HIGH PURITY WATER THROUGH
VAPOR COMPRESSION UNIT

- Distillation at a fraction of the cost
- Easy access to all internals
- Sea water, wastewater, source water in 50,000 GPD modules
- Waste discharge to suit local regulations
- Less than 0.6¢ per gallon energy usage (at 11¢ per KwH)
- Available in most materials of construction

- Internals can be exposed for maintenance repair and/or replacement 5 minutes after cool down
- Skid mounted to fit in containers or placed on a flatbed truck for mobility
- Raw Water pre-treatment reduced or eliminated
- Heat transfer takes place through the use of nano fluids

Patent Pending
Vapor compression for the efficient distillation of seawater, process water, wastewater, and source water

INTRODUCTION
Maloney Process Inc. (MPI) units are designed on the basis of well proven technology and thirty years experience in the design, construction and operation of treatment plants. All units operate on a reduced pressure evaporation, vapor compression, and condensation principle. Pre-treatment is usually not required; however, raw water containing volatile hydrocarbon compounds whose vapor pressure is lower than water may require additional consideration. Emphasis is placed on an effective, novel method that recovers the sensible and latent heat. More than 97% of the energy is recovered and reused in the process. This methodology uses binary technology where water is evaporated using a specially formulated fluid. In addition, raw water is preheated by separate reuse heat exchangers.

PRINCIPLES OF OPERATION
Raw water is first pumped through four system heat exchangers, arranged in series. Heat exchanger “A” acts as a cooling source allowing the condensate to transfer its heat to the raw water. Waste brine, from the evaporator is a second heating source to raise raw water temperature, incrementally, in exchanger “B.” Particular attention is given to scaling and fouling potential in this area. Two heat exchangers “C” and “D” utilize binary fluids, a sensible heat source for the raw water. Higher temperature B2 fluid flows from the secondary condenser to heat exchanger “C.” Fluid B1 provides a final high energy source to heat exchanger “D” and brings the raw water temperature close to the boiling point corresponding to the slightly negative pressure in the evaporator.

Evaporation takes place as water cascades over heating elements in a falling thin film configuration. The boiling mechanism employs a combined nucleate/film technique. Here, the high temperature Binary fluid B2 provides the latent heat of vaporization to the water. About 50% of the water returns to its source as a manageable waste brine in a concentration acceptable to the regulatory agencies. Vapor is drawn from the evaporator through a compressor, then discharged at higher temperatures and pressure to the condenser.

Binary fluid B2 recycles to the condenser to pick up the latent heat from the pressurized, higher temperature vapor. This re-energizes the system and starts the cycle over. A continuous reuse develops using small quantity of make up heat.

Binary fluid B1 extract heat from the secondary condenser to lower condensate temperature further before final storage.

We encourage the client to inventory all possible waste heat recovery techniques i.e. that available from exhaust and cooling operations that will enable energy savings.
CONSTRUCTION
The system is designed, fabricated, and installed to the highest industry standards and is shipped fully skid mounted, thereby requiring only the minimum of on-site work. Source water piping adjacent to the battery limits and treated water storage can be furnished as an option. Heating elements are constructed of 304 stainless steel and furnished with a sequential purge. This permits a flush of potential crevices. Subsequently, the delay of chloride attack extends the life of the elements.

Tower internals are readily accessible. Weir setting, flow distribution, monitoring potential fouling and corrosion inspection are routine preventative maintenance chores.

COST
We offer two distinct policies:
- “Take or Pay” means the client purchases water of a specific quality, a fixed daily volume, and at a price per gallon. MPI provides the equipment, installation, O&M of the distillation plant. Supply of ancillary equipment etc. is negotiable.
- Lease option provides plant facilities under a two-year program. MPI constructs and operates the plant during the lease period and trains the potential client operating staff. Ultimately, plant ownership will revert to the client.

Operating costs consist of power, labor, maintenance, and capital equipment amortization. Energy unit cost is regional and is also influenced by availability of waste heat. For example, 50,000 GPD plant consumes about 0.5 MBTU per hour make-up heat demand. If this is not available through waste heat, we can furnish our own energy source.

Power cost components are necessary to compress the vapor, operate the pumps, and miscellaneous control power. A 50,000 GPD plant requires about 0.042 kwh/gal.

APPLICATION AND EXPERIENCE
Maloney Process Inc. (MPI) has been active in industrial water and wastewater plant design and construction since 1975. There is hardly a wastewater source that we have not treated successfully, at least twice. The development of the Vapor Compression System evolved from this experience.
Since 1975 Maloney Process has successfully worked to treat water for the following industries:

- Chemical Plants
- Mining Operations
- Oil Field Production
- Metal Finishing
- Printed Circuit Board Manufacturers
- Textile Industry
- Jewelry and Cyanide Treatment Facilities
- Food Processing
- National, State and Local Governments, and Municipalities
- Shipping Lines, Tankers and Tourism Ships
- Animal Tanks and Facilities (Zoos and Aquariums)
- Power Plants

If you have a process that requires returning clean water to the environment, Maloney Process has a solution for you!

For more information Call…

1261 North Lakeview Ave. • Suite 527
Anaheim, CA 92807
Phone: 714.650-3770 • Fax: 909.336-3831