PET
AP-42
Section 5.13.2
Reference Number
10

TELEPHONE CONVERSATION REPORT

File/Charge No.: C602

Date: 12/7-14/88

Time A.M. [X] P.M. [X]

Incoming Call [X]

Outgoing Call [X]

Person: Jerry Henderson and Larry Williams
Organization: E.I. du Pont de Nemours and Company
Address: PO Box 800
Kinston, NC 28501

Telephone: Jerry: 919/522-6445; Larry: 919/522-6785
By: Robert Purcell

Subjects Discussed: Due to a Public Hearing comment and responses to follow-up questions received from DuPont concerning the Polymer NSPS requirements pertaining to the condensate stream from vacuum producing steam jet ejectors for the polymerization reaction at poly(ethylene terephthalate) (PET) process lines, I called Pamela Meitner of DuPont's legal department (302/774-8720) and asked her to have someone contact me that was knowledgeable about the aforementioned comment/responses. Jerry Henderson at DuPont's Kinston, NC facility contacted me and we discussed several issues. Further information was provided during a second telephone call that also included Larry Williams at Kinston and during a third telephone call with Mr. Williams; Mr. Henderson was on vacation during the third telephone call. (Mr. Henderson and Mr. Williams are Senior Research Chemists.) The following narrative is a composite of these three telephone calls.

DuPont had two basic concerns regarding the NSPS requirements for the steam jet ejector condensate streams. The first concern, "... no appropriate limits can be set for the ethylene glycol condensate from the vacuum system servicing the polymerization reaction because that condensate stream cannot be analyzed separately from the vastly larger steam jet condensate steam," presented by DuPont originated from a misinterpretation of the NSPS requirement. DuPont believed that the concentration of the actual condensate stream from the polymerization reactor, excluding the other sources of water driving the steam jet ejectors, had to be measured for each steam jet ejector servicing the polymerization reactor. DuPont stated in their 8/29/99 response that the steam jet ejector vacuum system effluent (i.e., the condensate and ejector cooling water) drained into a reservoir, called the "jet hot well", where it could be sampled. I explained that the intent of the proposed standard was to require the measurement of the steam jet ejector vacuum system effluent and, thus, obtaining a sample from the reservoir for determination of the condensate concentration was appropriate. DuPont then suggested that their mininterpretation would not have occurred if the requirement was worded as follows: "... maintain the concentration of the ethylene glycol in the effluent from the ejector vacuum system at or ..." instead of its current wording "... maintain the concentration of ethylene glycol in the condensate from the ejectors at or ..."

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Subjects Discussed cont'd: DuPont's second concern was as follows: "... the very dilute ethylene glycol in the combined condensate stream is not recovered, but is biodegraded harmlessly. As such, its release into the environment is adequately regulated under provisions of the Clean Water Act. It has a vanishingly low vapor pressure in wastewater solutions at ambient conditions, so air emissions from trade water basins are insignificant. We request that this stream be excluded from regulation because it is already regulated by NPEDS permits. Further, it is not cost effective nor is it technically feasible to regulate it as proposed." This concern was raised because some of DuPont's PET process lines do not use a cooling tower to cool the polymerization reactor steam jet ejector vacuum system effluent. The vacuum system effluent is sent directly to an activated sludge wastewater treatment system. DuPont claimed that the ethylene glycol is removed from the PET process water at an efficiency level greater than 90 percent through biodegradation, and a negligible amount is emitted into the atmosphere due to volatilization. Since the intent of the the proposed requirement to measure and limit the ethylene glycol concentration in the vacuum system effluent is to limit the ethylene glycol air emissions from cooling towers, plus the fact (as claimed by DuPont) that ethylene glycl air emissions from their wastewater treatment system are negligible, DuPont believes that a steam jet ejector vacuum system effluent stream that is sent directly to a wastewater treatment system be excluded from the standard. DuPont has two facilities that do not have cooling towers. A third facility (the Kinston, NC plant) has several process lines that periodically do not use the available cooling towers and has two test lines that never use the towers. DuPont also stated that a new facility may not use/build cooling towers depending on economics, water availability, and applicable regulations.

The remainder of this discussion pertains to DuPont's Kinston facility. Kinston is the original polyester manufacturing facility. Consequently, it was designed for maximum flexibility in product development and production. Kinston produces a full line of Dacron® polyester products, ranging from partially drawn yarn to filling products. The Kinston facility has a total of 13 process lines. The actual number in operation at any given time is dictated by sales and product mix. The newest process lines (three) always drain into the cooling towers. There are two test lines that are not

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Subjects Discussed cont'd: connected to any cooling tower and always drain to the wastewater treatment system. The remaining eight process lines are capable of draining into one of the two cooling towers or draining directly to the wastewater treatment system. Where these eight lines drain is a function of many factors including line operability, ambient temperature, condition of the cooling tower, etc. For example, if a major process upset occurs resulting in a large ethylene glycol carry-over through the vacuum system, the condensate stream is sent directly to the wastewater treatment system; this situation happens very infrequently. In addition, one or more condensate streams (one for each process line) could be sent directly to the wastewater treatment system during conditions of very high ambient temperatures; this also occurs very infrequently. In short, these eight lines are drained into the cooling towers whenever possible.

Each polymerization reaction vessel in each line is placed under reduced pressure by one to two steam jet ejectors. Prior to entry into the steam jet ejector vacuum system, the reaction vessel vapor stream passes through a spray condenser which removes most of the etheylene glycol. The vacuum system effluent from each reaction vessel in a specific process line drains into a reservoir (Mr. Henderson called this reservoir the "jet hot well"). The effluent from each jet hot well drains to the cooling towers or wastewater treatment system, as previously discussed.

A slip stream from each cooling tower is sent to the wastewater treatment plant. The slip stream flow rate is controlled at 10 to 30 gallons per minute. The flow rate of the slip stream is adjusted to maintain the level of cooling water in the cooling tower and its COD content. Past history has shown that the two cooling tower systems function well when the COD content is one of the towers is maintained at approximately 7,000 to 8,000 ppm and at 8,000 to 10,000 ppm in the other tower. The COD content in each tower is normally measured once a week. If process upsets are occurring, the COD content may be checked daily.

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Subjects Discussed cont'd:

Additional points of interest discussed are as follows:

1. Jerry Henderson said he would provide PES with a process flow diagram for the Kinston facility; included with the diagram will be process stream flow rates and composition.

2. Larry Williams indicated that he and Jerry would assist PES in investigating/documenting the fate of ethylene glycol when it is sent to a wastewater treatment facility.

3. The 0.04 percent by weight ethylene glycol content for the jet hot wells was determined by sampling; however, this measurement was only obtained so that DuPont could respond to our questions (i.e., it is not normally measured).

4. The condensate streams are sent directly to the wastewater treatment system by turning manual valves.

5. Bleed-off (slip stream) from the cooling towers to the wastewater treatment system is continuous, but varying in flow rate.

6. Overloading the wastewater treatment plant during cooling tower bypass situations is not a concern. Normal volume in the treatment system is 2.5 to 2.8 million gallons; however, full capacity of the system is 3.6 million gallons and Kinston has a permit to operate the treatment plant at full capacity.

7. The statement in DuPont's 8/29/88 response saying that 350 gallons per minute of condensate waters travel to the biobasin was incorrect. The 350 gallons per minute flow rate is an estimate of the combined flows from the jet hot wells.