BIO-RAN Co
International Bio Technologies

Company Details and Technology Presentation

Who we are

The **Ydro Process®** is now being used in more than 500 wastewater treatment units and industrial plants, worldwide.

BIO-RAN LTD led by the chemical engineer Dr. George Ganatsios, has forty years of experience in the water treatment industry and represent **Ydro Process®** biotechnology for industrial and domestic wastewater, in the field of environmental protection.

HYDROTECH ENVIRONMENTAL

Worldwide environmental solutions

Thessaloniki, Greece, 7/06/2023

To whom it may concern,

Hydrotech Environmental - A. Ganatsios & Co L.P. is the inventor and patent holder of the Ydro Process® technology, which has been implemented since 2007. Since 2018, Hydrotech Environmental has been expanding the implementation of the Ydro Process® with selective representatives worldwide. The production facilities are located in the EU, Greece.

Hereby, we confirm that BIO-RAN Group of Companies, i.e. Bio-Ran Ltd registered in the U.K., UAB Bio-Ran registered in Lithuania, Bio-Ran LtdA registered in Brazil, are our selective representatives and responsible for cooperation on our behalf in the following countries:

Australia, Azerbaijan, Bahrain, Belgium, Brazil, Chile, Egypt, Estonia, Jordan, Iraq, Kazakhstan, Kenya, Kuwait, Kyrgyzstan, Latvia, Lithuania, Morocco, the Netherlands, Nigeria, Oman, Poland, Portugal, Qatar, Saudi Arabia, Spain, Sierra Leone, Tajikistan, Turkmenistan, Uganda, Ukraine, the United Arab Emirates, the United Kingdom and Uzbekistan.

We remain at your disposal for any further details or clarifications.

Yours sincerely,

HYDROTECH ENVIRONMENTAL E.E. WASTEWATER Design & Construction

Andreas Ganatsios

Managing Director

Ydro Process®

Ydro Process® creates optimum conditions for growth, reproduction and microbial processes which contain

With each project, **Ydro Process®** and a specifically tailored microbial product combination is utilised, resulting in:

- **Up to 100% degradation and elimination of excess sludge**
- Significant improvement in plant effluent parameters (BOD, COD, SS, TN, TP etc)

- Liquefaction and elimination of FOG (fats, oils and grease) in treatment plants and pumping stations
- Substantial odour elimination

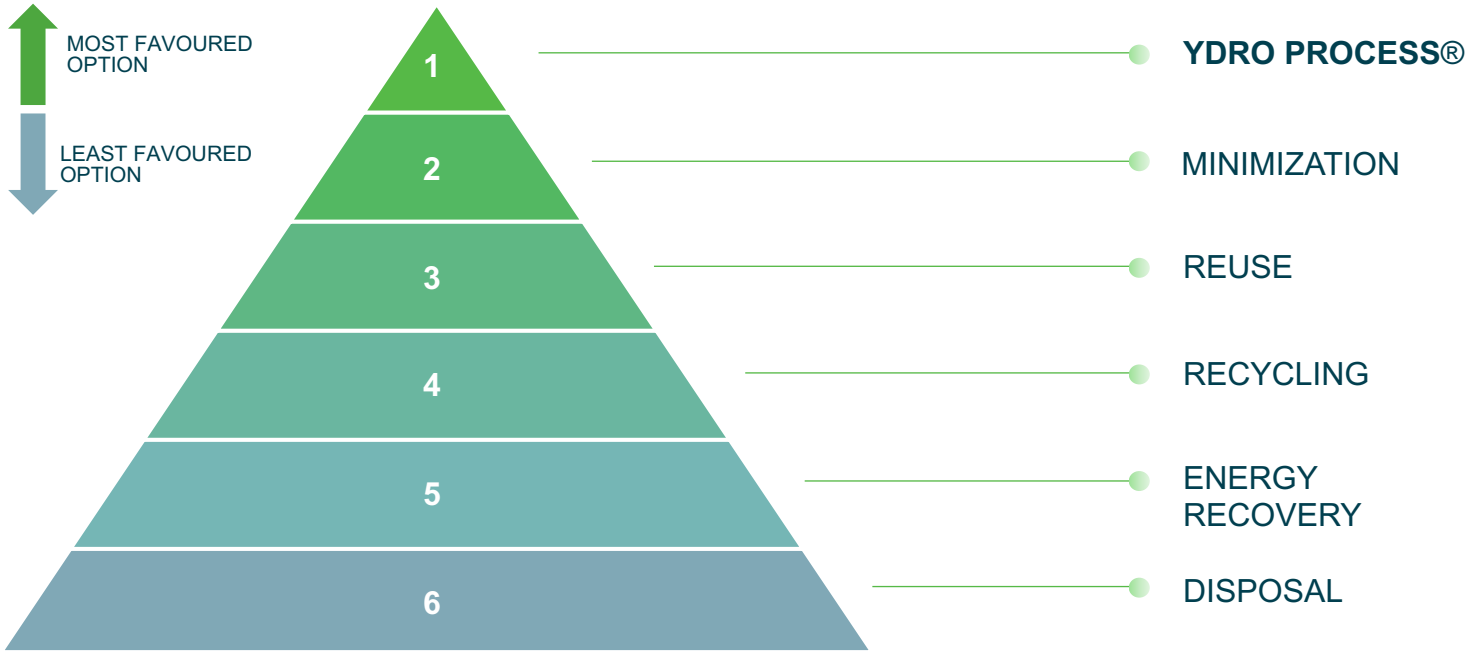
- **Potential reduction in energy consumption at aeration stage**
- Potential increase in biogas production with simultaneous increase of methane content therein

