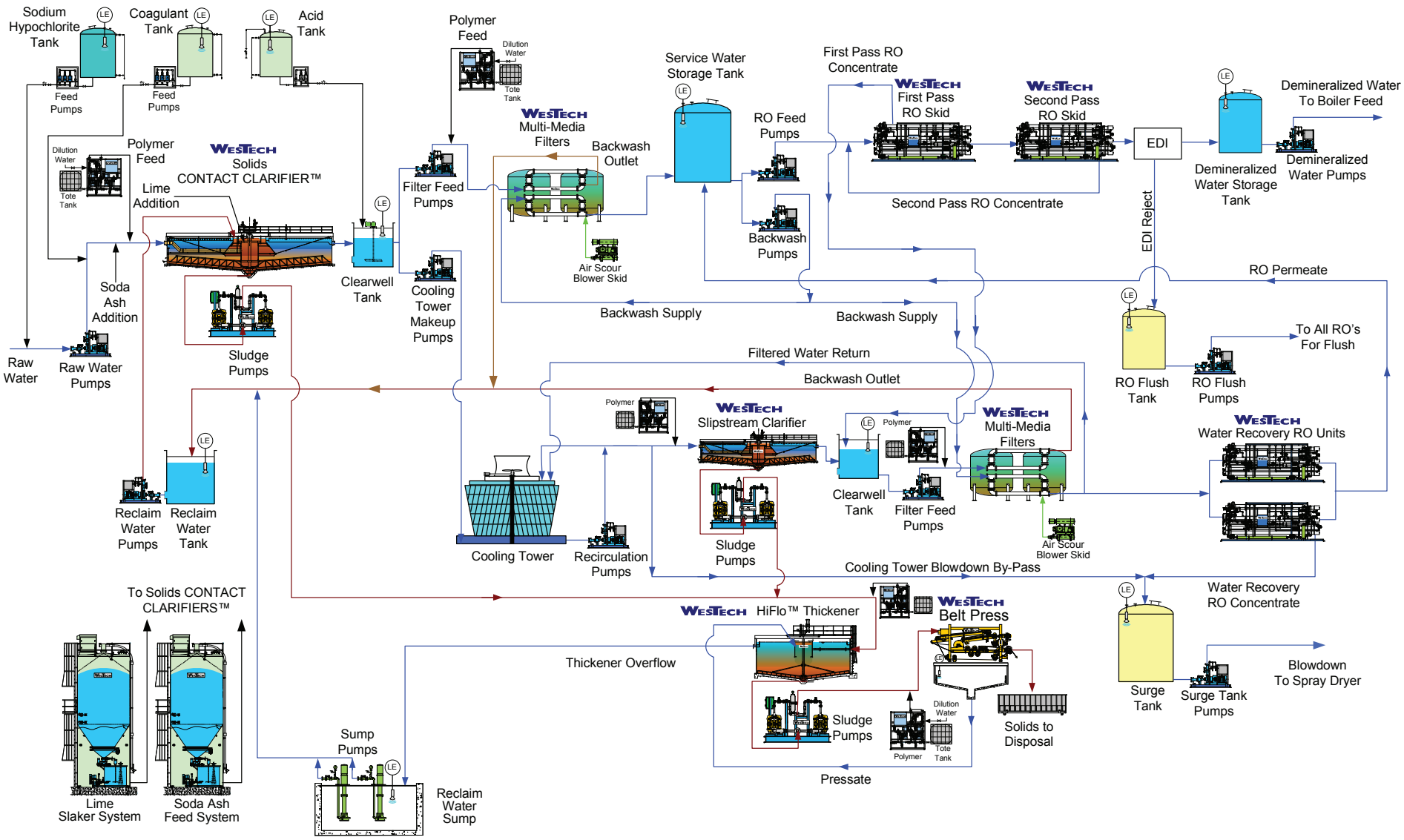

Power Generating Station – ZLD with Sidestream Softening

WESTECH

DWN: **RCS** DATE:

WesTech's advanced line of equipment for industrial sedimentation applications includes a wide range of ***Clarifiers and Thickeners*** expressly designed for current and future process requirements. The equipment is precision engineered and manufactured to rigid standards providing high torque capacities, long life and reliability. WesTech manufactures our own thickener and clarifier ***Drive Units*** ensuring long drive life and the best fit for your process equipment.

Power Station

Power-generating stations, like other industrial wastewater producers, are facing stricter discharge requirements. This flow sheet combines many of the water treatment steps that might be encountered in converting a power station into a zero liquid discharge (ZLD) system. In this system, the final waste stream is sent to a spray dryer.

This flow sheet is a combination of several other flow sheets. The first section where the raw water enters is the service water pretreatment. The service water can be used for general water needs in the plant. The next section is demineralization for boiler feed water. The final section is the zero liquid discharge system that treats a slip stream from the cooling tower.

Not shown is water treatment necessary for drinking (potable) water and sewage (see man camps).

Service Water Pretreatment - Cold Lime Softening and Clarification

In the first stage of treatment the raw water is softened to reduce the calcium and magnesium hardness (for more information on softening see the Cold Lime Softening flow sheet). Some of the softened water is diverted to the cooling tower.

After recarbonation, the treated water is collected in the service water storage tank. Some of the service water is sent to the demineralizer system. The rest of the water is used for backwashing filters.

The softening system includes a sludge dewatering step that is common to the entire plant. The thickener overflow is sent to the clarifier. The belt press pressate and wash water are returned to the thickener.

Boiler Feed Water - Demineralization

The softened water passes through two stages of reverse osmosis (RO) to remove the bulk of the minerals. The RO reject is sent to the ZLD system. The electrodeionization (EDI) system makes high purity water by polishing the trace contaminants left after reverse osmosis using electricity instead of chemicals.

Zero Liquid Discharge – Cooling Tower Slip Stream

The cooling tower slip stream treatment system is nearly identical to the ZLD flow sheet (a more detailed description of the process can be found on the Cold Lime Softening flow sheet). In this case, the clarifier is not used for cold lime softening, but it could be. The ZLD system shares the sludge dewatering facilities with the service water pretreatment system.

The water is clarified, filtered, and treated with reverse osmosis. The reject from the boiler feed water system may be added to the clarifier or sent to the drying system depending on the chemistry of the water. The reverse osmosis concentrate is treated with a spray dryer and the dry solids are sent to a landfill. If the concentrate stream is too large for a spray dryer, the wastewater may be sent to drying beds in areas where the evaporation rate is greater than nominal rainfall, or to an evaporator/crystallizer system.