

PED ORIENTATION PROGRAM
CDRTM DRAG REDUCER PLANT
LAKE CHARLES CHEMICAL PLANT

CDRTM drag reducer is a very high molecular weight poly alpha-olefin. It was developed by Chemicals Research in cooperation with Production Research for use in crude oil pipelines and as a friction reducer in hydraulic fracture treatments of oil wells.

Conoco was awarded a patent in 1972 for CDRTM drag reducer use in pipelines. The material and its applications were developed during the late 1960's. It was tested in a number of pipelines with its performance being a technical success. However, in each case, economic considerations indicated expansion of pipeline capacity through equipment changes and additions rather than using CDRTM drag reducer. This situation prevailed until 1977 when interest in CDRTM drag reducer was dramatically revived as a result of the fire at pump station No. 8 shortly after startup of the Trans Alaska Pipeline System (TAPS). The problem reduced crude oil flow from 1.2 MM BPD to 730,000 BPD. At that time, Alyeska Pipeline Service Company approached Conoco with an emergency interest in CDRTM drag reducer. However, the pump station outage was to last "only" six months, not enough time to allow for commercialization of CDRTM drag reducer.

Although the immediate need could not be met, enough information was developed to point to a potentially attractive future use of CDRTM drag reducer in TAPS to give additional incremental throughput.

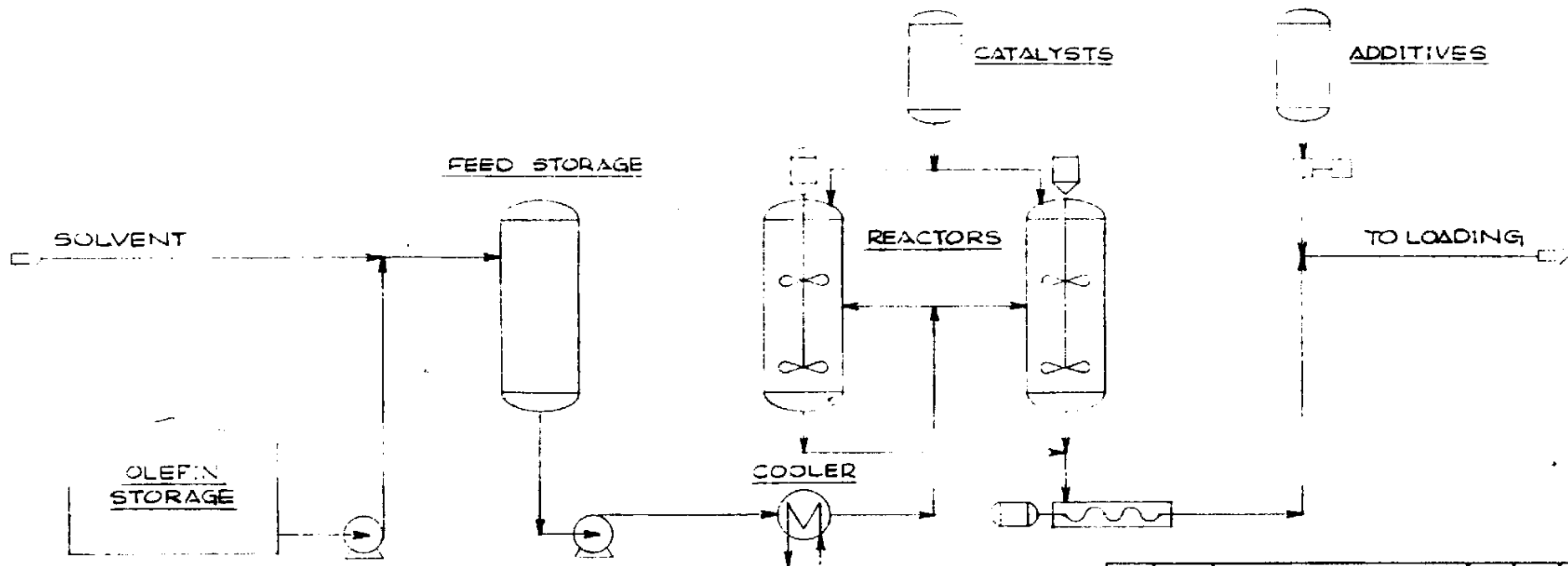
A pilot plant, including a 3,500-gallon reactor, was operated in Ponca City during 1978 to produce an optimum product. Very successful test runs were made in a Conoco eight-inch pipeline and in an Arco fourteen-inch pipeline transporting North Slope crude oil. Finally, a full scale test run was made in TAPS on April 1, 1979. The test was successful and led to a contract with the Alyeska Pipeline Service Company, with supply to begin in July 1979.

The CDRTM drag reducer plant was designed by PED in Ponca City. The plant was then built in Lake Charles and started up on July 13, 1979. The original plant included an olefin storage tank, a chiller, a reactor, catalyst addition, and two loading spots with a capacity of 3 MM gallons per year of CDRTM drag reducer. Since that time, a feed storage tank, a second reactor, an improved catalyst addition system, three more loading spots, and railcar loading facilities have been added with the capacity now being about 9 MM gallons per year.

The improved catalyst addition system enabled production of a more effective drag reducer which, in turn, led to a new long range contract with Alyeska beginning in 1982.

General Process Description

CDRTM drag reducer is made by charging chilled olefin and plant solvent to a stirred reactor. Catalysts are then charged and a polymerization reaction takes place. When the polymerization reaction is complete, the CDRTM drag reducer is pumped to loading with additives being injected to deactivate the catalysts. The CDRTM drag reducer is loaded into either railcars or sea containers for shipping.



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ISU	DATE	DESCRIPTION				BY	CKD APD
CONOCO INC. ENGINEERING CENTER PONCA CITY, OKLAHOMA							
PROCESS FLOW DIAGRAM CDR™ DRAG REDUCER PLANT LAKE CHARLES CHEMICAL PLANT							
APPD: <i>Eric J. Byline</i>				SHT. NO.		UNIT	
DATE: 8/20/82						AREA	
NO.				CT-61-B			
				ISSUE			

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Spec. No. 11-5590

CONOCO CDR

<u>Test</u>	<u>Specification</u>	<u>Typical Property</u>	<u>Test Method</u>
Polymer Content, Wt %	10 min	10.3	1.085-79
Viscosity, Inherent (300 sec ⁻¹)	8.5 min	9	1.084-79
Chlorides, Total, Wt %	0.12 max	0.07	1.083-79
Metals Analysis, WT %			1.086-79
Sodium	0.09 max	0.05	
Titanium	0.03 max	0.02	
Aluminum	0.05 max	0.03	
Lead	0.002 max	<0.001	
Nickel	0.005 max	<0.001	
Copper	0.002 max	<0.001	
Ash, Total, Wt %	0.30 max	0.19	1.087-79

Ethoxylation Unit

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