be cleaned and painted. The tail section should be cleaned and painted immediately.

Both W1 and W2 have new stainless head chutes.

A second means of egress should be provided from the head end of conveyors W1 and W2. Currently the only way down is from the walkway along the conveyor. A fire in T7 could seal off this egress.

1.3 STRUCTURAL

Note: Items identified as C-1, C-2, etc. refer to annotated drawings at end of this section.

McNally Pittsburg Drawing E-5437-332

C-1 thru 6	Top chord members have heavy corrosion and moderate to severe metal loss. Recommend replacement in kind.

McNally Pittsburg Drawing E-5437-333

C-7	Top chord member has heavy corrosion and moderate to severe metal loss. Recommend replacement in kind.
C-8	Truss section has moderate corrosion. Recommend cleaning and painting to prevent further damage.

McNally Pittsburg Drawing E-5437-334

C-9	Truss section has moderate corrosion. Recommend cleaning and painting to prevent further damage.
C-10 & 11	Members at connection on both East and West side have moderate metal loss and delamination. Recommend cleaning, repairing and painting to prevent further damage.
C-12 & 13	Members at connections have heavy corrosion and delamination. Recommend cleaning and painting to prevent further damage.
C-14	Bottom chord of truss has heavy corrosion and mild delamination of the bottom flange. Recommend cleaning and painting to prevent further damage.
C-15	Member has moderate to severe corrosion. Recommend cleaning and painting to prevent further damage.
C-16	Member has severe delamination of the bottom flange. Recommend replacement in kind.

C-17 thru 20	Gusset plates have moderate delamination. Recommend cleaning and painting to prevent further damage.

McNally Pittsburg Drawing E-5437-335

C-21 & 22	Portions of vertical brace have severe corrosion and moderate metal loss. Recommend replacement in kind.

McNally Pittsburg Drawing E-5437-336

C-23	Flange on West side of bent has severe corrosion and moderate metal loss. Recommend cleaning, repairing of flanges with plates and painting to prevent further damage.
C-24	Lower portion of vertical brace has severe corrosion and metal loss. Recommend replacement in kind.
C-24A	Lower portion of vertical brace has heavy corrosion and mild metal loss. Recommend cleaning and painting to prevent further damage.
C-25	Beam has moderate delamination of top and bottom flanges. Recommend cleaning and painting to prevent further damage.
C-26	Flange on East side of bent has severe corrosion and mild metal loss. Recommend cleaning and painting to prevent further damage.

McNally Pittsburg Drawing E-5437-337

C-27 thru 36	Members have moderate to severe corrosion. Recommend cleaning and painting to prevent further damage.

McNally Pittsburg Drawing E-5437-338

C-27 thru 40	Base of monorail supports have severe corrosion. Recommend cleaning and painting to prevent further damage.

Comments for Conveyor W1 pertain to conveyor W2 also.

SECTION 26 – K-FEEDERS

The K Feeder Building houses four feeders (K1A, K1B, K2A, and K2B) and transfer hoppers for the transfer of coal from W1 and W2 conveyors onto L1 and L2 conveyors.

The feeders are used to meter in flyash, limestone and in emergency situations coal. The structure is relatively low and built into the side of a hill. Water collects on the ground at the base. A very strong concentration of ammonia can develop in the basement of the K Feeder building. Ammonia laden ash is sometimes added to the coal through the K Feeders for re-burning in the boilers. Also, ammonia is sometimes added to the coal at the tail end of the W conveyors.

K1A Feeder

Summary:

1. Structural
   - N/A – Mostly concrete.

2. Electrical
   - Electrical equipment is in good condition. Labeling is required to make operating/servicing easier.

3. Mechanical
   - Significant corrosion of the structural steel observed that should be cleaned and repainted.
   - A number of chutes need to be cleaned and painted.

