



CROWN ZED SYSTEM

ZERO EFFLUENT DISCHARGE (ZED) SYSTEM

DISCHARGE WATER DISPOSAL

The Crown Zero Effluent Discharge system (ZED) can eliminate effluent from a solvent extraction plant. In the ZED System, waste water is concentrated in specially-designed pressure vessels, and converted to 40 psig steam for recycle in the extraction plant.

PROCESS DESCRIPTION

Discharge water from the waste water reboiler is pumped to the waste water storage tank where a caustic solution is metered into the tank to control water pH. A fitted tank agitator ensures proper caustic mixing.

From the waste water storage tank, water is pumped through a forced circulation evaporator. This corrosion resistant evaporator is powered by indirect steam and the resulting low pressure steam is super-heated prior to entering the DT as sparge steam. Depending on plant type, 75 to 100 percent of sparge steam requirements for the DT can be supplied by this flash steam.

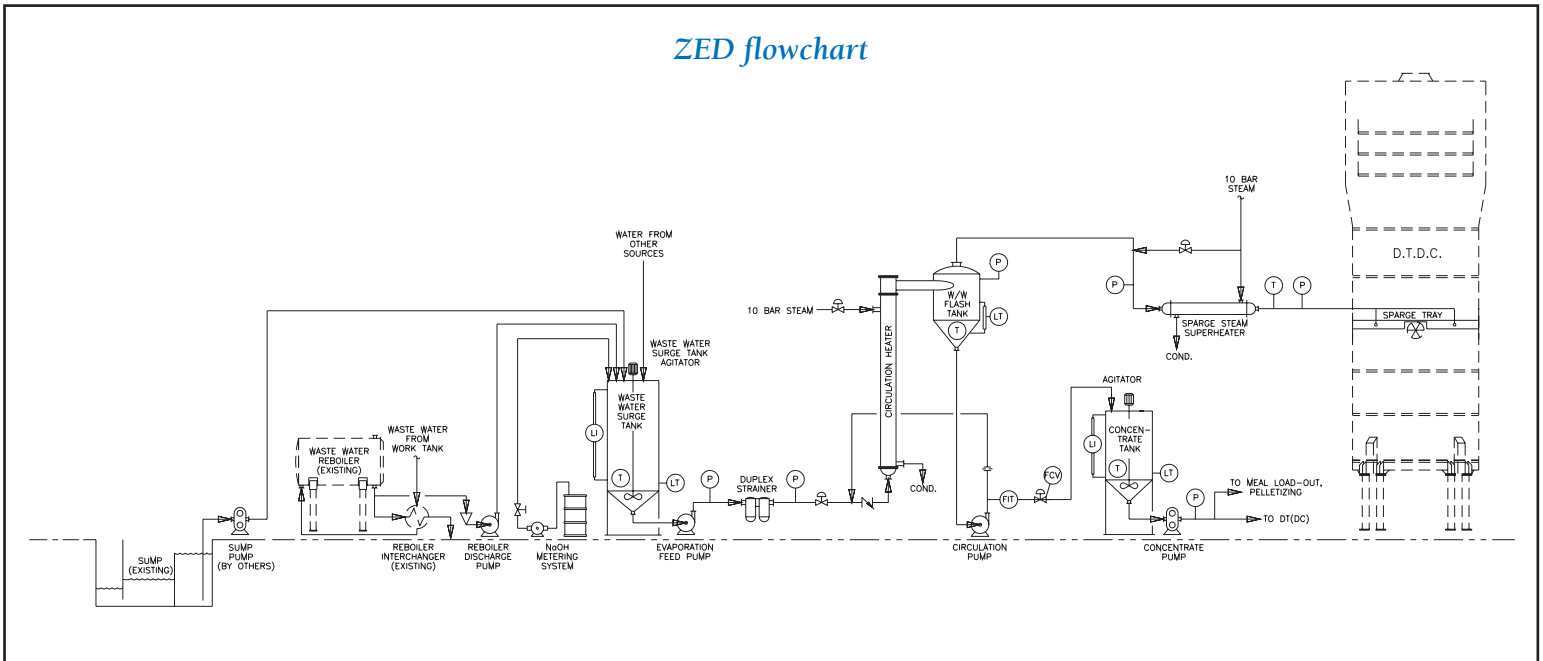
The remaining waste water (typically 5-10 percent of incoming water flow) is continually discharged to a concentrated water storage tank. In addition, a large quantity of water is recycled back through the evaporator to maintain a high water flow rate through the tubes and prevent fouling.

The concentrated water storage tank is equipped with an agitator to prevent settling of particulate matter. From this tank the concentrated (dirty) water is pumped to any number of possible locations within the plant where the water is totally utilized. These locations include hull or meal pelletizing, meal load-out, or meal drying.



FEATURES AND BENEFITS

- The amount of condensate returned to the boiler is increased from 40 percent to 80 percent of total steam consumption, therefore reducing energy costs for preheating the make-up water.
- Chemical treatment costs for boiler make-up water are reduced.
- Waste water disposal fees are essentially eliminated.
- The plant permit application process is simplified due to the elimination of a major effluent source.
- The ZED System can supply 75 to 100 percent of the sparge steam needed for a typical DT operation.
- Superheated sparge steam supplied by the ZED System can potentially improve the meal drying, reduce solvent loss, and increase the digestible protein in the product.
- Additional waste water sources can be incorporated into the ZED System for recycling.



BASIC SYSTEM SIZING (MTPD SOY BASIS)

PLANT CAPACITY MTPD	WATER FROM WORK TANK KG/HR	DT SPG STEAM KG/HR	CONCENTRATED WATER OUT KG/HR	WATER FROM OTHER SOURCES KG/HR	SYSTEM SIZING KG/HR WATER TO EVAPORATOR
1000	2500	3800	200	1500	4000
1500	3750	5700	300	2250	6000
2000	5000	7600	400	3000	8000
3000	7500	11,400	600	4500	12,000
4000	10,000	15,200	800	6000	16,000
5000	12,500	19,000	1000	7500	20,000
6000	15,000	22,800	1200	9000	24,000



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