

Technical Memorandum 4

DATE: July 7, 2004

TO: Ron Mitchum (BCDCOG)
Environmental Technical Advisory Committee

FROM: Bill Martello (JJG)
Steve Davie (TT)

SUBJECT: Charleston Harbor System
Williams Steam Plant Thermal Discharge

This technical memorandum provides a more detailed description of the data needs to better characterize the effluent discharge of the Williams Station Steam Plant (NPDES Permit SC0003883). The purpose of this technical memorandum is to address concerns raised in the public comments of the previous Cooper River Dissolved Oxygen (DO) Total Maximum Daily Load (TMDL). Specific comments were made by Mr. J. Marc Hehn from the Berkeley County Water & Sanitation Authority in a letter dated December 5, 2002 to the SCDHEC.

In the previous 2-D modeling effort, in support of the Cooper River DO TMDL, the effluent flows and temperature in the hydrodynamic model as well as dissolved oxygen in the water quality model were omitted. The effluent UOD for only the sanitary component was included in the water quality model as a load. Therefore, the exclusion of flow and DO may have misrepresented the assimilative capacity in the Lower Cooper River. For the current 3-D modeling effort, the effluent flows will be included in the hydrodynamic model as a daily time series as estimated in their NPDES permit. Mr. Hehn's letter states that the discharge is "95 percent reliable" and is "in excess of 500 mgd" as a result of once-through cooling water combined with a small sanitary sewer inflow. The heat load due to the increase in temperature will also be included in the 3-D hydrodynamic model. For the water quality model, the water quality of the effluent needs to be further characterized.

We have received DO data for a study performed by Davis & Floyd from October 3, 2002 through November 3, 2002 where DO were monitored daily on the southeast side of the cooling tower discharge canal. While in operation, the DO values ranged from 5.9 to 8.6 mg/L and while not in operation (maintenance outage), the DO values were a minimum of 5.0 mg/L. This is the only DO data we have at this time to characterize the steam plant effluent. We will need this type of data (daily DO) for the 2004 model calibration period.

From the NPDES permit requirements, outfall number 002 includes cooling and sanitary water. The flows are estimated daily and temperature is monitored daily upstream in the Cooper River and in the effluent discharge. BOD5 is monitored monthly because there is a small sanitary sewer inflow from the facility that is mixed with the cooling water in a discharge canal.

Data were submitted to JJ&G and Tetra Tech, Inc. in March 2004 that summarized the daily operations of the steam plant for January and July of 2002. Only one day out of the two months that were analyzed had an effluent flow of less than 500 mgd. The flow difference of the water withdrawal from the Back River compared to the discharge to the Cooper River was small (on the order of 1-4 mgd). The temperature difference of the upstream Cooper River compared to the effluent discharge was 2.0 (July) to 15.1 (January) degrees F. The NPDES permit limit is 17.5 degrees F for a maximum water differential temperature of upstream Cooper River to effluent discharge.

Therefore, there is a need to gather more information on the Williams Steam Plant Discharge to characterize better characterize the effluent for the model. Specifically, we need to gather, collect, or measure the following:

- Daily flow (estimated by permit),
- Daily temperature,
- Daily DO

These parameters will be gathered, collected, or measured at the discharge location (discharge canal is sufficient) before entering into the Cooper River. Upstream Cooper River temperatures are being collected for the NPDES permit and this information will be useful to calibrate the Cooper River temperature upstream of the pipe.

JJG will collect grab samples of both the Back River intake water and the Williams Steam Plant discharge three times during the summer of 2004 and test for the full suite of parameters being measured at the instream river sites, excluding chlorophyll.