1.1 ELECTRICAL

Observations of the K Feeder Building were noted:

1. At grade elevation, there is a lighting transformer and panelboard inside a NEMA 4X box, and a 480V, 3-phase disconnect switch.
2. At the intermediate elevation, the following equipment is located:
   a. K2A vibrator control cabinet and motor starter.
   b. K2B vibrator control cabinet and motor starter.
   c. Conveyor control junction boxes and startup alarm bell.
   d. K1A vibrator control cabinet and motor starter.
   e. K1B vibrator control cabinet and motor starter.
   f. K1A tilt switch control box.
   g. K1A NEMA 4X junction box.
   h. K1B NEMA 4X junction box.
   i. K2A NEMA 4X junction box.
   j. K2B NEMA 4X junction box.

K Feeder Control Cabinets and starters

3. Equipment at the top elevation includes:
   a. W1 Conveyor motor (150 HP, 1800 RPM, 460V, 445T Frame).
   b. W1 conveyor start/stop pushbutton station.
   c. W1 discharge chute retract pushbutton station
   d. W2 Conveyor motor (150 HP, 1800 RPM, 460V, 445T Frame).
   e. W2 conveyor start/stop pushbutton station.
   f. W2 discharge chute retract pushbutton station
   g. This area is open to the weather. All of the legend plates are illegible from exposure to weather.

4. In general, the equipment at the K-Feeder building is in good working order; however, some attempt at better labeling could be made to make operating/servicing the equipment easier.

1.2 MECHANICAL

High humidity levels have caused corrosion of the carbon steel equipment. The steel at the mating flanges of the feeders is delaminating. Much of the chute work needs patching and the conveyor frames need to be cleaned and painted.

K-Feeder Discharge Chute

TECO may want to consider purchasing one new feeder and swapping out one at a time to rebuild them.

1.3 STRUCTURAL

A structural evaluation was not completed. The structure is for the most part concrete.

SECTION 27 – CONVEYORS L1/L2

The L1 and L2 conveyors transport coal from the K Feeder building up to the tripper room in the powerhouse where it is deposited in each unit's coal bunker.

Summary:

1. Structural
   - In general, Conveyors L1 and L2 appear to be in fair condition although there are areas where there is significant corrosion.

2. Electrical
   - Miscellaneous corrosion degradation to the electrical equipment supports that should be repaired.
   - Oil filled switch needs to be replaced due to age.

3. Mechanical
   - Gear boxes need to be maintained.
   - Cleaning, painting and repairs of plates required.
   - General corrosion repair and cleaning required.

1.1 ELECTRICAL

Specific observations of this original installation conveyor gallery:

1. The conveyor gallery at the tail end of the L1 and L2 conveyors has weigh belt type flow measurement systems (Merrick MC3).
2. The cable tray running along the south side of L1 conveyor has no cover and is full of coal dust.
3. There is a multi-pair (>25 pr #22) tray cable cut off and laying in the tray.
4. 50 percent of the lighting fixtures are working.
5. Most of the stanchions that the light fixtures are mounted to are bent.
6. Handrails are rusty and broken.
7. Cable tray supports are rusty; some are broken.
8. L1 Conveyor motor (400 HP, 1800 RPM, 4000V).
9. L2 Conveyor motor (400 HP, 1800 RPM, 4000V).

10. At the L conveyor head pulley area there are junction boxes, conduits, pushbutton stations, and tilt switches (all rusty and in poor condition). Some equipment is out of service (sampling system).
11. There are heat detectors installed on both the L1 and L2 conveyors as part of the Fire Suppression system.
12. The pull cord switches appear to be in good working order.
13. Two floors below the Tripper Hall (6th floor of the powerhouse) there are the Westinghouse Ampgard™ 4160V motor starters for L1 & L2 conveyors, a Modicon 584 PLC rack, a 480V MCC feeding the K1A and K1B Feeders, and a 480V MCC feeding the K2A and K2B Feeders. Also at this location is an ancient oil filled switch to select the source of 4160V power for the L conveyors from either circuit 117E or 111W. This oil filled switch is a General Electric model 9F31YGA205, 200A, 5kV transfer switch with lots of rust on its painted steel case. Due to its age, this switch should be replaced.

