Water & Sewage Solutions for Work Camps & Remote Sites

Modular, Scalable Systems, Operations & Support for Cost-Effective On-Site Treatment & Reuse
In business since 1992, newterra provides potable and sewage treatment solutions for use at camps for resource exploration and production, military operations, and disaster response. We’ve become a leader in delivering robust solutions that provide outstanding performance with minimal maintenance or operator demands. newterra’s sustainable solutions are also designed for water reuse to reduce consumption and equipment requirements.

newterra Advantages:
• Scalable Systems that can expand and/or contract with your camp population – and be easily relocated to other sites
• No Costly On-Site Construction: Systems are factory-built and tested in our MET-certified production facility
• MicroClear® Membranes: We manufacture our own patented UF membranes for our sewage treatment systems
• Minimal Downtime: Systems are built with proven, standardized components and feature strategic redundancy in their designs to allow continuous operation – even during maintenance procedures
• Remote Monitoring & Control: Systems feature sophisticated controls and advanced telemetry for 24/7 access from anywhere
• Simplified Decommissioning: Systems are portable and require virtually no infrastructure – minimizing remediation requirements at the conclusion of a project
• Flexible Financing Models: Buy, lease or rental options to suit your needs, including Build, Own, Operate (BOO) models

newterra offers pre-engineered treatment systems for a wide range of camp sizes that can be installed and operational within very short timeframes. We also have a track record of engineering and building fully customized solutions that require rapid deployment. Our potable and sewage systems are available separately or as integrated solutions with reuse capabilities to conserve camp water resources.

Our MBR Technology is Optimized for Remote Sewage Treatment
newterra’s Membrane Bioreactor (MBR) sewage treatment systems are extremely space efficient – with a footprint only one quarter of the size of equivalent conventional activated sludge plants. Our MBR systems replace secondary clarification, aeration and filtration by combining biological treatment with a physical membrane barrier.

Other benefits:
• Our patented MicroClear® UF cassettes deliver maximum treatment in minimal space – and offer configuration flexibility
• Cassettes are framed in modules and submerged in separate membrane tanks to allow simplified, periodic, in-tank cleaning
• Operate at high biomass concentrations – reducing process tank size

standardized & custom system configurations

newterra’s many installations include this 50-person camp in Canada’s Northwest Territories (top) and this 4,000-person camp in the African nation of Zambia (bottom).
A Wide Range of Water Sources
Source water chemistry and characteristics vary widely—even in regions of close proximity. Groundwater is a common source of potable water source for work camps. Typically starved of oxygen and rich in dissolved minerals, groundwater often requires an involved series of process steps to ensure a highly polished, aesthetically-pleasing finished product.

Well Established Treatment Technologies
The technologies for treating potable water are mature and well proven. Their application is highly dependent on the source water characteristics. newterra has decades of experience designing and manufacturing systems that utilize these technologies to treat water from a wide range of sources.

Remote Solutions That Are Modular, Containerized & Scalable
newterra potable water treatment solutions can accommodate work camps and remote sites of any size—from our standardized, pre-engineered systems for smaller populations to large customized systems. Our potable solutions embody the same advantages as our sewage treatment systems. Their “building block” designs are modular to accommodate different treatment technologies, and are scalable—allowing additional units to be added or removed quickly and easily to address changes in camp population. Housed in rugged, steel enclosures, the systems are durable and built to handle a wide range of climate extremes. Equally important, they are easily and efficiently transported by truck, rail or ship to remote locations anywhere in the world.

Well Established Treatment Technologies

![Diagram showing different water sources and treatment technologies]

A Wide Range of Water Sources
Source water chemistry and characteristics vary widely— even in regions of close proximity. Groundwater is a common source of potable water source for work camps. Typically starved of oxygen and rich in dissolved minerals, groundwater often requires an involved series of process steps to ensure a highly polished, aesthetically-pleasing finished product.

Well Established Treatment Technologies
The technologies for treating potable water are mature and well proven. Their application is highly dependent on the source water characteristics. newterra has decades of experience designing and manufacturing systems that utilize these technologies to treat water from a wide range of sources.

Safe, Pure Water. Guaranteed.
newterra treatment solutions meet the most stringent regulatory requirements. Our systems incorporate redundancy and safeguards to ensure maximum safety—and treatment technologies that provide abundant pure water for all potable requirements.

Complete Camp Solutions That Increase Efficiency
newterra’s water and sewage treatment systems are engineered to complement each other. They offer efficiencies to reduce capital costs, increase water reuse, and provide sustainability to your camp operations.
Flexible Treatment Train Design with Unlimited Capacity

For larger camps, newterra’s self-contained water and sewage systems are configured in treatment trains. This approach allows capacity to be supplemented with additional trains quickly and efficiently — with unlimited capacity. Trains can easily be removed from the system and relocated at other sites for maximum flexibility.

On-Site Sludge Dewatering

newterra offers on-site sludge management. Our integrated dewatering system produces filter cakes suitable for incineration, landfill or use as fertilizer.

Screening & System Controls

Centralized screening removes larger debris to safeguard the system, and our sophisticated control system with telemetry allow remote monitoring.

Systems Designed for Scalability and Redeployment

Membrane Bioreactor (MBR) Sewage Treatment System

Equalization Tanks

Our Equalization Tanks feature operator-friendly features, such as view ports.

Aeration Tanks

The second stage of our MBR sewage treatment systems incorporates air diffusers to facilitate an active, productive biomass. Anoxic tanks can also be configured for nitrogen reduction.

