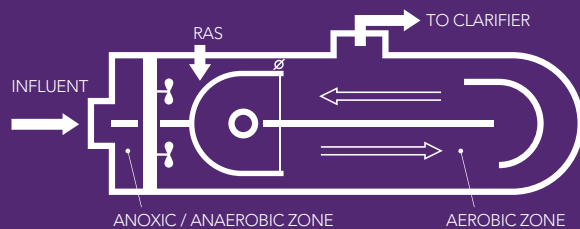


OVIVO[®]
Bringing water to life[®]

MAXIMUM TREATMENT, MINIMUM EFFORT

HOW IT CAN MEET YOUR NEEDS:

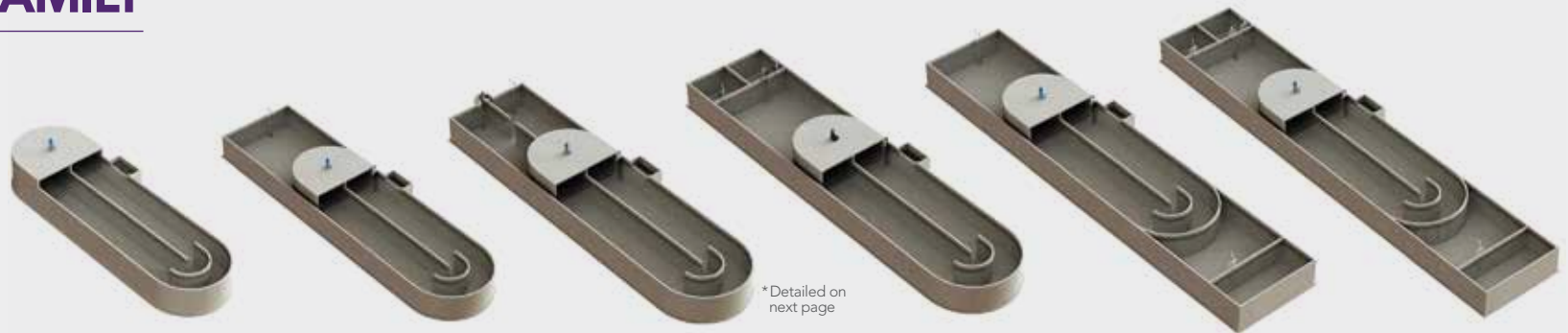
- Meets the **Most Stringent Effluent Nutrient Requirements**
- **Simple** to Operate and **Easy** to Maintain
- **Eliminate** Chemical Dependency
- **Reduce** Energy Use
- **Proven Technology** – 700+ U.S. installations



CARROUSEL[®]
SYSTEMS

OVIVO | NUTRIENT REMOVAL

THE CARROUSEL® PROCESS FAMILY



*Detailed on next page

	1-STAGE	2-STAGE	2-STAGE	3-STAGE	4-STAGE	5-STAGE
	BASIC CARROUSEL® SYSTEM	denit/R® CARROUSEL® SYSTEM	Alternat/R™ SYSTEM	A²C™ SYSTEM	BARDENPHO® CARROUSEL® SYSTEM	BARDENPHO® CARROUSEL® SYSTEM
ANAEROBIC			✓	✓		✓
1 ST ANOXIC		✓	✓	✓	✓	✓
AEROBIC	✓	✓	✓	✓	✓	✓
2 ND ANOXIC					✓	✓
RE-AERATION					✓	✓
EFFLUENT (mg/L)	BOD≤5 NH3-N≤0.5	BOD≤5 NH3-N≤0.5 TN≤5-8	BOD≤5 NH3-N≤0.5 TN≤5-8 TP≤0.3*	BOD≤5 NH3-N≤0.5 TN≤5-8 TP≤0.3*	BOD≤5 NH3-N≤0.5 TN≤3	BOD≤5 NH3-N≤0.5 TN≤3 TP≤0.3*

*May require trim doses of metal salts

OVIVO: AN ENGINEERING PROCESS POWERHOUSE

The Ovivo Carrousel Process Team, which consists of decades of biological wastewater treatment plant design and innovation, has provided expertise and design assistance for wastewater treatment plants consisting of all shapes, sizes, and effluent permits.