L1 Conveyor Motor Starter

Manual Xfr Sw for L Conveyors


PLC Cabinet for L Conveyors

1.2 MECHANICAL

The original installation had vibratory feeders on the tail end of L conveyors being fed from W conveyors. These feeders have been disabled and shrouded with plate to convert the feeders to a chute. Some plate repairs and painting in this area is required.

L1 has two bent and corroded idler brackets on the inside walkway towards the head end.

The head chutes are ceramic and appear in good condition.

L1 gearbox is leaking oil out of the high speed shaft seal. The L1 gearbox is nosier than the L2 gearbox.

On both L1 and L2 the conveyor frame to conveyor head bolts are loose.

1.3 STRUCTURAL

For simplicity of the Structural portion of the Assessment, observations for Conveyors L1 and L2 will be combined into one and will be discussed in this Section.

Note: Items identified as C-1, C-2, etc. refer to annotated drawings at end of this section.

Continental Conveyor Drawing E2-1A

Previous Observations

M-1 The bottom of the column and the anchor bolts for Tower No. 1 have been repaired since the previous assessment and appear to be in good condition as seen in Picture CONV-L1-A.

PICTURE CONV-L1-A

M-2 The bottom of the column and the anchor bolts for Tower No. 1 have been repaired since the previous assessment and appear to be in good condition, again as seen in Picture CONV-L1-A.

M-3 The bottom of the column and the anchor bolts identified as “Yellow” for Bent B, have been cleaned and painted although some corrosion appears to be coming back, as seen in Pictures CONV-L1-B and CONV-L1-C. Column bases and anchor bolts should be monitored and cleaned and touched-up if corrosion becomes significant again.

PICTURE CONV-L1-B

PICTURE CONV-L1-C

M-4 Refer to M-3 above.

M-5 Referring to Pictures CONV-L1-D thru CONV-L1-Y for Tower No. 2, the bottom of the column and the anchor bolts identified as “Yellow”, have been cleaned and painted although some corrosion appears to be coming back. Pictures CONV-L1-D thru CONV-L1-F refer to the northwest leg of the tower, Pictures CONV-L1-G thru CONV-L1-L refer to the northeast leg,

Pictures CONV-L1-M thru CONV-L1-T and CONV-L1-Y refer to the southeast leg and Pictures CONV-L1-U thru CONV-L1-X refer to the southwest leg. A number of the anchor bolts seem to have "necked-down" near the top of the base plate, as seen in Pictures CONV-L1—D, CONV-L1-E, CONV-L1-J, CONV-L1-K, CONV-L1-M and CONV-L1-U. The anchor bolts should be cleaned back to solid metal to determine how much of the anchor bolt is left in order to determine if repairs are necessary. At the northeast leg, as seen in Picture CONV-L1-K, there has been some significant corrosion of the nuts for the anchor bolts. This appears to be due to a pipe from above dumping on top of the nuts and causing corrosion. The discharge from this pipe should be redirected away from these anchor bolts as was done at the southeast leg. However, at the southeast leg as seen in Picture CONV-L1-Y, the pipe is damaged and may still be dumping on the anchor bolts. Although these column bottoms have been repainted, there is still considerable coal dust accumulation around these bases and anchor bolts. This dust needs to be cleared away from the column bottoms regularly so as to minimize further corrosion. In Picture CONV-L1-X, the ground lead has been broken. It should be repaired and reconnected to the grounding grid.