Membrane Tanks

Our innovative membrane tanks feature our patented MicroClear® UF membranes, view ports, and roll-out membrane modules to simplify maintenance.
Our MicroClear® UF Membranes Turn Sewage into Clean Water

Innovative Design. Outstanding Performance

euterra’s patented MicroClear cassettes consist of a series of durable, specially-designed polypropylene plates sandwiched by ultrafiltration membranes. The cassettes are submerged directly into the wastewater, and clean permeate is drawn through the membranes into the permeate collector using a slight negative pressure (1.5 PSI; 0.1 bar). The UF membranes physically block particles, bacteria and viruses – creating permeate of exceptionally high quality.

Patented UF Membranes with Exceptional Packing Density

- Extremely compact design; 8 m² membrane surface area per cassette
- Efficient membrane aeration process minimizes power consumption by 50%
- Robust membranes can maintain consistent flux rates for long periods between cleanings
- Consistent long-term performance with fewer membranes & reduced operating costs
- Built in our ISO 9001:2008 certified facility
- Proven worldwide in thousands of installations

Excellent Permeate Quality That Meets Global Standards

euterra MBR treatment systems provide high quality permeate that meets or exceeds global regulatory standards for reuse applications or direct discharge – even in environmentally sensitive areas.

- WHO Health Guidelines for the Use of Wastewater in Agriculture & Aquaculture
- EU Bathing Water Directive (2006/7/EC)
- UN International Maritime Organization bacteriological limits
- California Title 22 – 4 Code of Regulations

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Permeate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Oxygen Demand</td>
<td>&lt;2.0 mg/L</td>
</tr>
<tr>
<td>Total Suspended Solids</td>
<td>&lt;1.0 mg/L</td>
</tr>
<tr>
<td>Ammonia-N</td>
<td>&lt;0.5 mg/L</td>
</tr>
<tr>
<td>Total Phosphorus</td>
<td>&lt;0.05 mg/L</td>
</tr>
<tr>
<td>Total Nitrogen</td>
<td>&lt;3.0 mg/L</td>
</tr>
<tr>
<td>Turbidity</td>
<td>&lt;0.5 NTU</td>
</tr>
</tbody>
</table>
Operator-Friendly Systems Designed for Reuse & Sustainability

Designed & Built for Minimal Maintenance
Feedback from operators has been a key part of the development and refinement of our low maintenance systems which are field proven in some of the most extreme conditions on the planet:

- **Intuitive Controls**: We design and program our own control systems, interfaces and instrumentation to be user-friendly
- **Remote Monitoring & Operation**: Sophisticated controls and advanced telemetry allow 24/7 access from anywhere – reducing the frequency of site visits
- **Built-in Redundancy** allows trouble-free, continuous operation – even during maintenance. Permits more flexibility in scheduling service procedures and extra latitude if repairs are required
- **Standardized, Proven Components**: Systems are built from robust parts and assemblies that reduce downtime – and simplify the stocking of spares

MicroClear® UF Membranes Simplify & Reduce Cleaning Requirements

- **Minimal Fouling**: Innovative air scouring and periodic UF membrane relaxation prevent fouling and reduce cleaning frequency of newterra sewage treatment systems
- **Membrane Cleaning Only 1-2 Times Annually**: MicroClear membranes require in-situ full tank cleaning much less frequently than other membranes
- **No Roof Access Required**: Our membranes are easily accessed through side tank doors. Larger sewage treatment systems have our patented ground-level module removal system

Water Reuse That Provides Capital Cost Savings
newterra offers camp operators a single source for potable water, sewage treatment and operations. A complete newterra water solution is good for business and for the environment:

- **Reuse Options**: Our combined treatment solutions can be configured to repurpose reject water from the RO stage of the potable water system and/or the high quality permeate from our sewage treatment system for reuse as toilet flush water
- **Reduced Water Intake & Discharge**: Toilet flushing is the single largest use of water, accounting for over 25% of daily consumption. newterra solutions can eliminate the water requirements for this usage, thus lowering discharge volumes
- **Lower Capital Costs**: When designed and configured for reuse, our integrated water and sewage treatment systems reduce capacity requirements and corresponding capital costs

Water Reuse That Provides Capital Cost Savings

- **Reuse Can Reduce Treatment Requirements for Potable Water**
  - Up to 31%
- **Reuse Can Reduce Treatment Requirements for Sewage**
  - Up to 17%

Sewage Treatment That Offers A Wide Range of Reuse Applications
newterra sewage treatment systems have been designed to extract clean water from sewage – delivering permeate of such high quality that it can be reused for a wide range of applications. Supplementary technologies, such as activated carbon and ultraviolet (UV) disinfection broaden the reuse opportunities.

- **newterra MBR System**
- **UV Disinfection (if required)**
A Global Water Technology Leader

newterra is recognized as a leader in the development of modular treatment solutions for water, sewage, wastewater and groundwater remediation for industrial, municipal, land development, commercial & residential markets. Our heritage of innovation in providing clean water solutions dates all the way back to 1863. Over that time, newterra has grown to over 200 people and we’ve installed thousands of treatment systems – some of which operate in the most extreme conditions on the planet.

Full Control from Start to Finish

At newterra, we take full control of virtually every aspect of the treatment systems we build – from process design and engineering to manufacturing, installation, operations and ongoing parts & service support. That also includes manufacturing our own MicroClear® UF membranes in newterra’s ISO 9001:2008 certified facility. This award-winning approach ensures newterra treatment systems meet our high standards for quality and on-time delivery.