

US EPA ARCHIVE DOCUMENT



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# **ENERGY INNOVATION:** **Boosting Biogas Production** **with an Organic Biologic Booster**

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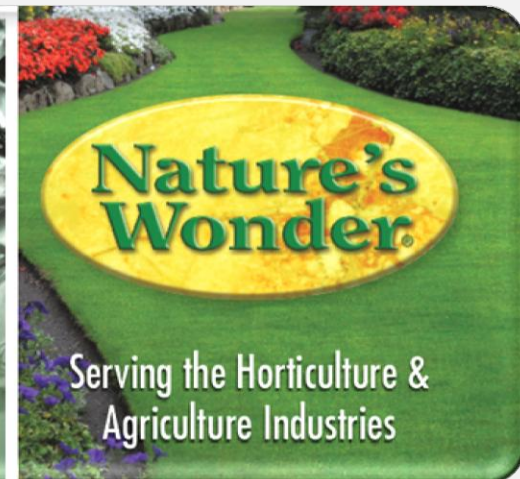
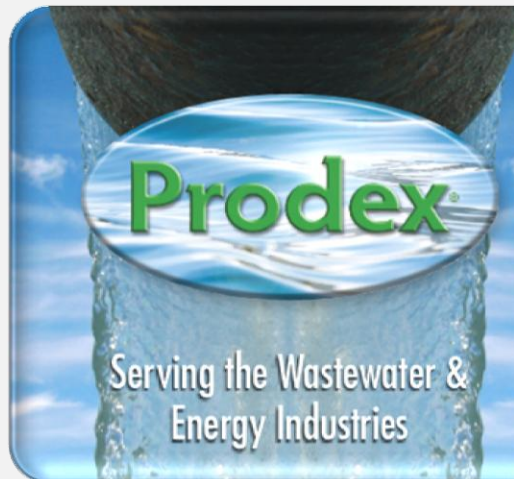
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## About Us

- Revolutionary Patented Stabilization & Extraction Process Used to Produce Our Core Material
- Developed/Manufacture a Line of Biologic Boosters
- Improve Biological Efficiency in a Variety of Environments
- Our Family of Companies:





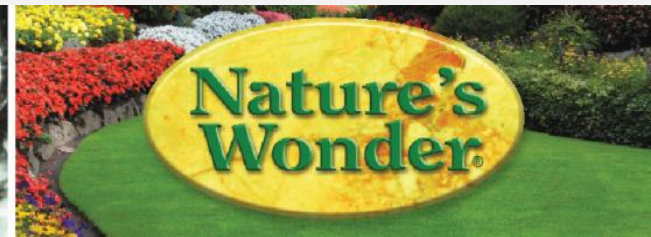
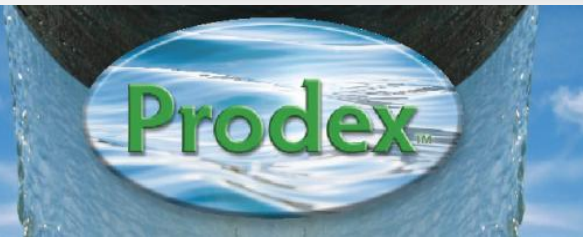


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# Prodex



- ***Increasing Renewable Energy Production***
  - In Wastewater Treatment, Agricultural, and Industrial Anaerobic Digesters
- ***Improving Plant Operational Efficiency***
  - In Activated Sludge and Non Activated Sludge Environments





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## **Prodex: Biological Activity Enhancer (BAE®)**

**BAE**<sup>®</sup>

BIOLOGICAL ACTIVITY ENHANCER

### *Organic, Cost Reducing Solution for Wastewater Systems*

- Biologic Booster
- Created Using a Revolutionary Extraction Technology
- Derived from Carefully Selected Peat Sources
- Increases Existing Microbial Populations 4-5 times
- Doubles Microbial Activity



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## Boosting Biogas Production with BAE<sup>®</sup>