PICTURE CONV-L1-D

PICTURE CONV-L1-E

PICTURE CONV-L1-F

PICTURE CONV-L1-G

PICTURE CONV-L1-H

PICTURE CONV-L1-J

PICTURE CONV-L1-K

PICTURE CONV-L1-L

PICTURE CONV-L1-M

PICTURE CONV-L1-N

PICTURE CONV-L1-P

PICTURE CONV-L1-R

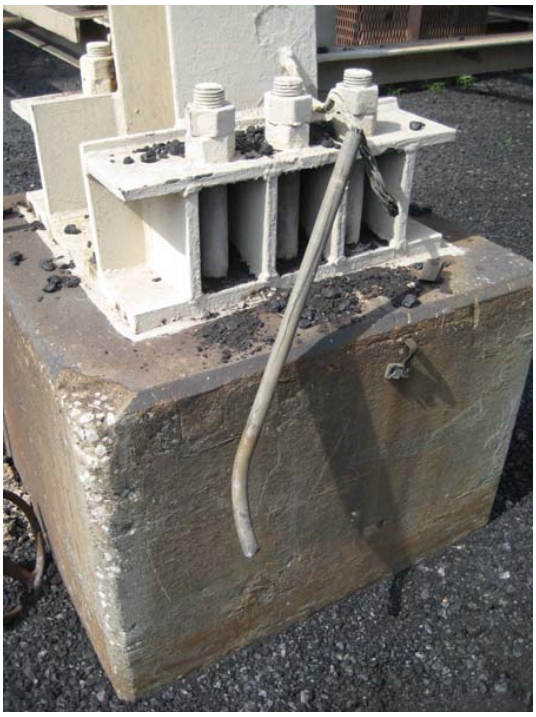
PICTURE CONV-L1-S

PICTURE CONV-L1-T

PICTURE CONV-L1-U

PICTURE CONV-L1-V

PICTURE CONV-L1-W



PICTURE CONV-L1-X

PICTURE CONV-L1-Y

M-6 Refer to M-5 above.

M-11 The double angle horizontal X-bracing near the top of Tower No. 2 seen in Pictures CONV-L1-Z and CONV-L1-AA is separating and corroded to the point that there is little section left of these members. These members are critical to the stability of the Tower and will need to be replaced, preferably with WT-sections in place of the existing double angle sections. WT's will not separate the way double angles do.

PICTURE CONV-L1-Z

PICTURE CONV-L1-AA

M-14 As seen in Picture CONV-L1-AB, it appears that the ladder has been repaired/replaced.

PICTURE CONV-L1-AB

M-19 Did not observe grating condition previously noted. Grating may have since been replaced.

New Observations

C-1 As seen previously in Picture CONV-L1-A, a lower horizontal column tie has been twisted. Although not critical, this member should be straightened, cleaned and painted

C-2 In Pictures CONV-L1-AC thru CONV-L1-AE, it can be seen that some of the conveyor frames have corroded thru and the spill pans have also corroded and separated from the frames. In general, the frames should be able to be repaired by cover plating over the holes and the spill pans reattached to the frames. Cleaning and painting will also be necessary

PICTURE CONV-L1-AC

PICTURE CONV-L1-AD

PICTURE CONV-L1-AE

C-3 In Pictures CONV-L1-AF and CONV-L1-AG, it can be seen that a vertical double angle member is missing at grade on the east side of Tower No 1. This member should be replaced, preferably using a WT section.

PICTURE CONV-L1-AF

PICTURE CONV-L1-AG

C-4 In Pictures CONV-L1-AH and CONV-L1-AJ, some corrosion was observed at about 8 feet above grade at the southwest leg. Cleaning and painting is necessary and possibly repairs if rust removal reveals excessive loss of section.

PICTURE CONV-L1-AH

PICTURE CONV-L1-AJ

It is recommended the entire tower be inspected for its full height to determine if there are areas of corrosion not visible from grade or the conveyor level with cleaning and painting and repairing if necessary. Additionally, the horizontal X-bracing should also be inspected along the full height if the tower to see if any other areas exhibit the deterioration noted in M-11 above and previously in Pictures CONV-L1-Z and CONV-L1-AA, including the end connections.

Continental Conveyor and Equipment Co. Drawing E2-2A

C-1	All the steel framing in the bunker has moderate corrosion. Recommend cleaning and painting to prevent further damage from moisture and coal dust.
C-2 & 3	Base of columns and base plates have moderate corrosion and metal loss. Recommend cleaning and painting 36” of column, including base plate and anchor bolts.
C-4 & 5	Steel beams running North and South that support Conveyor L1 & L2 have severe corrosion and metal loss. Recommend replacement in kind.

Comments for Conveyor L1 pertain to conveyor L2 also.

