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Produced Water

WESTECH

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WesTech builds a complete line of **Dissolved Air Flotation (DAF)** and Dissolved Nitrogen Flotation (DNF) equipment for both municipal and industrial applications. Dissolved air and nitrogen flotation is used in applications where the specific gravity of the solids or contaminants is close to or less than 1.0. Dissolved air or nitrogen provides the driving force for separation. The gas is dissolved into a liquid under pressure in a specially designed saturation tank. The saturated liquid flows under pressure to the mechanism. The pressure is released by the back pressure control valve near the center of the unit. The sudden release of pressure causes the gas to come out of solution and form microscopic bubbles. These microscopic bubbles adhere to the incoming solids and form a buoyant blanket which rises to the surface for removal by mechanical means.

Produced Water Treatment

When oil or natural gas comes out of the ground, water flows with them. The drillers call this “produced water” because it is produced by the well. This water is naturally occurring and the chemistry is unique to each strata. The flow rate of produced water varies greatly. Dry gas wells may only produce 2-3 barrels (42 gallons) of water a day. Some oil wells produce 2-3 barrels of water for every barrel of oil produced.

The amount of water “produced” by a well is usually constant over 80% of the life of the well. Initial flows are no indication of long term flows and, at the end of the life of the well, water production usually goes up. Fortunately water quality does not vary after the first few weeks of production.

Deep Well Injection

Most produced water is deep well injected. The only treatment needed for deep well injection is usually filtration to remove solids that could plug the well. In some cases, partial softening is needed because the deep wells are often very hot, causing hardness to precipitate and plug the well screen or the formation.

Treatment Options

With the recent increase in well drilling, along with problems in permitting new deep wells, treatment options are being studied. The preferred option is to reuse the produced water. Some states allow the use

of produced water as anti-icing solution or as dust control on the roads to the wells. However, these allowances are under review by the state and federal authorities and may not be allowed in the future.

Drilling, Finishing, or Hydraulic Fracturing

Another reuse option is to use the produced water as makeup for drilling, finishing, or hydraulic fracturing (“fracing”) of wells. This option is especially attractive in areas where fresh water is difficult to obtain. Since the wastewater characteristics are unique and the makeup requirements vary with each usage, customized treatment systems are usually necessary. These treatment systems may include filtration, clarification, softening, and reverse osmosis.

To complicate the design, the system may be in the middle of “nowhere” with the only power available from diesel generators. The system will operate for about 30 days and then it must be moved to another site which may have different chemistry. All waste materials, solid and liquid, must be hauled off to a location that may be miles away.

When the TDS in the produced water exceeds 10,000, it can be difficult to reuse. Other options for disposal are deep well injection or zero liquid discharge (ZLD) by using evaporators and crystallizers. Some of the dry waste has been used for road salt but most has to be encased and buried.