**BAE Provides a Comprehensive Economic Benefit  
for the Wastewater and Biogas Industries**

BAE helps Operators  
Take Full Advantage of  
the Energy Source Right  
at their Finger Tips

- Results have shown increases in Methane Gas Production from 28% to more than 100%

Enhances the Anaerobic  
Digestion Process

- Increases Volatile Solids Destruction (VSD), Improving Sludge Quality & Dewatering



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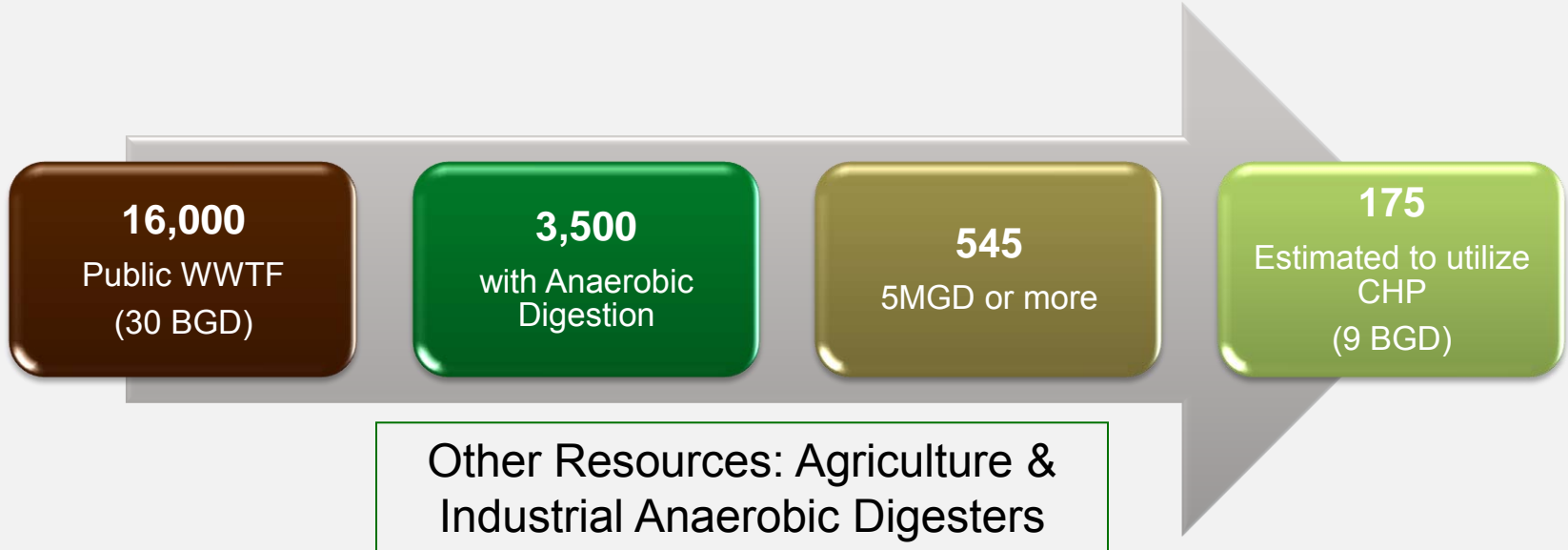


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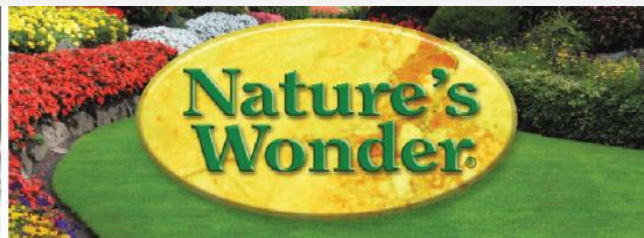
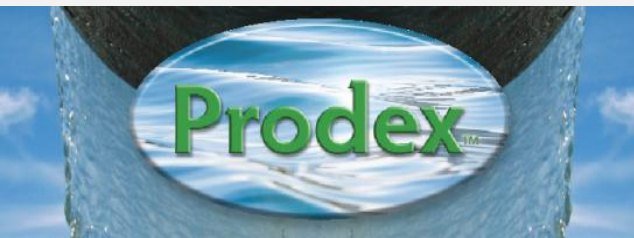


