

1700 S. SECOND ST	Lindbergh & Olive St. Road	ANNISTON
T. M. Patrick A. M. Ellenburg H. L. Merten F. J. Holzapfel R. E. Bilger - JFQ Plant	R. M. Morris R. S. Wobus J. W. Graves - WGK J. F. Stickley (2) R. G. Calkins	D. B. Hosmer C. M. Edelblut J. H. Gould (3) Jack Clegorn W. J. Dougherty R. L. Hedworth

PROGRESS REPORT
TECHNICAL SERVICES DEPARTMENT
ANNISTON, ALABAMA PLANT

JOB NO. 729-81 REPORT NO. 1 DATE January 24, 1958

TITLE: Aroclor Chlorinator Off Gas

OBJECTIVE: Reduce liquid carryover in chlorinator off gas.

PERSONNEL: W. J. Dougherty, R. L. Hedworth, and J. W. Malloy

REPORTED BY: R. L. Hedworth

SUMMARY: The Aroclor Department is having trouble with plugs in the HCl off gas lines and build-up of material in the coke scrubber due to excessive carryover of condensable Biphenyl and Aroclor vapors in the off gas leaving the chlorinators.

An experimental cooler was designed and installed above one chlorinator to demonstrate cooling the gas to knock out the condensable vapors. The condensed material is returned to the chlorinator. The experimental cooler has been successfully operated on both liquid and solid Aroclors. It reduces off gas temperatures from 85-110°C. to 60-70°C.

Calculations, presented in the detail section of this report, show this temperature reduction will reduce vapor losses by 67 to 95%. This material, approximately 26,000 lbs./month, is now being drained from the coke scrubber and returned to the system; consequently, the dollar savings on material is neglectable while the difficulties caused by this material in plugged lines and handling is considerable.

The detail section of this report presents the design data for installation of coolers on the remaining 7 chlorinators.


R. L. Hedworth

RLH/fb

DSW 334323

STLCOPCB4080901

DetailsCalculations:

Pounds of Aroclor or Biphenyl vapor per pound of dry HCl is:

$$\frac{P_1}{P - P_1} = \frac{\text{moles of Aroclor or Biphenyl}}{\text{moles of dry HCl}}$$

where P_1 = partial pressure of Aroclor or Biphenyl vapors

P = total pressure of system

$P - P_1$ = partial pressure of dry HCl

Ref. page 87: "Fundamentals in Chemical Process Calculations,"
by MacMillian

The vapor losses are primarily Biphenyl and/or Aroclors containing only a small percentage of chlorine. The attached graph shows the amount of condensable vapors based on Biphenyl that will be carried from the chlorinators per 1,000 lbs. of HCl at different off gas temperatures.

Design

Purchase and install 7 coolers for cooling the Aroclor chlorinator off gas. The coolers are to be duplicates of the existing off gas cooler now installed on chlorinator No. 5. See attached drawing TS-A-63.

Alter the HCl line as required and provide water to and from these coolers. All piping is to be schematically located.

Water headers are to be provided above the HCl headers, for both feed water to and discharge water from these coolers.