- Significant reduction of micropollutants
- Higher resistance to incoming organic shocks

Benefits of Ydro Process®

The innovative Ydro Process® technology can be used to make a difference in the environmental protection providing a significant reduction in sludge formation through the underlying bioaugmentation method.

Ydro Process® & Conventional Methods of Sludge Management



Research

Ydro Process® has been scientifically validated by:

University of Stuttgart
Germany

"The comparative operation of two test plants with different sludge concepts has **clearly shown that the use of Ydro Process technology makes it possible to operate a wastewater treatment plant without significant sludge removal** if the excess sludge can be hydrolysed together with the primary sludge in the primary clarifier."

FLEMING COLLEGE
TORONTO

"(…) We have found to have **remarkable abilities at optimizing the treatment of wastewater**. Their technology has proven to be **able to drastically reduce energy input** requirements compared to energy intensive conventional wastewater treatments. (…) is **one of the greenest technologies** I have ever seen in the wastewater treatment sector"

1862
RIGA TECHNICAL UNIVERSITY

EUROPEAN UNIVERSITY OF TECHNOLOGY

VILNIUS TECH

Who we work with

The **Ydro Process**® has been successfully introduced to:

- Municipal wastewater treatment plants
- Sewer grid systems, large hotel groups and septic tanks
- Composting and fertilizer production sites

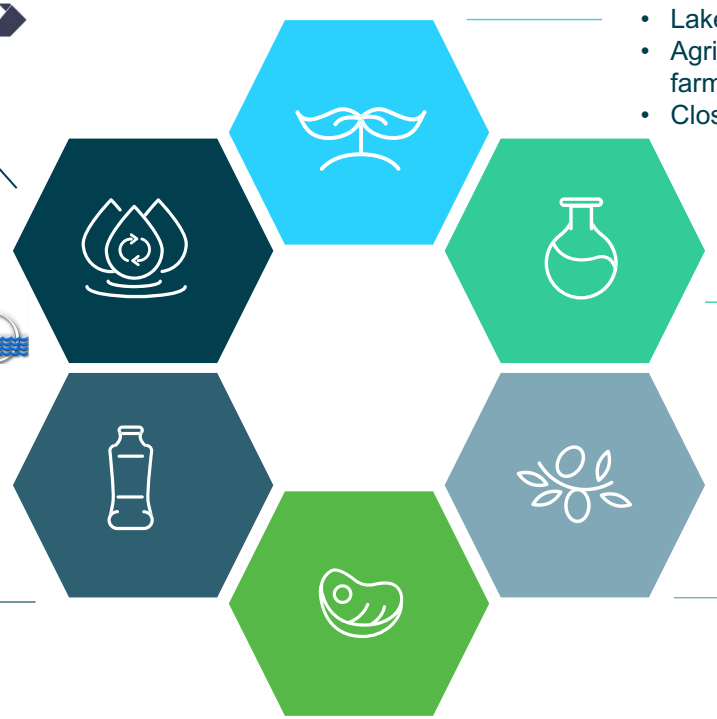
- Lakes, ponds and lagoons
- Agricultural applications: Greenhouse and flower farming
- Closed loop cooling water systems