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# WASTE TO ENERGY VS. ENERGY GOING TO WASTE



*Information collected from US EPA, US DOE Energy Efficiency & Renewable Energy, Energy & Environmental Analysis Inc (EEA)*







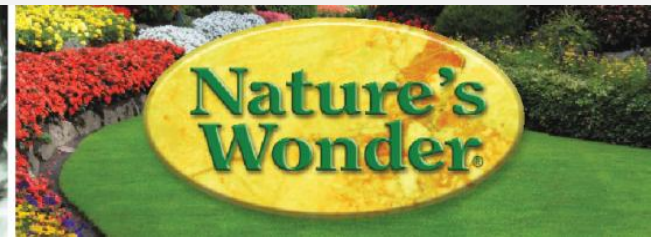
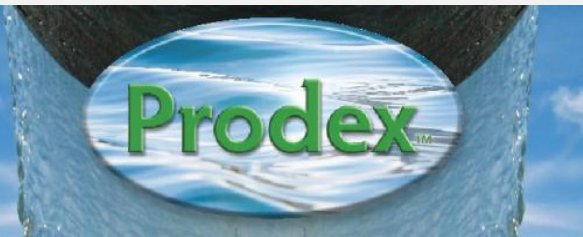
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## US Energy Opportunity: Biogas

- If all 545 plants were to employ CHP systems, approximately **340 megawatts (MW)** of clean electricity could be generated, offsetting 2.3 metric tons of carbon dioxide emissions annually.
  - That is equivalent to planting approximately 640,000 acres of forest or the emissions of approximately 430,000 cars.\*
- If the US tapped our entire supply of sewage, animal waste and landfill gas, we could replace about 6% of natural gas consumption.\*\*

\* EPA CHP Partnership, *Opportunities for and Benefits of CHP at Wastewater Treatment*

\*\* Global Intelligence Alliance, *How to Profit from Biogas Market Development*







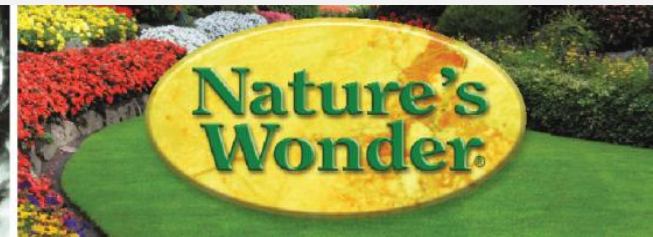
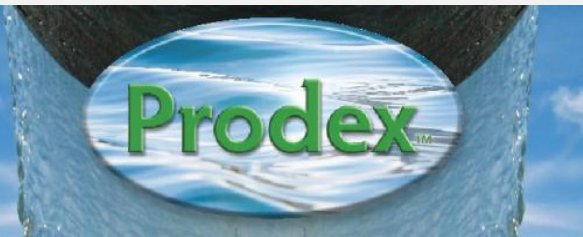
# Biogas Project Profile: Landis SA, Vineland, NJ (6MGD)

- Increased Methane Gas Production by 28%
- Increased Energy Efficiency From 85% to 100%
- Reduced Loan Payback Period by 5.4 months
- Yearly Savings

KWH 221,664	\$29,924
Fuel 8,700 gal.	\$21,315
Loan Reduction	<u>\$27,500</u>
Total	\$78,739



**2010 US EPA Energy Star Award Recipient**  
BAE was Instrumental in Landis Being Recognized  
for Achieving Outstanding Energy Efficiency





## Biogas Project Profile: East Coast WWTP (55MGD)

- Case Study in Development
- 53% increase in Methane Gas Production
- Prior to Evaluation, 2 electric generators in use.
  - A 3<sup>rd</sup> generator began operating *regularly* during the evaluation.
- Significant annual savings on energy costs.
- Improved sludge quality led to a major reduction in polymer usage, resulting in additional significant cost savings.