FUTURE UPGRADES

As noted previously, in general, the mechanical and electrical equipment is old and outdated. The electrical equipment and controls for the coal yard are obsolete (except where recent replacements have been completed). In the event of failure of this equipment and controls, replacement parts are not available. The mechanical equipment is generally worn and several pieces need to be replaced due to wear. TECO has started a phased replacement of the equipment. The specifics are described below. Stantec recommends continued development of a replacement program.

Note, we reviewed the flow of material and found the general arrangement of the coal yard to be good. No bottlenecks were observed that could be addressed by re-arrangement. We suggest TECO look at the supply problems that could occur if critical pieces of aged equipment were to fail and have contingency plans available to continue the supply of coal.

1.1 ELECTRICAL

Future Power Distribution Upgrades

Two projects have already been approved by TECO's management. One is to replace the existing electrical equipment on the T3 transfer structure, and one is to install new 5KV switchgear on the generator deck in the Powerhouse to refeed the coal field and L conveyors. The switchgear has been procured, and drawings are being prepared for the installation.

In the warehouse near the coal barge unloading dock, the 5kV switchgear is stored awaiting installation. These are Square D Load Interrupter switches (factory order #17-19423193-002):

1 – Single section switch assembly.
2 – Triple section switch assemblies.

New 5kV Switchgear for coal yard

TECO has discussed other projects such as refeeding the fire pump house from the new switchgear and running a separate feed from the new switchgear to the T1/T2 transfer structure.

Other projects TECO has considered include replacing the 4KV starters on the third floor of the T2 structure as well as the 480V MCC there. However, no specific projects have been initiated.

It is important that these planned power system upgrades are implemented because the condition of the existing equipment is so poor. Much of the installation is 50 years old and the need for rewiring the coal yard is real.

Please refer to the attached one line diagrams (existing and proposed) for details on the changes that are proposed.

Future Control System Upgrades

Plans are being made to upgrade the coal yard control system by replacing the Modicon PLC with an Emerson Ovation™ DCS. New Operator Work Stations and Engineering Work Stations will be located in the Coal Blending Station control room to replace the existing control panel and mimic panel. Fiber optics cables for communication will monitor I/O signals from termination cabinets to be located in the T2 transfer tower, the T6 transfer tower, the T7 crusher house, the coal blending building, and the Tripper house above the coal bunkers. Tie-ins to communicate with the existing plant DCS will be made at the No. 3 and 4 computer room at elevation 49'. Drawing 349-CLFLDDCS-SK1 shows the planned changes, and drawing 349-CBD-CW1 shows the anticipated number of cables required for the installation.

This control system upgrade will allow the coal yard to be integrated into the control system for the rest of the plant. It is anticipated that much of the control wiring will be replaced improving the coal yard reliability greatly.

1.2 MECHANICAL

Stacker/Reclaimer replacement

TECO received quotes from Metso and Tenova in 2007 to supply two new stacker reclaimers for replacement of the north and south stacker/reclaimers. Tenova replied back that the price had increased from 6,250,000 euro to 7,900,000 euro (approximately $8.1 M to $10.3 M U.S.). Metso responded with a price of $11,000,000 US (equipment only) for two bucket wheel reclaimers. The communication is included within this section.

Blending Bin Bypass

A recent fire in the blending bin building required the bins to be out of service and therefore interrupted the flow of coal to the boilers. During this period, coal was fed into the K-Feeders with mobile equipment, bypassing the blending bins and keeping the boilers operating. Front end loaders filled dump trucks that backed up to the K-Feeders. The coal was dumped on the K-Feeders grizzly grates and pushed in with another front end loader or bulldozer. The amount of mobile equipment required was very costly and TECO asked Stantec to provide some ideas to bypass the blending bins without having the expense of the mobile equipment.

