EMISSION INVESTIGATION

Date of Incident:	March 8, 1972 4:00 A.M. and 6:00 A.M.
Location:	Department 246, Distillation Column
Kind of Emission:	Aroclor
Result of Emission:	Sprayed Aroclors in cone shaped pattern Southeast of column to points at least 100 yards from column. No complaints received.
Cause of Emission:	Loss of cooling on column condenser resulting from 4:00 AM Incident - Electrical failure 6:00 AM Incident - City water make-up pump not started after electrical failure. isolate vacuum jet No means available to stop emission once it starts when power is off.
Investigating Committee:	Virgil Brawley Clarrie Buckley Jim Grant Gerald McRaven Ed Stewart, Chairman

DSW 296639

STLCOPCB4066552

THE INCIDENT:

An electrical insulation failure and resultant power failure occurred at a condulet fitting in the 8-3 feeder which supplies part of the electrical power for Department 246. The incident happened about 4:00 A.M. on 3/8/72. The power supply to the 1016 Aroclor distillation area, the control room instrument panel, the city water make-up pump and the #2 Still area were affected.

At the time of the electrical failure, Gerald McRaven proceeded to the #2 Still area where he performed the required emergency shut-down duties, cutting fires on the furnace and draining Aroclor from the furnace coils.

The power was restored about 4:45 A.M. and "Mac" proceeded to bring his equipment back on line. The #2 Still was first brought on line, and then the furnace was restarted and the distillation column was started ~~heating up~~. "Mac" noted the tempered water circulating pump was hotter than normal and internal noises were present in the water circulating pump. The water and vapor temperatures from the vent cooler continued to increase. The vapor temperature is normally about 70°C and at 90°C will trigger an interlock that cuts fires on the furnace to remove heat input to the column. This event occurred. However, residual heat in the column resulted in continued boiling in the column.

A Department 248 operator called and informed the department of Aroclor droplets and sprays coming from the column. "Mac" proceeded to manually shut off a valve in the vapor line between the vent cooler and the jet; thus, stopping the emission.

The distillation column was brought back on line on the day shift of 3/8. It was discovered by Virgil Brawley that the city water make-up pump was not on. This pump is normally running all the time and supplies cold water to the column tempered water circulating pump.

Another similar power failure occurred at 10:45 P.M. on 3/8 and the power was shut off for repairs at 10:00 A.M. on 3/9/72.

DSW 296640

DISCUSSION

The emission was caused by a loss of cooling water at the column condenser. ~~There is a heat sink in the column and an immediate decrease in pressure in the column, both of which will tend to result in continued generations of vapors even though the external source of heat has been removed.~~ Without cooling water on the condenser some vapors will pass uncondensed through the condenser, the vent cooler, the jets and into the atmosphere. Although there is a valve in the vent line it fails in the open position on electrical failure, and there is no way to immediately stop the vapors during an electrical failure. See sketch.

On 3/8 and 3/9 there were four emissions:

1st	4:00 A.M.	3/8	-	Power Failure
2	6:00 A.M.	3/8	-	Start-up without cold make-up water
3	10:45 P.M.	3/8	-	Power failure
4	10:00 A.M.	3/9	-	Shutdown for electrical repairs.

1st - The emission related to the 4:00 A.M. power failure was probably less severe than the 6:00 A.M. failure. With the power off, there was no cooling water circulating and vapors passed to the atmosphere. No complaints were received. No records are available because the power supplied instrument records did not function during the power failure.

2nd - The 6:00 A.M. incident was probably the most severe. After the 4:00 A.M. incident, the column was started not knowing the city water make-up pump was not running. This pump stopped on the 4:00 A.M. incident but was not started. It is in remote location from the column and is adjacent to two other pumps that were not affected.

It is believed that after the first power failure all the water in the tempered water loop drained from the loop, and during this attempted start-up very little water was present. However, the power was on and the interlock functioned as design to cut the fires. The emission was stopped by the operator when he shut the valve in the vent line to the atmosphere after receiving a call from neighboring department.

3rd - A second power failure occurred at 10:45 P.M. An emission was possible but no complaints were received. The same reason caused the power failure, a fault at the insulation in one phase of the 8-3 feeder.

4th - A planned shutdown was made on 3/9 to make electrical repairs. This happened during the investigation and an emission occurred. Aroclor droplets were blown to the Northwest.

The emissions can be stopped by closing the valve between the vent cooler and the jet. This can be done with minor electrical changes and can be done safely. ~~This~~ was reviewed with Dale Schillinger and Walter Howard of CED.