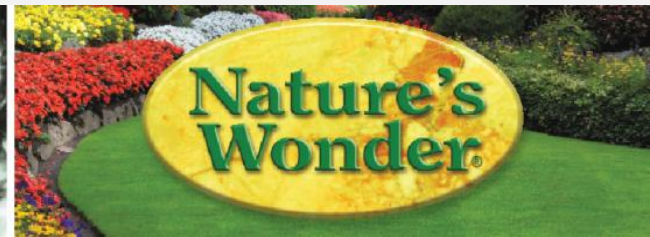
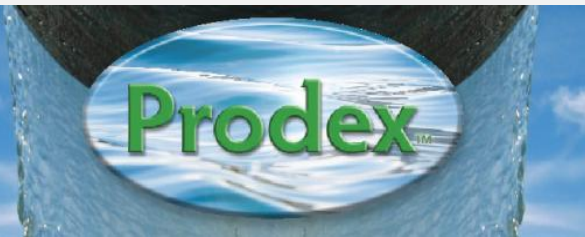
### Projected Savings:

Electricity	\$1,138,775
Natural Gas	\$ 282,584
Polymer	\$342,680
Total Projected Savings	\$1,764,039

### Results Summary:

	Before	After
Lbs. of Volatile Solids Fed/day (per Digester)	28,388	20,445
Cubic Feet of Gas per Lb of VSD (per Digester)	14.37	21.85

*Note: There was more digester gas produced per pound of Volatile Solids Destroyed with less solids fed*







## Biogas Project Profile: Hayward WPCF, CA (12MGD)

- Case Study in Development, Monetizing Results and Collateral Benefits
- Cogeneration Operating Hours have Doubled
- Increase in Gas Production with BAE is Apparent
- Reduction in Polymer Usage



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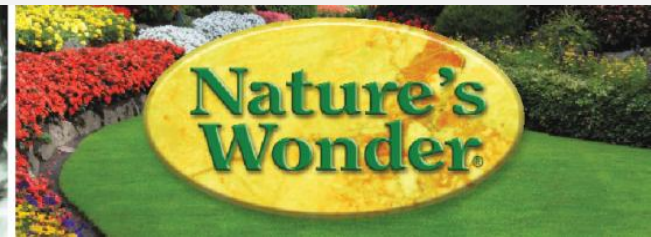
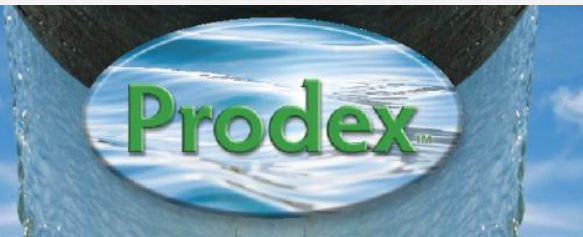
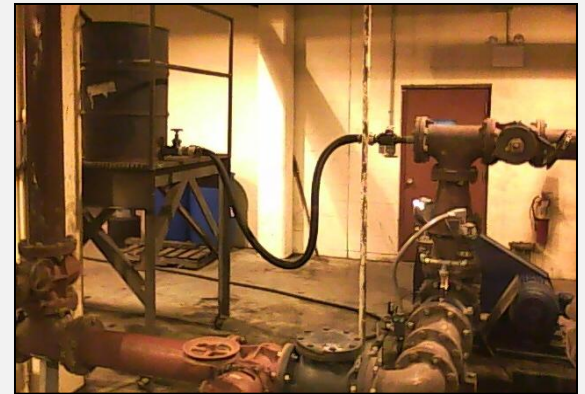


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## Biogas Project Profile: Ocean County UA, *Bayville, NJ* (24 MGD)

- **Project Goals**
  - Increase methane production in one of three digesters
  - Treated digester #3 with 4 gallons per day of BAE
  - Added material at the suction side of the digester pump
- **Results**
  - Increased monthly production by 130,180 ft<sup>3</sup> of gas in five months
  - Value of Increased KWH \$77,982