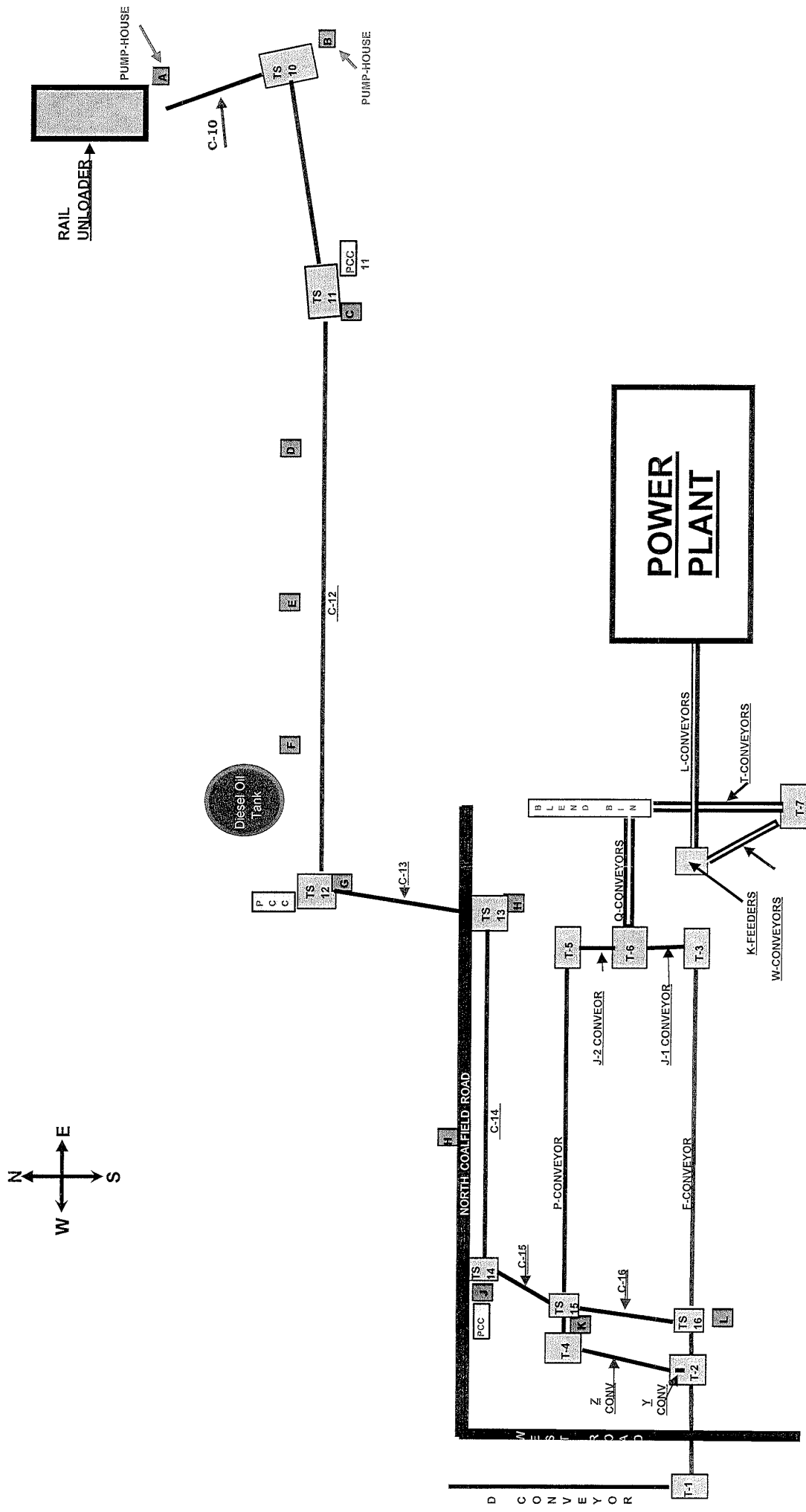
Potential solution in order of lowest cost, highest manpower requirements are:

1. Install a reclaim pit and conveyor in the south east end of the coal field. The conveyor will terminate at the K-Feeders. This option will still require mobile equipment for reclaim. Low capital cost, high mobile equipment and manpower costs.

2. Modify Conveyor F at transfer tower T3 and install a new conveyor from T3 to the K-Feeders. This option eliminates the need for mobile equipment to reclaim but it does require that the F conveyor is running and its approach does not have the flexibility to reclaim from the north yard.

3. Install a new conveyor from transfer tower T6 to the K-Feeders. This will be the most expensive option but allows the flexibility to reclaim from either the north or south yard without using mobile equipment.