- Oil and gas industries and refineries
- Landfills
- Papermills and wood processing industries

- Breweries
- Milk and dairy industries
- Organic residue treatment plants and anaerobic digesters

- Fruit, juice and soft drinks industries
- Olive processing industries
- Steel and aluminum industries

- Slaughterhouses and poultry industries
- Fish and aquaculture industries
- Textiles and tanneries



Our case studies:

CASE STUDIES	AROUND THE WORLD
Goals	Sludge, odor and FOG elimination
Population Equivalent	> 10,000,000
Flow	> 2000,000 m^3/day
Wastewater Treated	Municipal, industrial
Targets Achieved	Sludge reduction by 80%, CO2 by 50%

Ydro Process – What is it?

Ydro Process® is a unique biotechnology consisting of a naturally occurring, non-toxic, non-pathogenic Ydro Series® Microorganisms that increases the overall performance of the biological processes.

The application of the Ydro Process® enables the higher rate and efficiency of degradation of organic matter and leads to the overall optimization of the given system or process.

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Project Report

Application of Ydro Process® technology in a wastewater treatment plant Water Resources - Marketing LLP, Shymkent, Kazakhstan

Project customer: UAB "Water Resources - Marketing" LLP

Start of the project: 07.01.2024

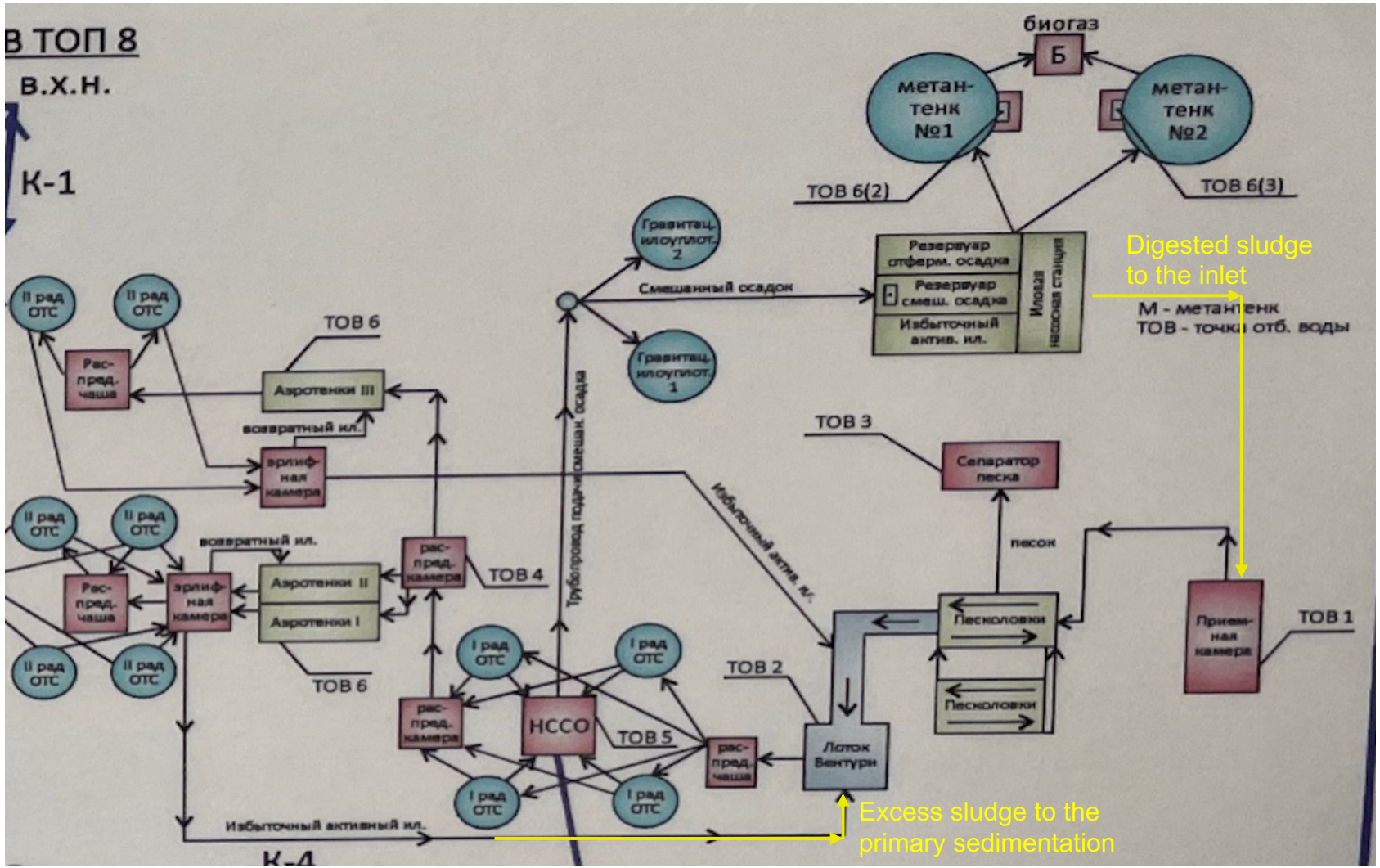
Project Executor: BIO RAN Limited

WWTP Data

Characteristics	Data
Type of Treatment Plant	Classic