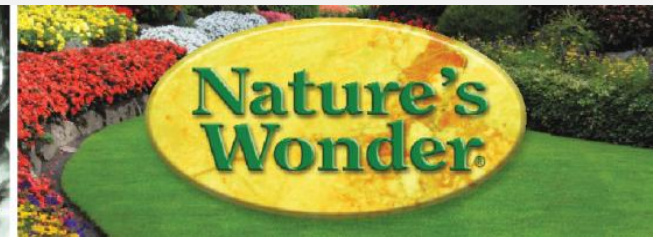
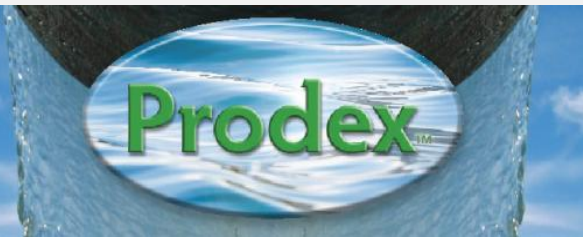
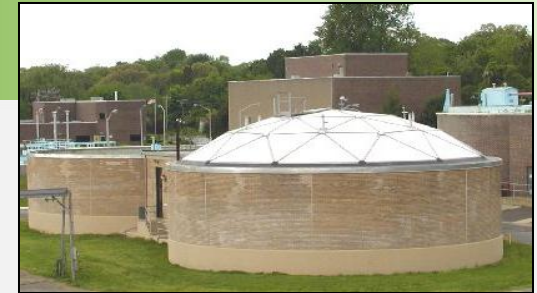
## Biogas Project Profile: Cumberland Co. UA, *Bridgeton, NJ* (3 MGD)

- **Challenges**

- Unable to meet Class-A Biosolids requirement of 38% VSD
- Second phase dominated by acid forming bacteria limiting methane production and causing major odor
- High secondary clarifier blankets and surface scum problems

- **Results**

- Met the demands of all challenges
- EPA National 1st Place Award "Beneficial Reuse of Biosolids"



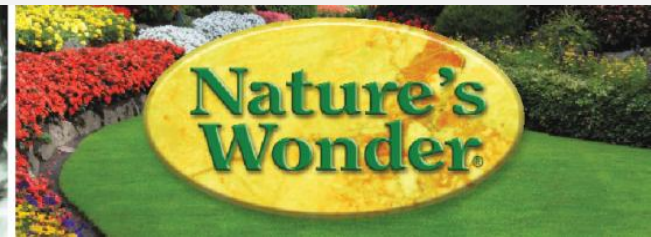
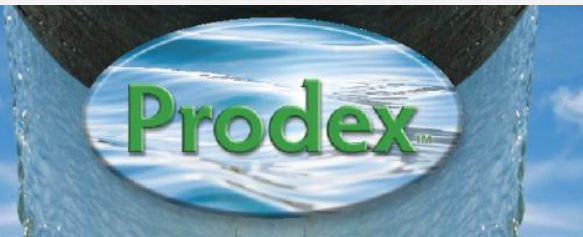


## Biogas Project Profile:

### Linden Roselle SA, *Linden, NJ* (10 MGD)

- Used BAE to measure gas production potential.
- Data used to maximize CHP system design and equipment selection.
- Results:

	Before	30 Days	60 Days
Methane:	109,000 ft <sup>3</sup>	160,000 ft <sup>3</sup>	178,000 ft <sup>3</sup>
% Increase:	-	46%	63%







## Biogas Project Profile: Evaluation Highlights

- In Progress:
  - Back River WWTF, Baltimore, MD
  - Stevens Point, WI
  - Ironwood, MI
- Upcoming:
  - Miami, FL
  - Derry Twp (Hershey), PA
  - Franklin Twp, PA
  - Rahway, NJ
  - Minneapolis, MN
  - Boston, MA
  - California: 5-7 WWTPs



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## **BAE<sup>®</sup>: Operational Efficiency Application**