Stantec is available to pursue these options with TECO when needed.


RAIL UNLOADER
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TS 10
B
PUMP-HOUSE
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PCC 11
C
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F
Diesel Oil Tank
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NORTH COALFIELD ROAD
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POWER PLANT
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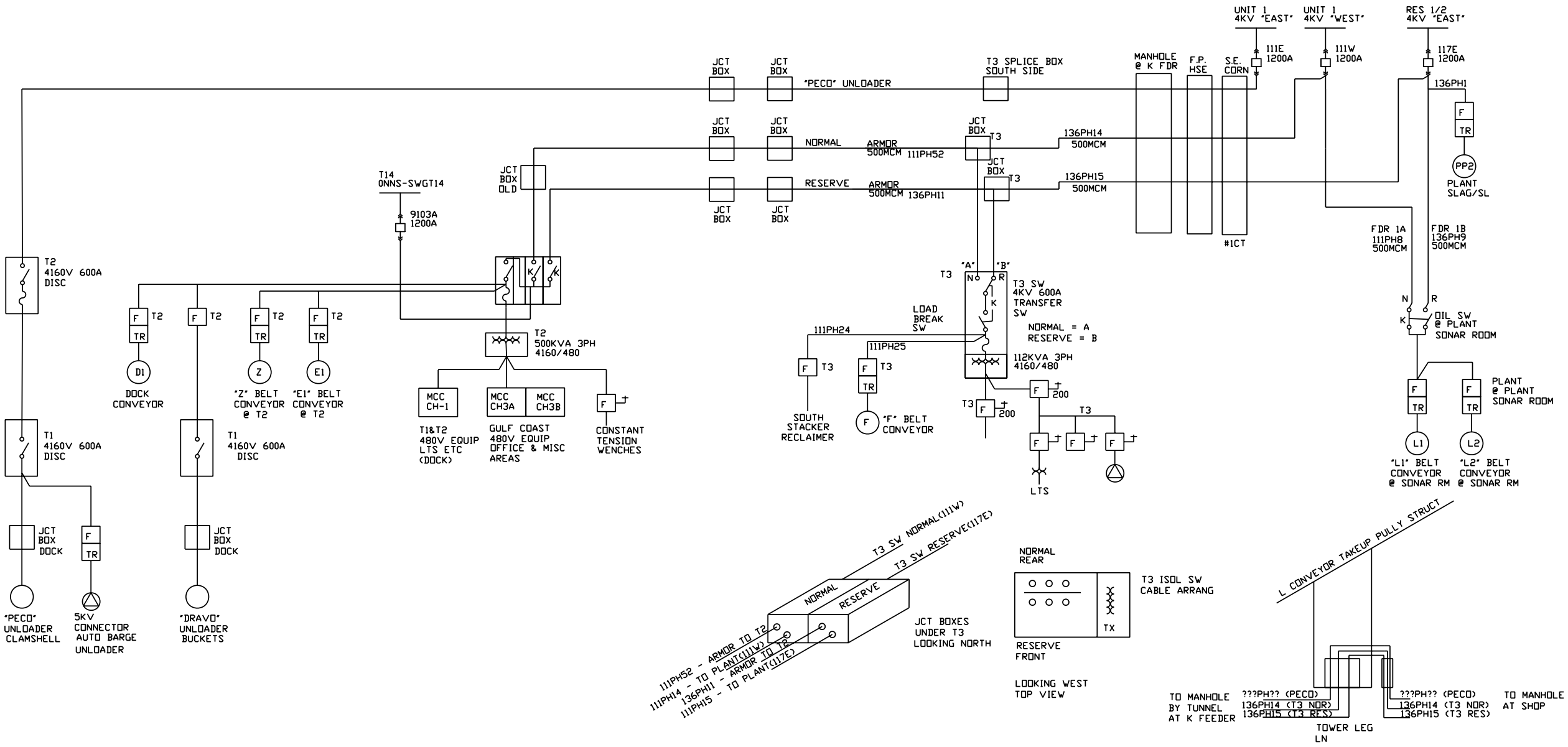