Design capacity	200 000 m3/day
Incoming flow per day (average)	150 000 m3/day
*Excess sewage sludge (98% moisture, 2024 estimate)	1400 m3/day

Adjustments at the WWTP:

For the effective operation of the technology, all excess activated sludge is diverted to primary sedimentation tanks 40-50 m3/h, as well as digested sludge 10-15 m3/h to the inlet of the WWTP to retain Ydro® microorganisms in the system.



Project objectives and requirements

Goals:

Reduction of excess sludge for disposal by 80% or more of the volume produced starting from week 12;

Reduction of costs associated with sludge treatment and disposal: dewatering, drying, transportation, chemicals, landfill gate-fee, etc.;

Elimination of odors and emission of foul-smelling substances at the WWTP.

Requirements:

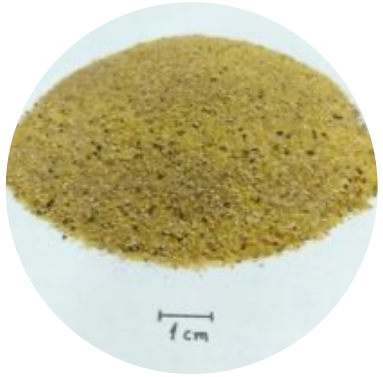
All excess activated sludge is diverted to primary sedimentation tanks 40-50 m3/h, as well as digested sludge 10-15 m3/h to the inlet of the WWTP to retain Ydro® microorganisms in the system and**:**

1. Start the activity of bacteria at an early stage of the process, as a result of which organic acids will be produced;
2. Organic acids are degraded during the process to carbon dioxide (CO2 and water H2O) in aerobic conditions and methane (CH4) and hydrogen (H2) in anaerobic conditions – as well as to free, available energy;
3. Reduce odors (if any) in this part of the WWTP.

Product features

Our Microbial Products:

