REDEFINING OZONE TECHNOLOGY

“Too good to be true!”

Spontaneous comment by engineer at Yorkshire water, UK

Primozone®

Clean water. The natural way.™

Sludge and wastewater treatment for the future

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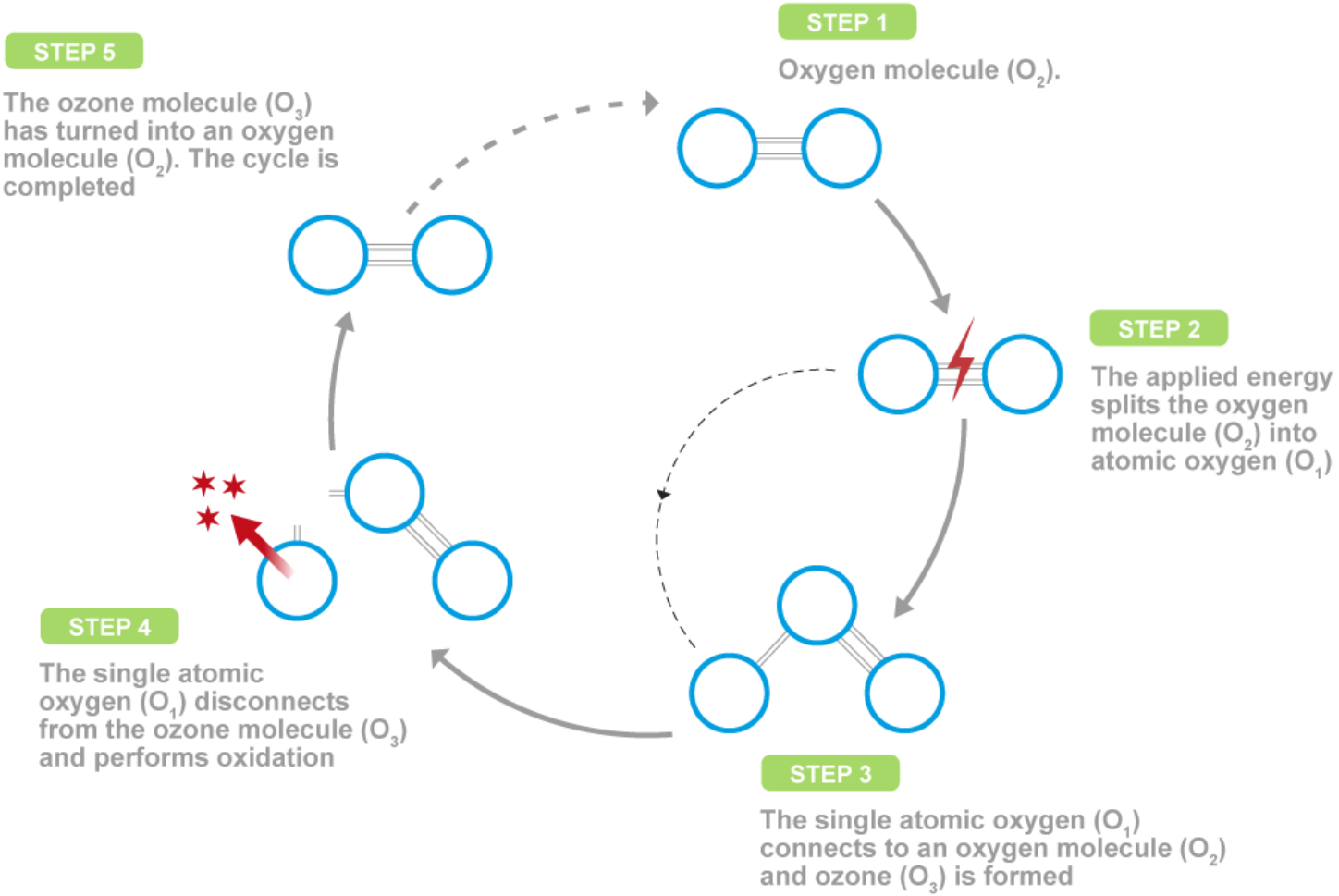
About Primozone

- Founded in 2000, Sweden
- Owned by industrial owner Westfal-Larsen Technology, Norway – invested 20million USD in R&D
- First installation in 2006
- Version 1.0 released in October 2010 – now in 25+ countries on 5 continents
- Experienced ozone provider – designs ozone solutions
- R&D and production in-house
- ISO 9001 & 14001 certified

Why Ozone

- One of the most effective water treatment processes
- The most ecologically sound process as ozone is a natural gas that breaks down into oxygen
- Replaces chemicals
- Kills microorganisms such as fungus, bacteria and viruses.
- Used for control water taste, odor and color
- Used for flocculation of organic material

The Oxygen - Ozone - Oxygen cycle



Ozone - an introduction

- Ozone may be used in water treatment for:
  - Disinfection
  - Color removal – break-up of humus molecules
  - Oxidation of inorganic compounds (E.g. Fe2+ and Mn2+)
  - Oxidation of organic compounds, as odor/taste, algal toxines and organic environmental poisons
  - Sludge reduction
  - Taste improvement – oxygenation
  - Removal of pesticides and pharmaceuticals

