



# WASTEWATER TREATMENT

**EXPERIENCE COUNTS:**

Carmagen’s staff has extensive, demonstrated expertise in a variety of environmental engagements including:

- Environmental Permitting
- Air Pollution Control
- Wastewater Treatment
- Solid and Hazardous Waste Treatment/Remediation

Our services include technology and process assessments, permitting, planning and design. We assist in preparing permit documents, project execution plans and equipment specifications, as well as assisting in defining environmental compliance requirements, performing safety reviews and project audits. Significant expertise is also available in troubleshooting and maintenance planning.

<b>WASTEWATER TREATMENT SERVICES:</b>	<ul style="list-style-type: none"> <li>• Evaluate existing equipment and/or control systems</li> <li>• Conduct conceptual design screening studies</li> <li>• Prepare basis of design and/or basic design packages</li> </ul>
<b>TECHNOLOGY EXPERIENCE:</b>	<ul style="list-style-type: none"> <li>• Primary Treatment               <ul style="list-style-type: none"> <li>– Equalization, Gravity Separation, Flotation, Neutralization, Stripping, Extraction, Physical/Chemical Treatment</li> </ul> </li> <li>• Secondary Treatment               <ul style="list-style-type: none"> <li>– Biological (Fixed-Film, Suspended Growth, Powdered Carbon, etc.)</li> </ul> </li> <li>• Tertiary Treatment               <ul style="list-style-type: none"> <li>– Filtration, Adsorption, Ion Exchange, Chemical Oxidation, Membrane Separation</li> </ul> </li> <li>• Disinfection               <ul style="list-style-type: none"> <li>– Chlorination, Ozonation, UV</li> </ul> </li> </ul>
<b>TYPICAL PROJECTS PERFORMED BY OUR SPECIALISTS:</b>	<ul style="list-style-type: none"> <li>• Designed an advanced wastewater treatment system for a large refinery to meet discharge requirements utilizing primary oil-water separation by segregating hazardous and non-hazardous sources in separate CPIs. System included induced air flotation and float emulsion breaking. Secondary biological treatment was designed to accommodate large load fluctuations, and high inert solids. Sludge was thickened and dewatered. High quality effluent was produced, suitable for plant service water.</li> </ul>

**TYPICAL PROJECTS  
PERFORMED BY OUR  
SPECIALISTS, continued:**

- Designed cost effective wastewater treatment schemes for cogeneration and power plants to allow high degrees of recycle, minimizing discharge. This included use of a second cooling tower operating at high cycles of concentration. Blowdown required softening, membrane separation and filtration to control the discharge quantity and TDS to acceptable levels. The upgraded product water was reused at suitable locations.
- Integrated existing drainage/slop oil wastewater system in parallel with new equipment at an Asian Refinery to meet local discharge regulations.
- Developed upgrade and expansion wastewater treatment process design for processing ballast water, process wastewater, stormwater, miscellaneous hydrocarbon and non-hydrocarbon discharges, spent caustic and sour water for a South American refinery.
- Developed wastewater treatment basic engineering design package for partially segregated process streams and stormwater at a silicone monomer plant in Asia.



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**Plant Operations  
Support**

**Process - Water  
Treatment**