GLASCO UV

ULTRAVIOLET DISINFECTION

2013

Municipal Markets

www.glascouv.com

Glasco Timeline

- **1940's** – NYC based industrial manufacturer - pharmaceutical and food grade stainless steel fabricator
- **1960's** - Added Industrial UV disinfection division
- **1999** - Glasco UV and Sunlight Systems enters UV municipal market
- **2011** - Acquired Sunlight Systems municipal product line from Siemens Water Technologies.

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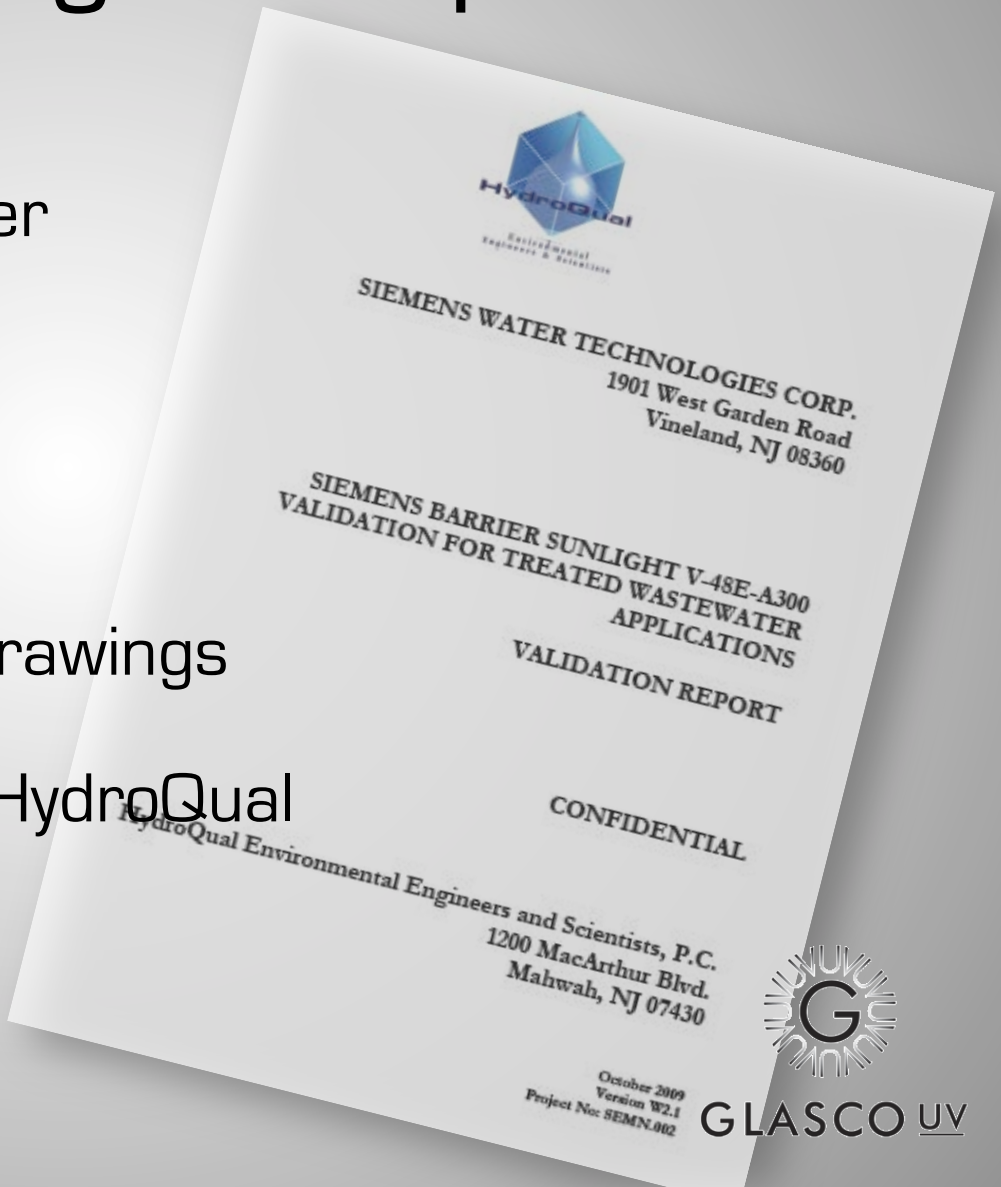
Siemens/Sunlight Acquisition