CAPABILITIES:

- Detail Design Support
- Process Calculations
- Equipment Sizing
- Process Guarantees
- Extended Warranties
- Retrofit Expertise
- Process Training
- Equipment Startup
- Ovivo Connect (Asset Management)

THE CARROUSEL® ALTERNATIR™ SYSTEM

In the denitIR® Carrousel® System an integral anoxic basin is added for Total Nitrogen removal without supplemental carbon addition. The internal recycle (IR) is large (6-15Q) and requires no additional power, taking advantage of the propulsion generated by the Excell® Aerator.

The automatically controlled EliminatIR™ Gate can be used to create anaerobic cycles in the anoxic zone in order to achieve phosphorus removal as well. This is called the AlternatIR™ System.

In the aerobic (Carrousel®) stage, BOD and ammonia oxidation (nitrification) proceed to completion. The Excell® Aerator provides all aeration and mixing required for the aerobic stage at all influent loading conditions.



EXCELL®
AERATOR



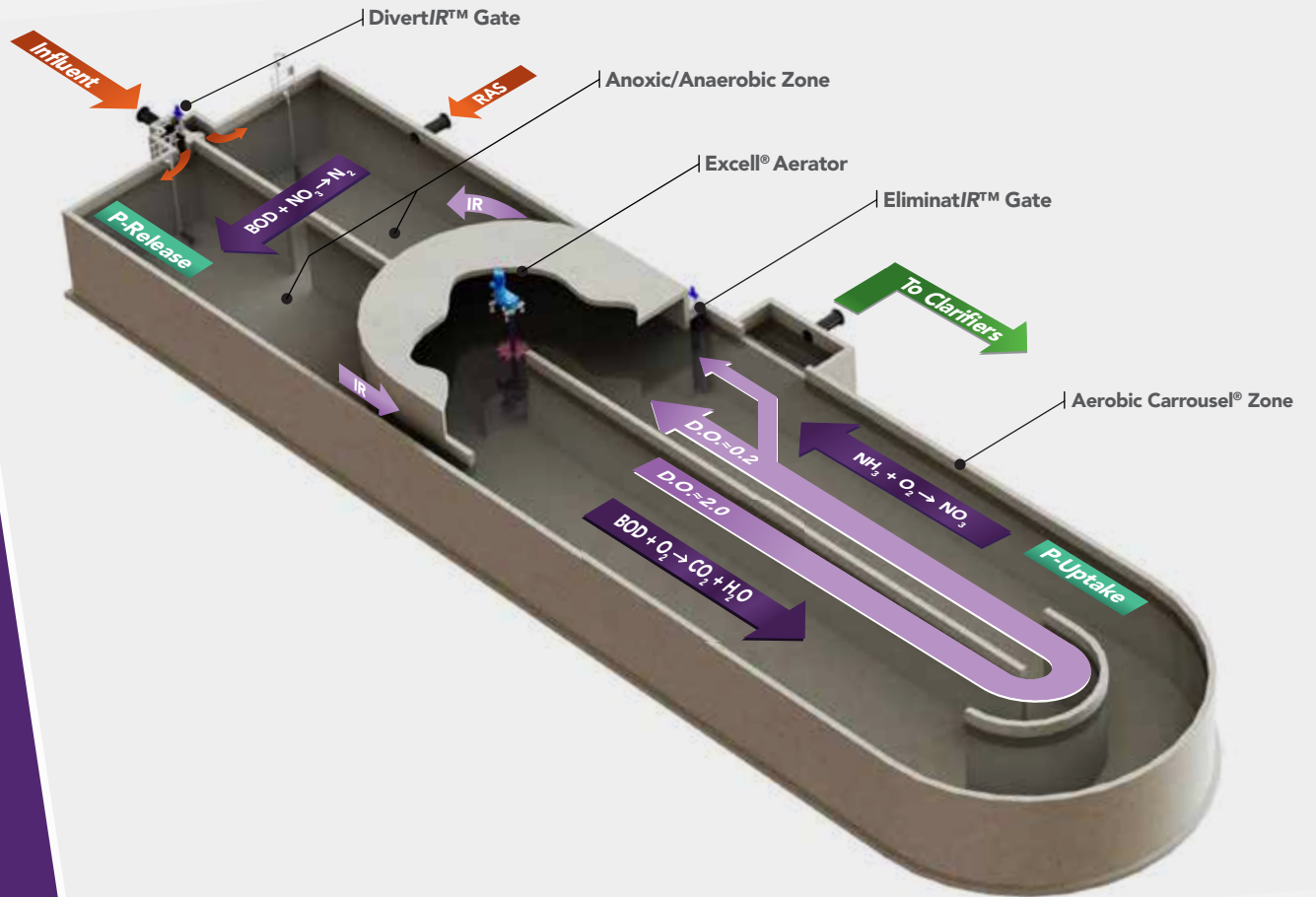
ELIMINATIR™
GATE



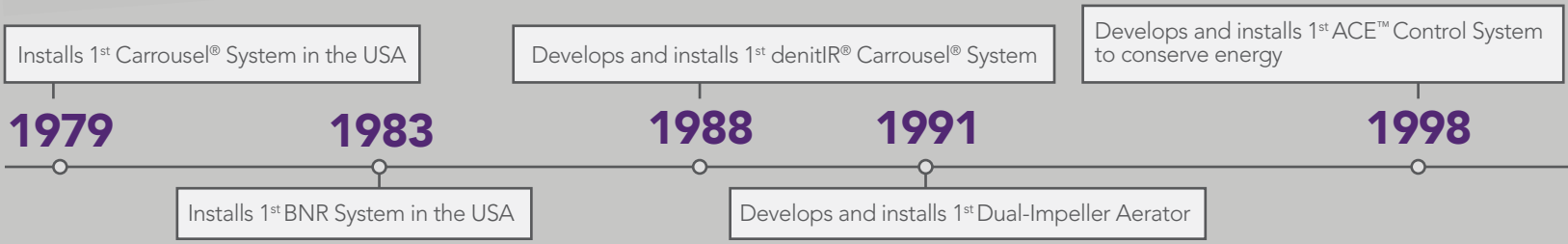
MIXING



OCULUS™
CONTROLLER



OVIVO: A HISTORY OF EXCELLENCE



EXCELL® AERATOR

- Efficiently provides all of the aeration and mixing required for the Carrousel Basin.
- 3.85 lb O₂/HP-hr
- Power Turndown Up to 90%