SLUDGE

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Introduction

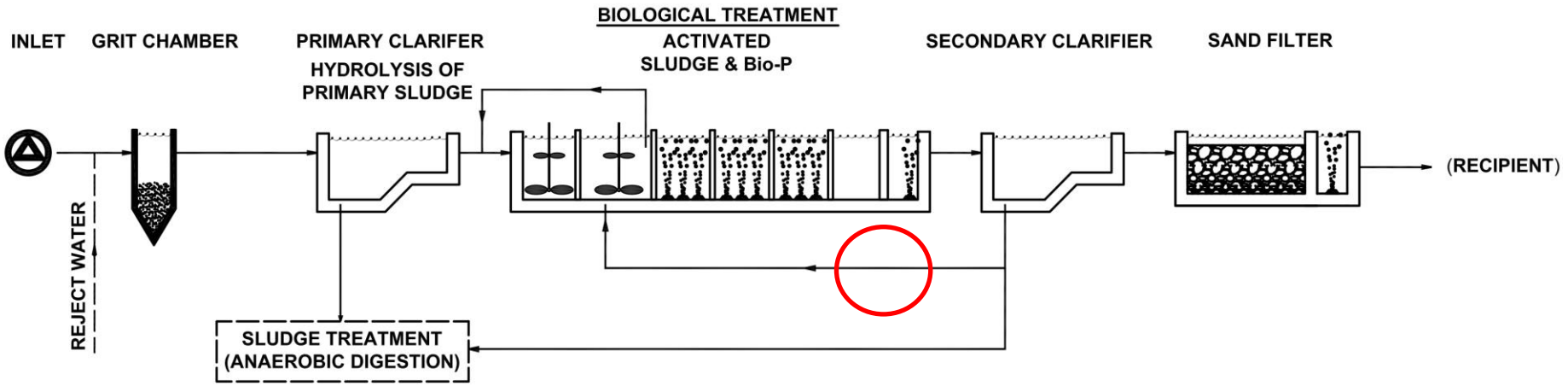
- Bulking sludge is very common at WWTPs using activated sludge.
- Can cause:
  - Reduced settling
  - Decreased capacity
  - Reduced solids retention
  - Increased costs

Solutions

- Possible to remedy with:
  - Changing process parameters
  - Non-specific methods such as ozone or chemical

- However, care **must** be taken to safeguard the biological processes with either approach

Full-Scale Ozone System



Aeration with ozone

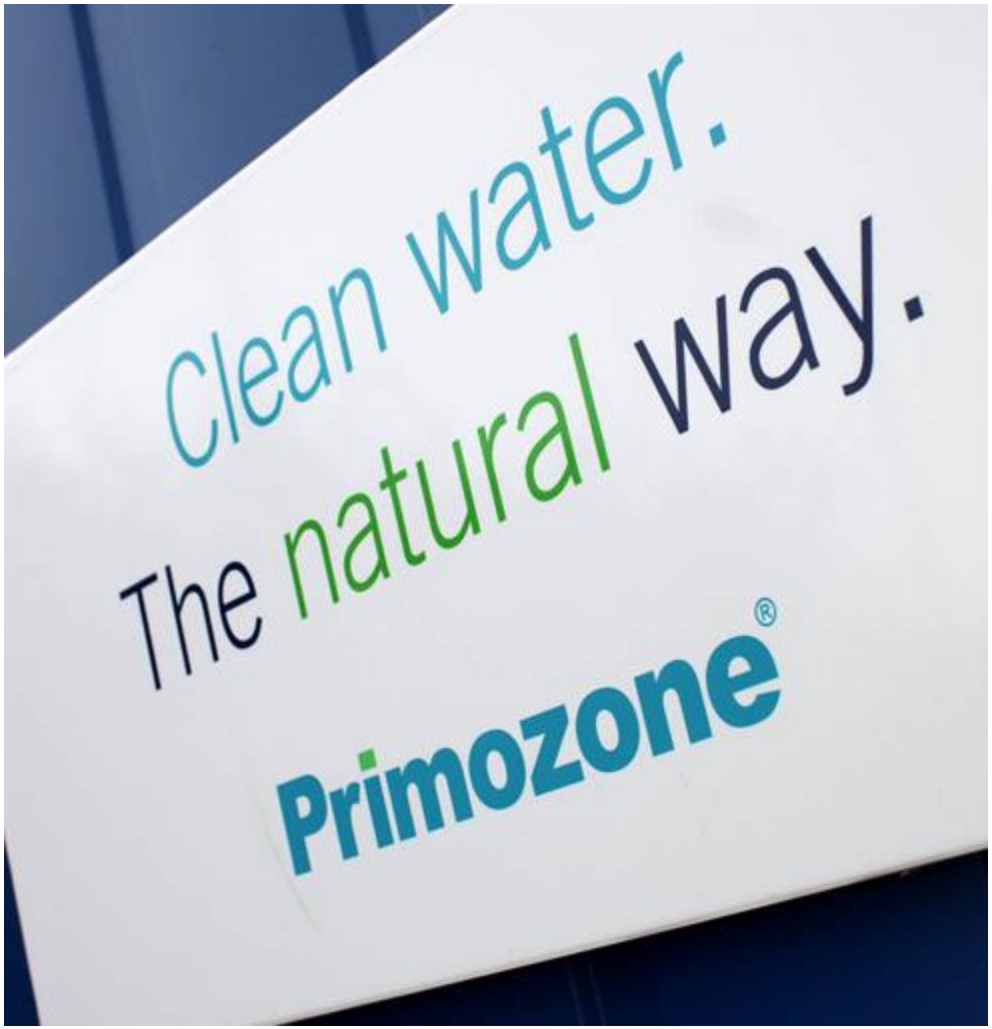
With ozone

Aeration before ozone

Before ozone

Summary

- The application of 2.8-5.0 g O_3/kg SS in the return sludge can significantly reduce the DSVI of activated sludge.
- No significant impact on the bacterial population in Bio.
- No adverse effect on neither Bio-P nor nitrification rate.



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