Are naturally occurring bacteria



Contain no animal derivatives

Are not genetically manipulated

Include additional strains uniquely tailored to treated waste type

Require a maturation time of approx 16 hours

Each gram of bacterial product contains 10^9 c.f.u

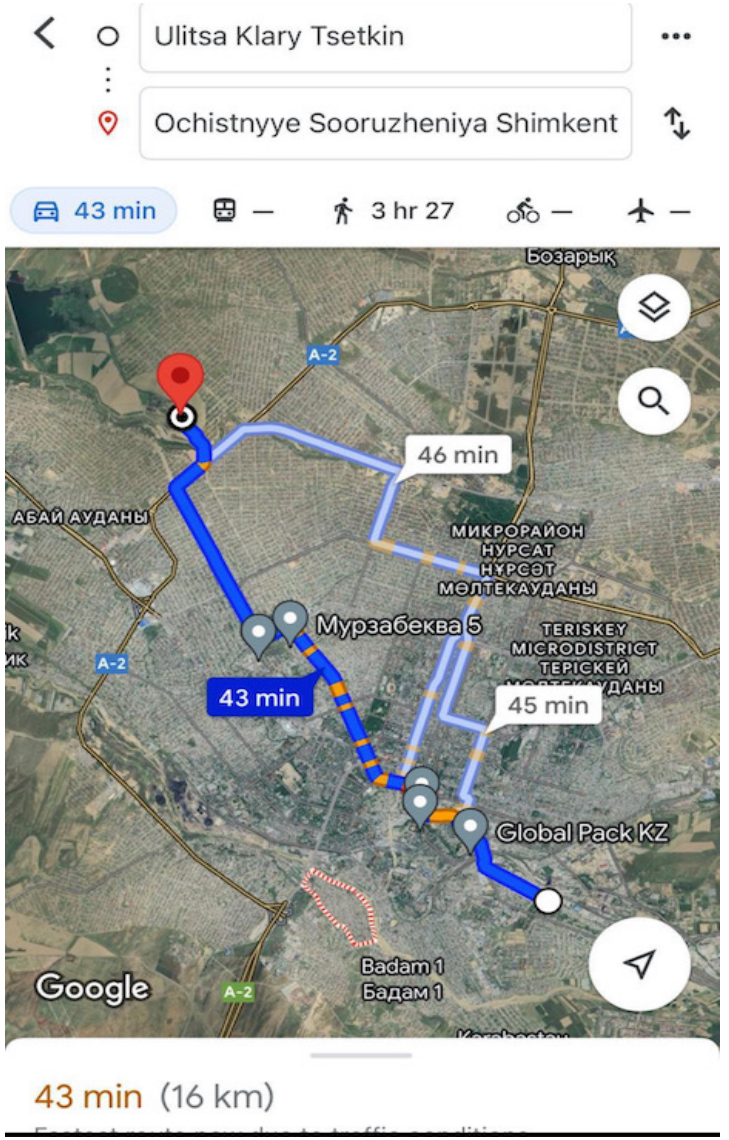
During maturation 10^9 c.f.u. population duplicates every 20 minutes