- Decreases Effluent TSS and BOD levels
- Improves Sludge Settling
- Reduces Sludge Hauling Costs
- Maintains Nitrification at low dissolved oxygen levels
- Improves Energy Efficiency
- Reduces Operational Costs



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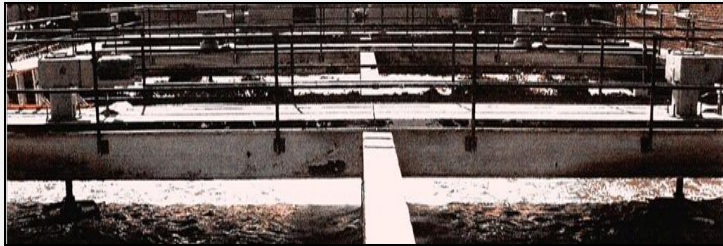


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# Op. Eff. Project Profile: Cinnaminson SA, NJ (1.3 MGD)

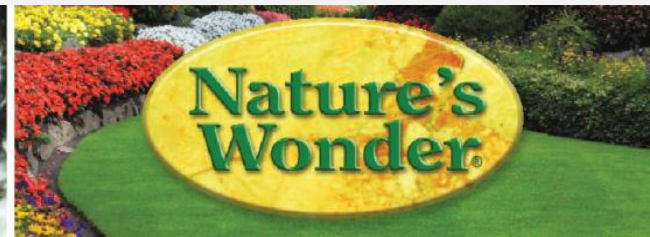
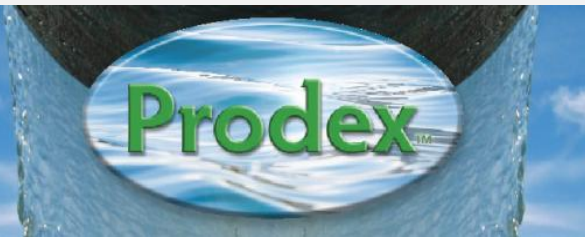
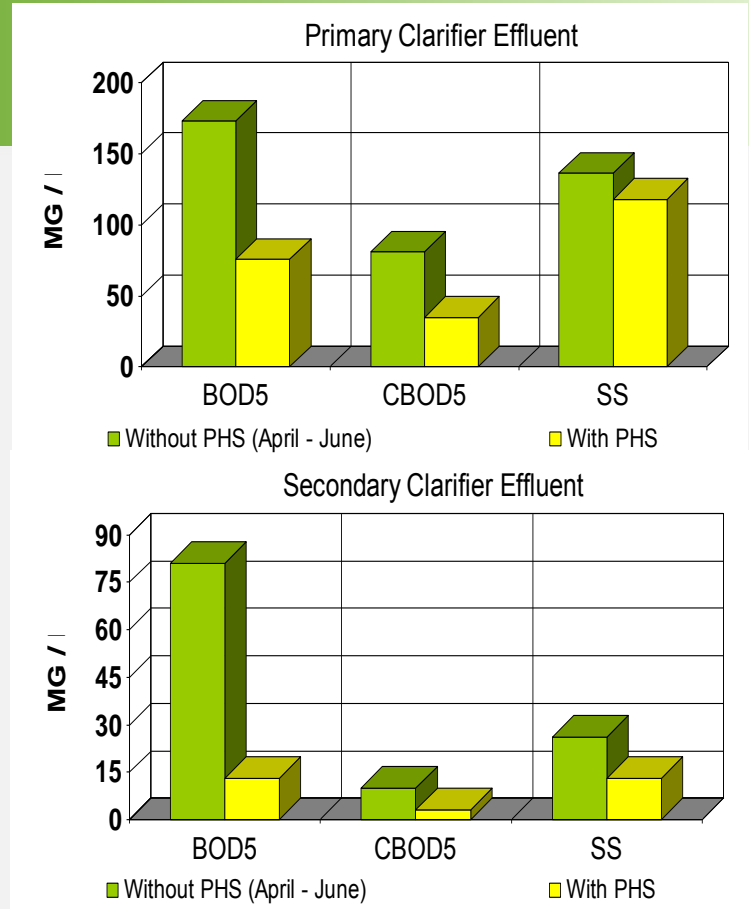


