

Memo to File

To: Bev McKeone
From: Mike Egnor
Date: October 23, 2015
Re: PD 15-088 • DuPont • Washington Works • 107-00001

This office received a permit determination request from DuPont October 15, 2015 and dated October 14, 2015. The Permit Determination request is to add two scrubbers to existing Salt Reactors in the Salt Section of the Zytel nylon resins production facility that is not covered under an existing Rule 13 permit.

Process/Project Description

The initial step in production of most types of Nylon resins is to produce a salt by combination of a di-functional acid with a di-functional amine in a concentrated aqueous solution. The solutions produced in the salt plant portion of the facility can be used for resin production in both the batch-type autoclave units and in the continuous polymerizer units.

The present vent configuration for the salt reactors uses a single control device to collect dust emissions that result from several emission points: From addition of solid ingredients into the Dump Station and from displacement air as powdered materials are dropped into either of the two salt reactors (#1 or #2).

The reactors pre-date the WV Reg 13 permitting rules and do not have emission limits other than those imposed by Reg 7. Emission point Z128E is estimated to have potential emissions of 0.29 pounds per hour and 1.3 tons per year of total suspended particulate. Emission rates for the PM-10 size fraction of the particulate were not stated earlier, though they would have been assumed to be equal to the rates for PM-total. The efficiency of the Roto-Clone scrubber was assumed to be 90% for particulate matter. The Permittee is unable to locate the calculations that supported this estimate, but from associated calculations for the 45CSR7 allowable particulate rates, it is clear that the calculations were based only on emissions from the two reactors and did not consider emissions from the dump station. Accordingly, the estimated emissions, individually, for each reactor and the dump station through point Z128E would have been 0.145 pph and 0.65 tpy. All three steps can be completed in less than 60 minutes, though the cycle time for each batch is several hours, so the peak emission rate though Z128E should have been 0.435 pph and 1.95 tpy. However, for the purposes of this

determination all deltas will be based on the previously cited 0.29 pph and 1.3 tpy so that it does not appear that the Permittee are correcting the calculation to show a larger reduction in emissions.

To improve process safety, the existing salt reactors will be placed under a nitrogen blanket and will be operated closed under a slight positive pressure. The scrubbers act to limit the positive pressure so that the powdered materials can properly charge to the reactors. The proposed project will provide more effective and separate venturi-type scrubbers for each of the two salt reactors. The scrubbing medium is aqueous process solution, and the collected material is returned to the salt reactor, so the scrubbers act as recovery devices and pressure control devices that are necessary for the operation of the unit rather than as emission control devices.

The proposed scrubbers are rated by the manufacturer to have 99.99% efficiency for PM-total, and 99.98% for PM-10. Each new scrubber will have a new emission point, to be designated as Z128eastE for the scrubber on the #1 Reactor and Z128westE for the scrubber on the #2 Reactor.

For the #1 Reactor two slightly different materials are added during the salt preparation process. Note in the calculations that the two materials have different proportions of PM-10 in the potential emissions.

Emissions Detail:

POLLUTANT	HOURLY PTE (LB/HR)			YEARLY PTE (TON/YR)		
	Z128E Dump Stn	Z128eastE Rx1	Z128westE Rx2	Z128E Dump Stn	Z128eastE Rx1	Z128westE Rx2
PM	0.145 + 0.0012 + 0.0004 = 0.1466			0.65 + 0.0049 + 0.0014 = 0.6563		
PM ₁₀	0.145 + 0.0011 + 0.0003 = 0.1464			0.65 + 0.0045 + 0.0011 = 0.6556		
VOCs	Negligible, No Change			Negligible, No Change		

Emissions Deltas:

POLLUTANT	HOURLY PTE (LB/HR)		YEARLY PTE (TON/YR)			
	Removed ⁽¹⁾	Proposed ⁽²⁾	Removed ⁽¹⁾	Proposed ⁽²⁾		
PM	- 0.145	+ 0.0016	= - 0.1434	- 0.65	+ 0.0063	= - 0.6437
PM ₁₀	- 0.145	+ 0.0014	= - 0.1436	- 0.65	+ 0.0056	= - 0.6444
VOCs	Negligible, No Change		Negligible, No Change			

⁽¹⁾ Vents from salt reactor #1 & salt reactor #2 to the Roto-Clone, though only taking credit for one.

(2) Vents from salt reactor #1 & salt reactor #2 to individual venture scrubbers.

Since there is an overall reduction in particulate matter emissions as a result of this permit determination request, no permit is needed for this equipment.

Evaluation Comments:

The facility will need to update the Part 5 of 14 Title V Permit to include the new sources and allowable particulate matter limits based on Rule 7.