- 1 man day of maintenance/year
- You Stay Clean! - No maintenance below the deck



ELIMINAT/IR™ GATE

- Internal Recycle (IR) Control
- Automatically adjusts to maximize Denitrification
- IR rates between 0-12Q
- Anaerobic Cycling for Phosphorus Removal



OCULUS™ SYSTEM

- The Process "All Seeing Eye"
- User Friendly Interface
- Efficient Aeration Control
- Optimized Nutrient Removal
- Save Energy
- Reduce Chemical Dependency
- Remote Access

Installs 600th Carrousel® System in the USA

Introduces the Excell® Aerator II: Our most efficient Dual-Impeller Aerator for BNR Systems to date!

Introduces the Elimina/IR™ Gate to maximize, optimize and automate BNR

Introduces Ovivo® ConnectSM Asset Management System

2001

2006

2007

2009

2010

2012

2013

2014

Develops and installs 1st Deep Tank Carrousel® System: 23 ft-SWD

Introduces the Oculus™ BNR Control System

Develops and installs the first Full BNR optimization Oculus™ MCC

Introduces Carrousel® SwingIR™ System

CARROUSEL® SYSTEMS:

A FORWARD LOOKING APPROACH

A leading technology in wastewater treatment and biological nutrient removal, the Carousel® system is universally praised for its durability, operational simplicity, low operating and maintenance costs, and consistently high effluent quality.