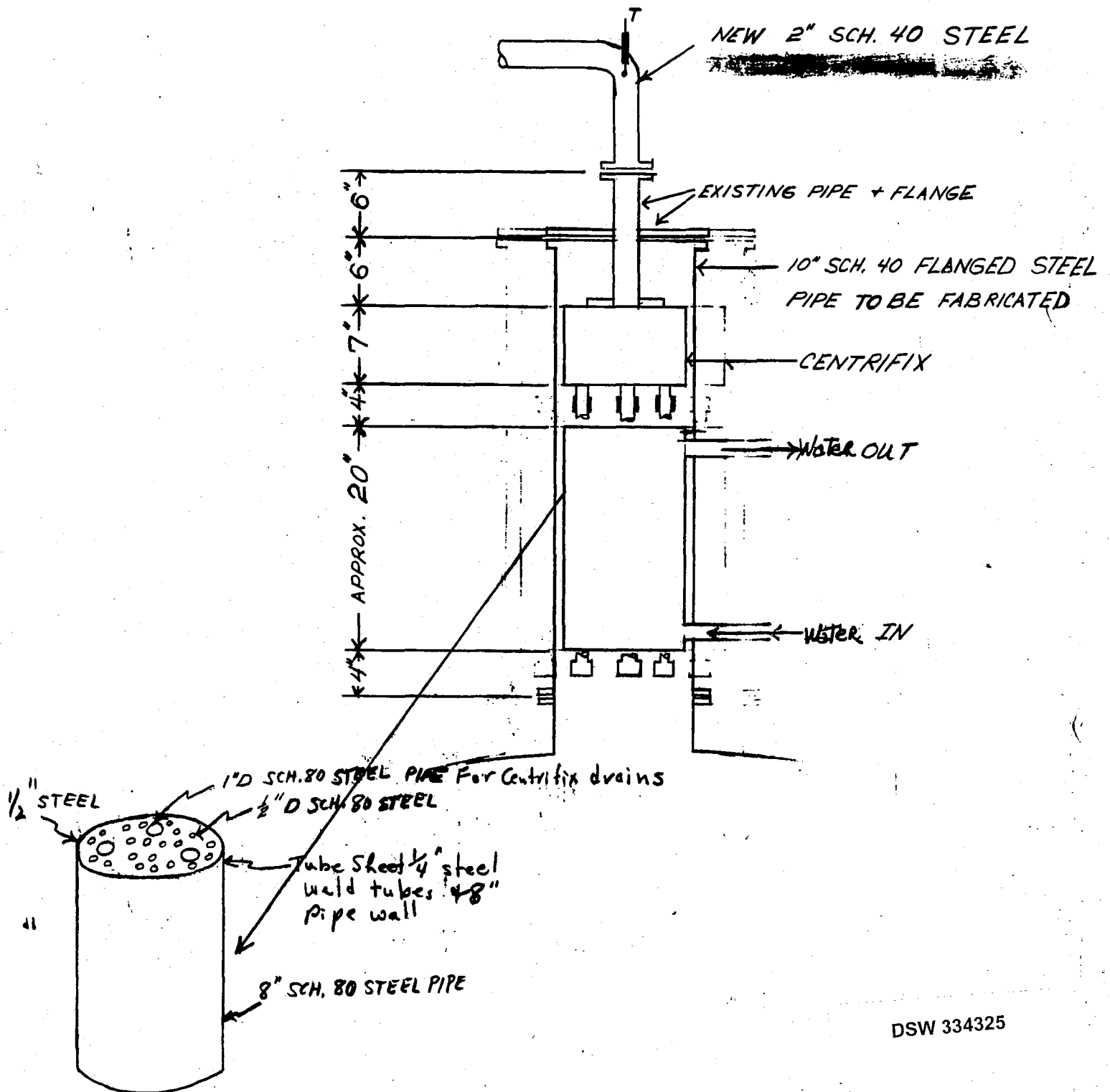


R. L. Hedworth

/fb
Att.

DSW 334324

CENTRIFIX CONDENSER

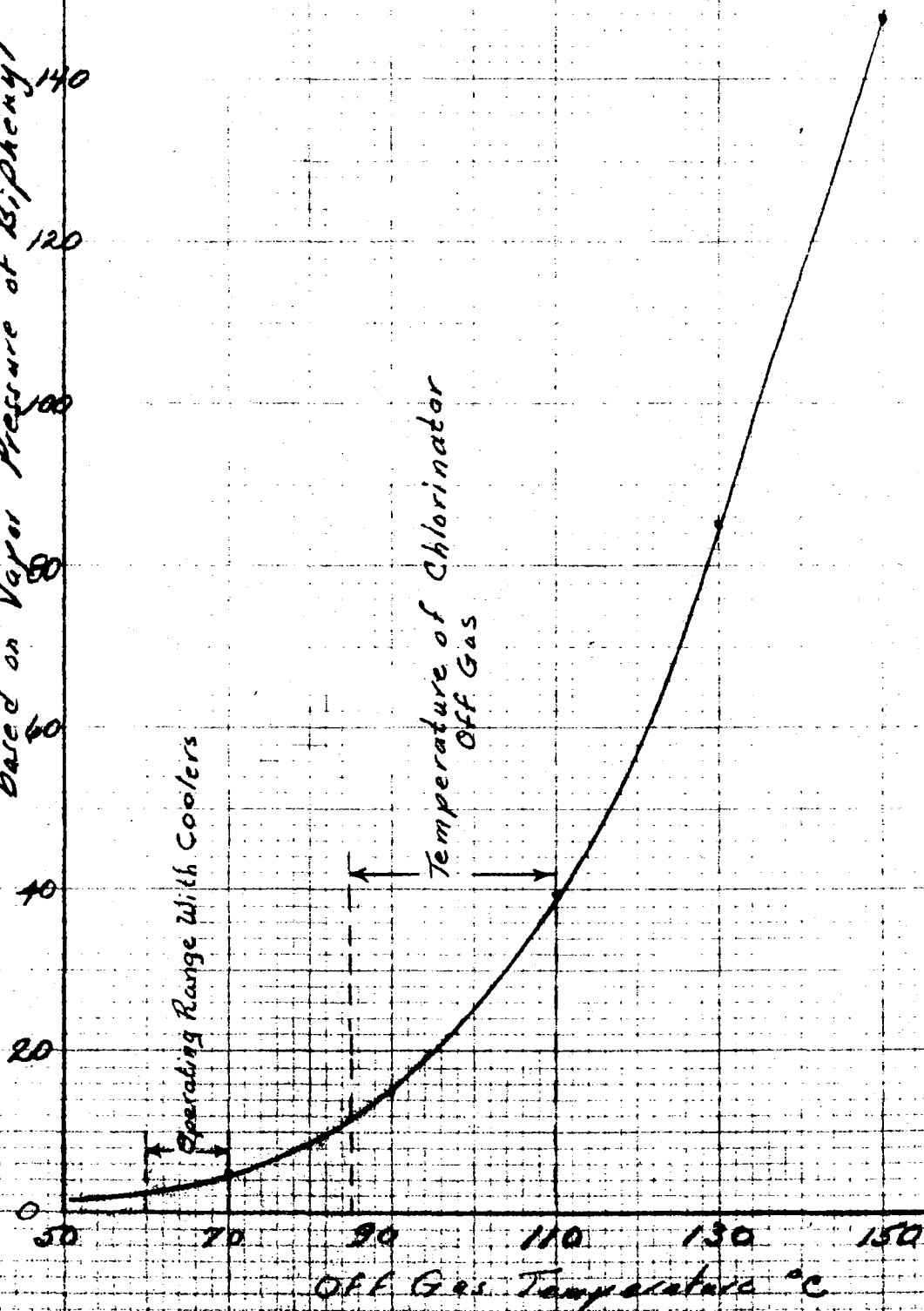


DSW 334325

7.5.-A-63
8-28-57
J.W.M.

Condensable Vapors in Chlorinator Off Gas

* Vapor Carried from Chlorinators per 1000 # HCl
based on Vapor Pressure of Biphenyl



DSW 334326