Secondary Clarifier Reduction: BOD 83%, CBOD 70%, SS 50%

### Yearly Operational Savings

Caustic Soda	\$8,200
Clarifier Polymer	\$21,316
Aeration Tank	\$31,677
Sludge Disposal	<u>\$39,000</u>
Total Yearly Savings	\$100,193

SS reduction equaled 125 lbs per day totaling 45,625 lbs per year

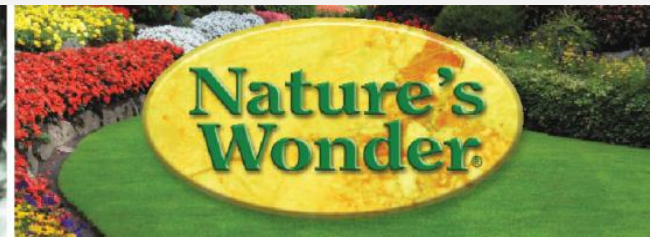
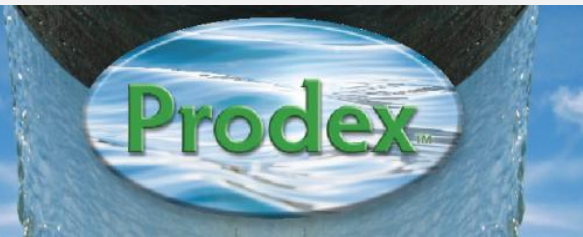




## Op. Eff. Project Profile: Gloucester Co UA, *West Deptford, NJ* (1.3 MGD)

- Plant experienced an excessive biological disruption from surfactants being discharged into the collection system.
- This dramatically affected the biology in the plant, placing the plant in violation for loading rates exceeding their permit limit.
- Would have incurred significant fines should this have occurred for another 30 days.
- Results:
  - At the beginning of the fourth sludge cycle:
    - Older forms of microbial populations began to appear indicating an abundant lower life form population
  - At the conclusion of the thirty day period:
    - Laboratory examination determined that higher life forms had established a healthy and abundant population.

*(Sludge retention time was approximately three days)*







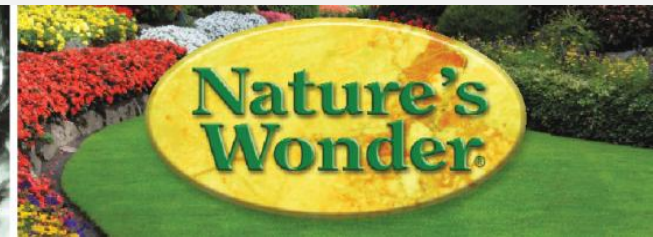
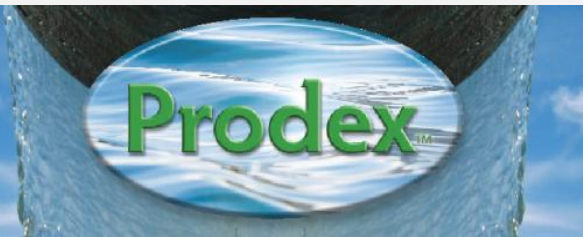
## Op. Eff. Project Profile: Lambertville MUA, NJ (1 MGD)

- **Challenges**

- Failing contactors causing high solids & ammonia effluent issues
- Ongoing odor complications
- Plant upgrade 12 months away DEP mandates dictated immediate restitution to effluent challenges

- **Results**

- Ammonia reductions as high as 29% and solids reductions by 19%
- Odors dissipated measurably
- Subjugated diesel fuel discharge





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## Conclusion

- BAE meets the growing demands authorities face with increasing populations and aging infrastructures
- BAE is a low cost wastewater treatment option that eliminates or defers necessary capital investments needed for expansion
- Most importantly BAE provides an organic solution to wastewater treatment challenges and will ultimately provide a safe and sustainable environment for future generations



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**Thank You**

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