Self-Unloading Project

1.0 Background

Tampa Electric Company ("Tampa Electric") requested authorization to use self-unloading vessels at the unloading dock at Big Bend Station. At the request of the Florida Department of Environmental Protection ("Department"), Tampa Electric requested this authorization as Comment 11 in the request for additional information letter, dated September 12, 2014. On October 16, 2014, the Department requested additional information on the self-unloading project. The request included a process description of the four new hoppers and applicable fugitive emission limits. On October 23, 2014, Tampa Electric requested to separate the self-unloading project from application no. 3781-1 as a separate air construction permit no. 0570039-076-AC. The final permit was issued on December 8, 2014.

On March 3, 2016, Tampa Electric requested an extension of the expiration date of air construction permit no. 0570039-076-AC. At the time, TEC proposed seeking authorization for self-unloading vessels operated by United Ocean Services, Inc. (UOS), and additional time was requested to allow UOS to install the necessary equipment to facilitate self-unloading. The installation was delayed due to UOS financial issues. Based on these circumstances, the Department extended the project from December 1, 2016 to June 1, 2018 pursuant to project no. 0570039-086-AC. Although, UOS is expected to continue to deliver solid fuel to Big Bend Station, TEC believes it would be advantageous to seek approval for generic self-unloading of solid material and not limit the use of self-unloading to a specific vessel(s).

2.0 Proposed Self-Unloading Project Description

The proposed project consisted of minor modifications to operate self-unloading ocean vessels at Big Bend Station. The project will utilize self-unloading vessels equipped with boom conveyor systems to unload solid fuels and/or supplemental materials directly into the existing Dravo hopper. Alternatively, the project will be capable of utilizing self-unloading vessels equipped with clam-shell crane unloaders to unload solid fuels and supplemental materials directly into receiving hoppers. The receiving and transfer hoppers contain angled chutes that discharge immediately above the existing conveyor. The angled chutes allow the material to slide down immediately onto the conveyor rather than simply dropping and creating fugitive dust emissions.

The Dravo Unloader was taken out of service and demolished; however, the existing Dravo hopper was salvaged and modified to accommodate self-unloading vessels. The two existing transfer points (FH-004 and FH-005) were used to accommodate the use of self-unloading vessels equipped with boom conveyors and the Dravo hopper. Four additional transfer points (FH-05a, FH-05b, FH-05c, and FH-05d) will be used to accommodate the use of self-unloading vessels equipped with clam-shell crane unloaders and the new four receiving hoppers.

3.0 Tampa Electric Settlement Agreement with United Ocean Services

Tampa Electric and UOS entered into a settlement agreement, dated July 15, 2016. This agreement names the Mississippi Enterprise as a self-unloading vessel and the Florida Enterprise

as a non-self-unloading vessel. The Energy Enterprise is no longer available as a self-unloading vessel or non-self-unloading vessel. However, Tampa Electric requests authorization to use other contracted self-unloading vessels that are equipped with boom conveyors and/or clam-shell crane unloaders to unload solid fuels and supplemental materials to receiving hoppers at Big Bend's dock.

4.0 Final Self-Unloading Project Description

The final self-unloading project consists of minor modifications to use self-unloading vessels and demolition of the Dravo Unloader and modifications of the Dravo hopper to receive solid fuel and materials. The project used self-unloading vessels equipped with boom conveyor systems to unload solid fuels and supplemental materials directly into the existing Dravo hopper. Alternatively, the project also uses self-unloading vessels equipped with clam-shell crane unloader systems to unload solid fuels and supplemental materials directly into receiving hoppers. The Title V air permit shall be revised to authorize self-unloading vessels with clam shell unloaders and receiving hoppers (FH-005a, FH-005b, FH-005c, FH-005d), self-unloading vessels with boom conveyors (FH-005) and the existing PECO clam-shell crane unloader (FH-001) to offload materials to Big Bend Station.

The final project removes three (3) additional transfer points. The demolition of the Dravo unloader eliminated two (2) transfer points, FH-002 and FH-003. The side chute for the Dravo hopper was not constructed, thus eliminating an additional transfer point, FH-004.

5.0 Final Self-Unloading Emissions Profile

Despite the removal of transfer points FH-002, FH-003 and FH-004, the emission analysis shows there is no net increase in emissions from the final self-unloading project compared to the existing unloading system. The revised emission calculations are shown in **Appendix A**.

6.0 Revisions to Air Construction Permit 0570039-076-AC

Tampa Electric requests to revise the air construction permit to reflect the revised scope of work in Section 4 above. The redlined revisions are shown in **Appendix B**.

Other Permit Revisions

7.0 Duct Leak Rate Thresholds

Industry standards and guidelines define acceptable duct leakage rates for HVAC and industrial applications. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), International Energy Conservation (IEC) defines duct leakage as a function of the static pressure and the surface area of the duct. This allows for the introduction of leakage classes that can be used to accurately calculate duct air leakage from ducts of various sizes and configurations.

The International Energy Conservation Code (403.2.7.1.3) defines the duct leakage criteria for high-pressure duct systems. These ducts are designed to operate at static pressures exceeding 3 inches w.c. in accordance with the SMACNA *HVAC Air Duct Leakage Test Manual* with the rate of air leakage (C_L) less than or equal to 6.0.

The acceptable duct leak rates are calculated using the operating pressure (P) and duct leakage class (C_L) as follows:

$F = C_L \cdot P^{0.65}$ (Equation 1)

where:
P = The static operating pressure (inches).
C_L = Class leakage rate (4):

The SO_2 concentration (lb/scf) is calculated using the hourly concentration (ppm) as follows:

$C = K \cdot C_H$ (Equation 2)

where:
C = SO_2 average hourly concentration (lb/scf)
K = 1.660×10^{-7} for SO_2, (lb/scf)/ppm
C_H = SO_2 average hourly concentration (ppm)

$L = 60 \cdot C \cdot F \cdot A$ (Equation 3)

where:
L = SO_2 average allowable hourly leakage rate (lb/hr)
F = Leakage rate in CFM per 100 square feet of duct surface area
A = Duct surface area (square feet)

The allowable SO_2 leakage rates for Units 1 to 4 are shown in **Appendix C**.

Tampa Electric requests a permit condition to establish allowable SO_2 leakage thresholds for CS0W1, Unit 3 and Unit 4 are based on the SMACNA calculation procedure discussed above. The requested permit revisions are shown below:

Condition A.10

e. Fugitive SO_2 emissions from duct leaks shall not exceed 105 lb/hr and 141 lb/hr from CS0W1 and Unit 3, respectively. Corrective measures shall be conducted for any discoverable duct leak exceeding these thresholds.

Condition B.14

d. Fugitive SO_2 emissions from duct leaks shall not exceed 117 lb/hr from Unit 4. Corrective measures shall be conducted for any discoverable duct leak exceeding this threshold.

8.0 Other Title V Revisions

Revision Engine Data in Permit No. 0570039-093-AV

The engine data in Subsection Q & R should be revised as shown in **Appendix D**.

Revision Permit to authorize Engine Data in Permit No. 0570039-093-AV

Tampa Electric is requesting to include the scope of work in the Notification of Change Without Permit Revision, dated July 3, 2007, into the Title V air permit. This activity includes the transporting 18,000 tons per year of petroleum coke and solid fuels into Big Bend Station by truck. A copy of the permit revision is shown in **Appendix E**.