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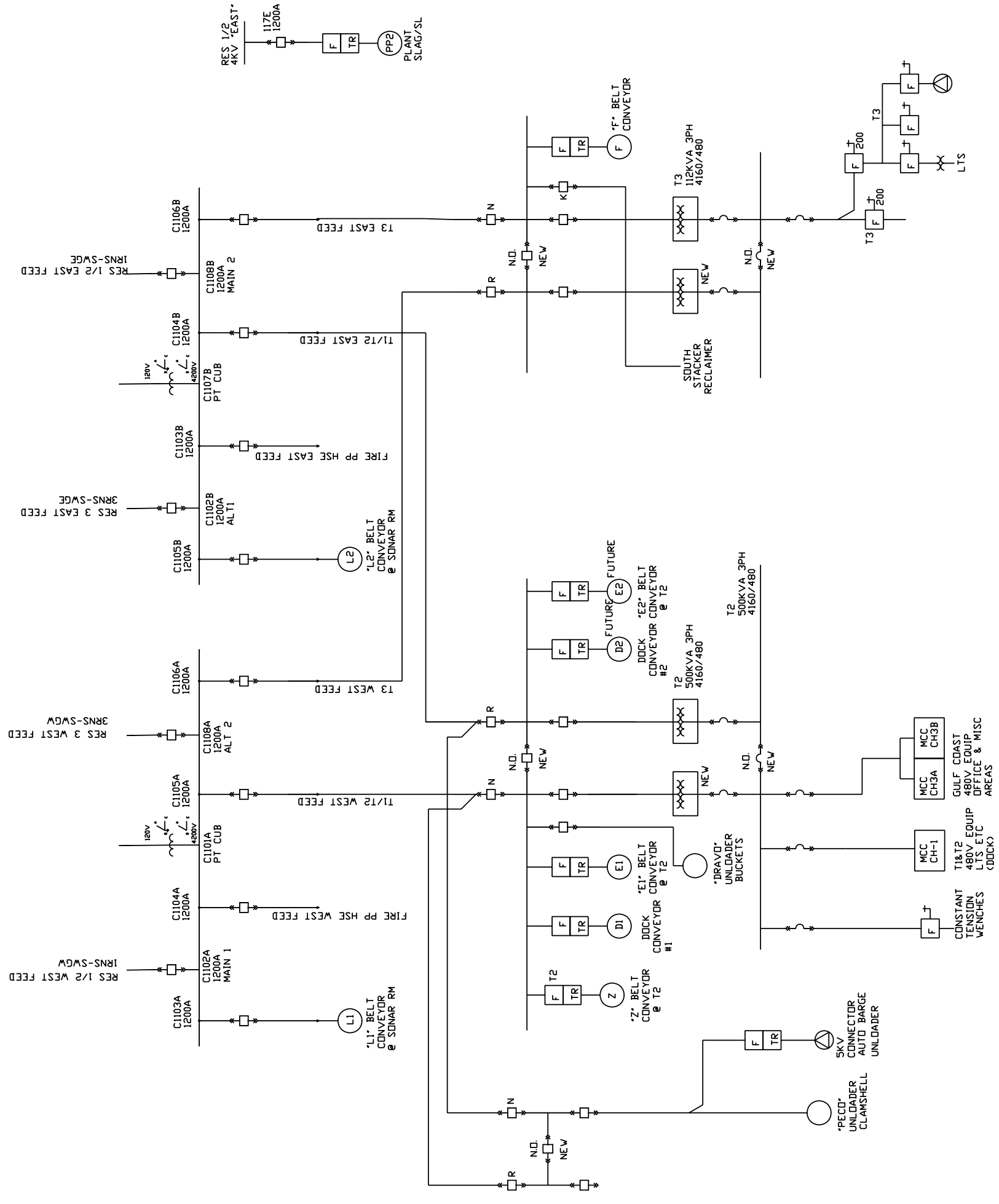
TAMPA ELECTRIC COMPANY
DOCKET NO. 130040-EI
HUA'S THIRD REQUEST FOR PODS
FILED: AUGUST 21, 2013



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