DSW 296641

STLCOPCB4066554

SPECIFIC RECOMMENDATIONS

1. Alter the vent valve (XV 308-4) to close on electrical failure. (TSD/Maintenance EDC 4/1/72)
2. Install "open-close" switch for vent valve (XV 308-4) in the control room so operator can accuate when needed. To be interlocked with the furnace such that when closed the fires will be cut. (TSD & Maintenance EDC 4/1/72)
3. Write specific procedure to be followed by operator when power failure occurs. Include nitrogen addition at Still Pot to reduce pressure. (Production EDC 4/1/72)
4. Install alarm in control room on city water make-up pump that supplies column tempered water circulating system. (TSD-Maintenance-TSD EDC 4/1/72)
5. Check and reset alarm and interlock on vent cooler outlet (TJR 1A-30((Production EDC 4/1/72)

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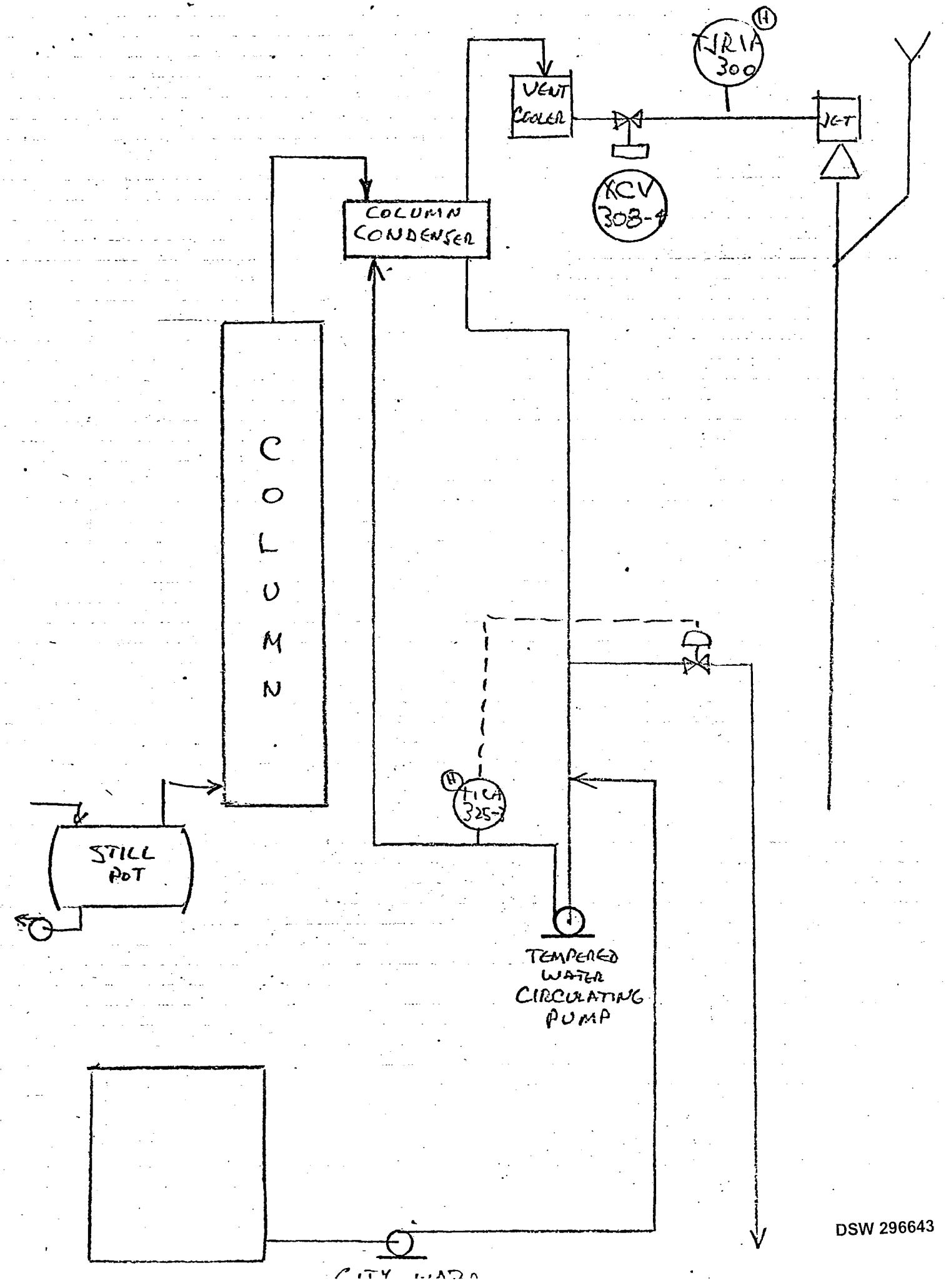

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