Require no further chemical analysis when applied

Application process requires no additional financing

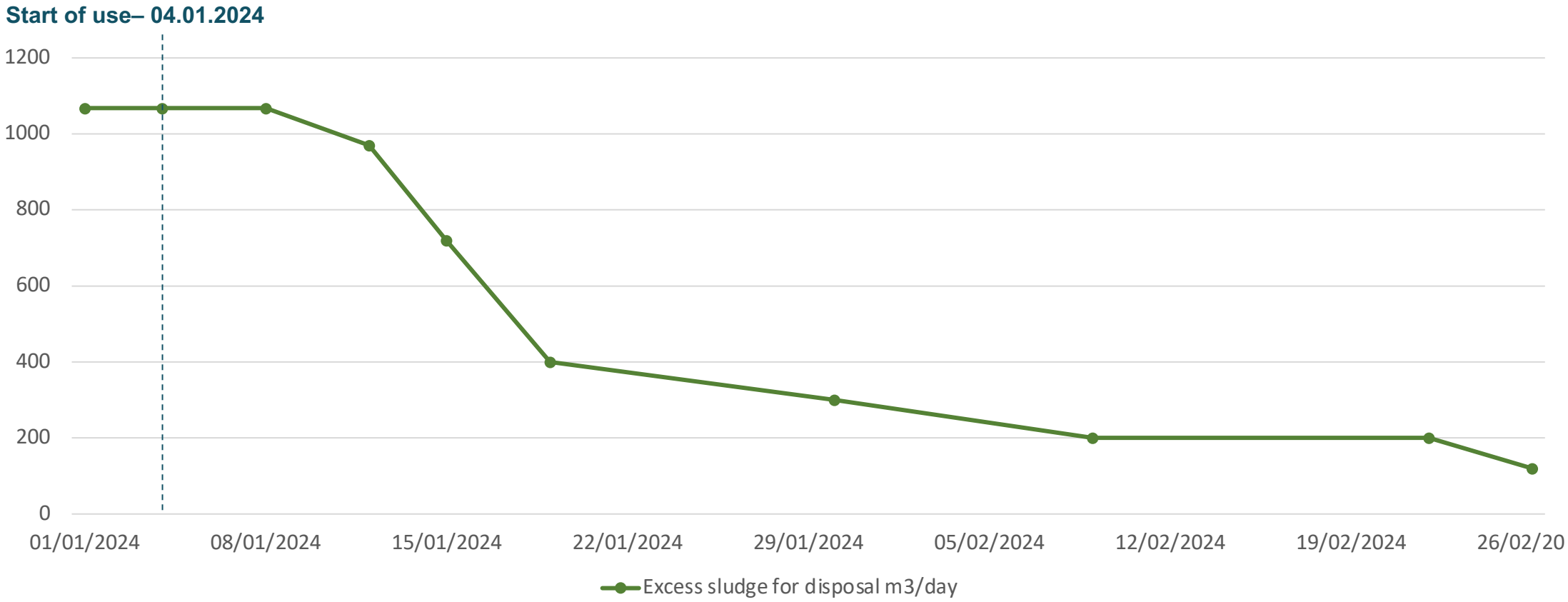
Dosing of Ydro® Microorganisms

- Dosing of microorganisms is carried out in the pipeline, 3 kg/day, and in the aeration tank (distribution chamber) 3 kg/day, (the first 30 days a double dose is used - 12 kg/day);
- Dilution ratio 1:10, i.e. up to 1 kg of product per 10 l;
- The maturation time is at least 12 hours, which can be increased to 24 hours depending on the availability of personnel;



Reduction of excess sludge for disposal

By the 8th week of application of the Ydro Process®, the excess sludge for disposal is reduced by more than 80%.



SVI and sludge blanket

	SVI / иловый индекс, и доза ила					
дата/date	Аэротенк No 1 / Aerotank No 1		Аэротенк No 2 / Aerotank No 2		Аэротенк No 3 / Aerotank No 3	
на выходе /outflow	SVI ml/g	MLSS / г/дм3	SVI ml/g	MLSS / г/дм3	SVI ml/g	MLSS / г/дм3
До начала ОПИ / before						
20.11.2023	75.7	4.0			156.5	5.4
22.11.2023	110.1	3.4			154.8	5.6
24.11.2023	75.5	2.7			81.4	11.7
27.11.2023	74.1	3.0			77.7	11.3
29.11.2023	76.9	3.8			59.2	16.6
01.12.2023	115.0	2.8			180.9	5.1
04.12.2023	198.0	3.3			189.0	4.7
11.12.2023	162.5	3.6			179.8	4.6
19.12.2023	80.0	0.6	160.9	3.2	271.1	2.8
25.12.2023	123.0	5.4	134.0	6.1	225.0	3.6
С начала ОПИ /start trial 04.01.2024						
08.01.2024	252.0	2.7	233.0	3.0		
11.01.2024	242.0	2,89	264.0	3,02		
15.01.2024	265.0	2.5	257.8	2.9		
18.01.2024	234.4	2.6	255.9	2.5		
05.02.2024	132.0	3.7	142.0	4.0		
12.02.2024	152.0	3.1	131.8	3.5		
19.02.2024	112.0	4.2	149.0	4.4		
23.02.2024	135.0	3.9	123.0	4.5		

sludge blanket / подушка ила во ВО , m				
clarifier No 1	clarifier No 2	clarifier No 3		дата / date
PO No 1	PO No 2	PO No 3	PO No 4	
0.00	0.00	0.00		
	0.90	1.50	0.88	11.01.2024
	0.90	1.20	0.75	12.01.2024
	3.10	3.32	2.40	13.01.2024
	0.70	1.30	0.70	18.01.2024
	0.70	1.10	0.70	19.01.2024
	0.60	0.95	1.00	24.01.2024
	0.70	1.20	0.70	31.01.2024
	0.90	1.00	0.95	19/02/2024
	1.00	0.80	1.30	23/02/2024

Influent and Effluent parameters

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Influent

Data (mg/l)	SS	COD	BOD5	NH4-N	Phosphate	Nitrites	Nitrates
Before use Ydro Process®	262	415	205	42	7.6	0.34	0.54
During Use (04.01.2024-present)	256	420	190	41	8.4	0.31	0.9

Effluent

Data (mg/l)	SS	COD	BOD5	NH4-N	Phosphate	Nitrites	Nitrates
Before use Ydro Process®	35	20	10	6.6	0.94	1.71	15
During Use (04.01.2024-present)	26	40	22	6.7	1.2	0.9	18

Results

Excess sludge reduction
sludge for disposal reduced by more than 80%

Cost reduction
costs associated with sludge treatment and disposal have been reduced by more than 80%;

Reduction of unpleasant odours
H2S decreased at the measuring points from 32 mg/m3 to 5 mg/m3, and to 0.5 mg/m3

Effluent parameters
within allowed limits

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