Carousel Systems offer the lowest number of aerators per basin compared to other oxidation ditch systems, such as those that use horizontal shaft aerators. This greatly simplifies installation and maintenance requirements.

At a minimum, a Carousel System consists of a "racetrack" style reactor basin with at least one vertical shaft, low-speed mechanical aerator, the Excell® Aerator, installed in the center of one of the turns. The basic Carousel System is capable of full BOD and Ammonia reduction. Nutrient removal is easily added to a Carousel System via the addition of anoxic and anaerobic selector zones, or even with simple, optimized operational strategies.

The Carousel System utilizes the Modified Lutzack-Ettinger (MLE) configuration for highly efficient denitrification. This process is known as the denitIR® System, where internal recycle (IR) flow is directed into the anoxic zone via a slip-stream channel using propulsion generated by the Excell Aerator. No additional energy for IR pumping is required. IR flowrate is varied by the EliminatIR™ Gate. The Oculus™ Control System automatically controls the aeration rate and IR flow.



Top: The Excell® Aerator is installed at one or more of the channel turns and provides all aeration and mixing required for full nitrification and BOD removal.

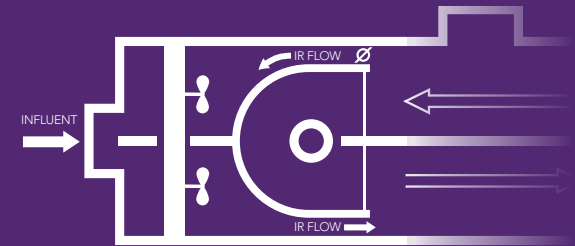
Bottom: Anoxic and anaerobic basins are easily added for Total Nitrogen and Total Phosphorus removal in Ovivo's denitIR® configuration.

ACTIVATED SLUDGE TREATMENT AND BIOLOGICAL NUTRIENT REMOVAL

35 YEARS OF
CARROUSEL®
SYSTEMS
1979 - present

Total Phosphorus ≤ 0.3 mg/L
Total Nitrogen ≤ 3 mg/L

- Virtually eliminates $\text{NO}_3\text{-N}$
- Dedicated environments maximize N and P removal
- Optimization eliminates or greatly reduces metal salt addition
- No IR pumps required
- No supplemental carbon required
- Full nitrification to $\text{NH}_3\text{-N} < 0.5$ mg/L in all U.S. climates



EXCELL®
AERATOR



ELIMINATIR™
GATE



MIXING



OCULUS™
CONTROLLER

RETROFITS:

OVIVO OFFERS COMPETITIVE TURNKEY AND TRADITIONAL UPGRADE AND RETROFIT PATHWAYS FOR YOUR EXISTING SYSTEMS, EVEN IF YOU DON'T ALREADY HAVE A CARROUSEL SYSTEM.

Upgrading your existing Carousel System has never been easier or more worthwhile. Improve your efficiency, reduce your maintenance, or automate your process.

Ovivo provides estimates for services and return on investment with a custom-made appraisal of your existing infrastructure.

You won't be disappointed you called.

ovivo®connectSM

Ovivo® ConnectSM portal is an innovative and intuitive application that allows our customers to use 'SmartTags' installed on our equipment (or a web URL) to access a personalized customer zone. Access your equipment documentation, find contract references, track service logs, manage spare parts, and plan your next maintenance to get the most out of your equipment.

NEED **ACCESS** TO YOUR **O&M MANUAL**?

NEED **SPARE PARTS**?

WANT THE **LATEST TIPS AND NEWS** ON YOUR ASSET?



GET CONNECTED!

ovivo.co



WATCH VIDEO
The Ovivo Carousel System

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