- Authorized Manufacturer
- Factory Service Center
- All inventory
- 10,000+ engineering drawings
- Bioassay catalog as by HydroQual



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Glasco UV System Offerings

- Wastewater Disinfection
  - Open channel - Horizontal and Vertical
  - Chambered wastewater
- Drinking Water
- Industrial process water
- Residential / Commercial

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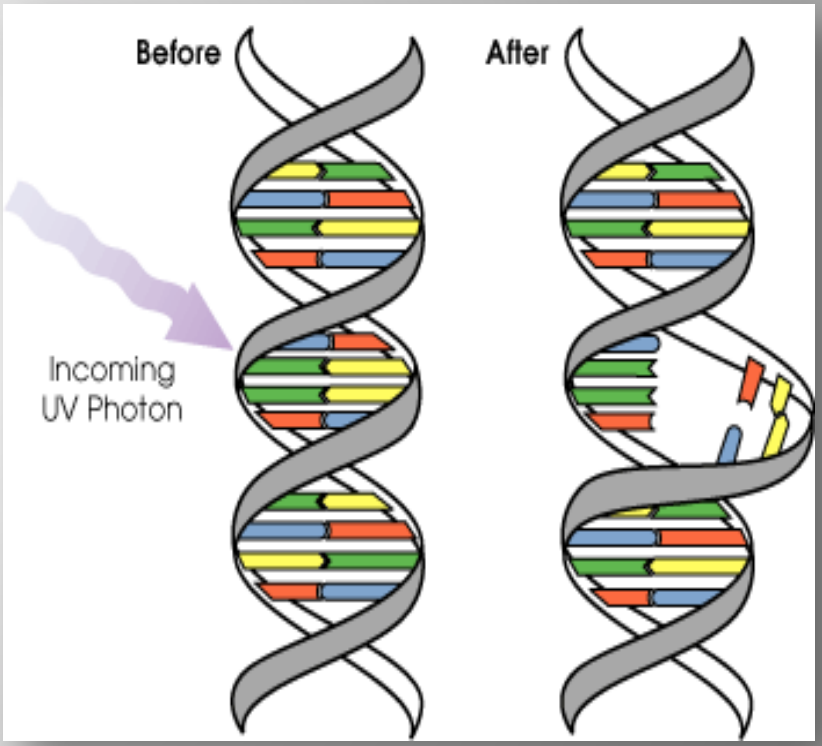
About UV Light Disinfection

- UV light damages DNA
- 254 nm wavelength most effective
- Dosage is expressed millijoules/cm2 (mJ/cm2)
- Sizing based on Intensity (mW/cm2) x Contact Time (sec)
- *Chlorine is concentration (mg/L) x Contact Time (minutes)*



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How Does it Work?

Intensity (mW/cm2) x Contact Time (sec)

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How UV Systems are Sized

- Basic information required:
  - Peak Flow — Peak instant flow rate (avg and min)
  - UVT% — UV % transmission of effluent (typ 50-70%)
  - TSS — Total Suspended Solids (30 mg/l)
  - BOD5 — Biological Oxygen Demand (30 mg/l)
  - Fe — Iron Level (<0.3 mg/)
  - Influent — Count in (???,??? mpn/100 ml) – Usually unknown
  - Discharge Permit — ??/100 ml
  - Location — (indoor or outdoor)

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How UV Companies Size

- Methods for sizing
  - Bioassay (biology)
    - Systems biologically tested
    - Always used for municipal drinking water

  - EPA Point Source Summation Method – UV DIS (light physics)
    - Uses flow rate, UVT, lamp spacing, lamp output, end of lamp life, fouling
    - CON: UV manufacturer's can overstate their lamp output and the lamp life. This makes it harder for engineers to design specifications

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Johnstown, NY Validation

Vertical, Horizontal and Chambered wastewater validated

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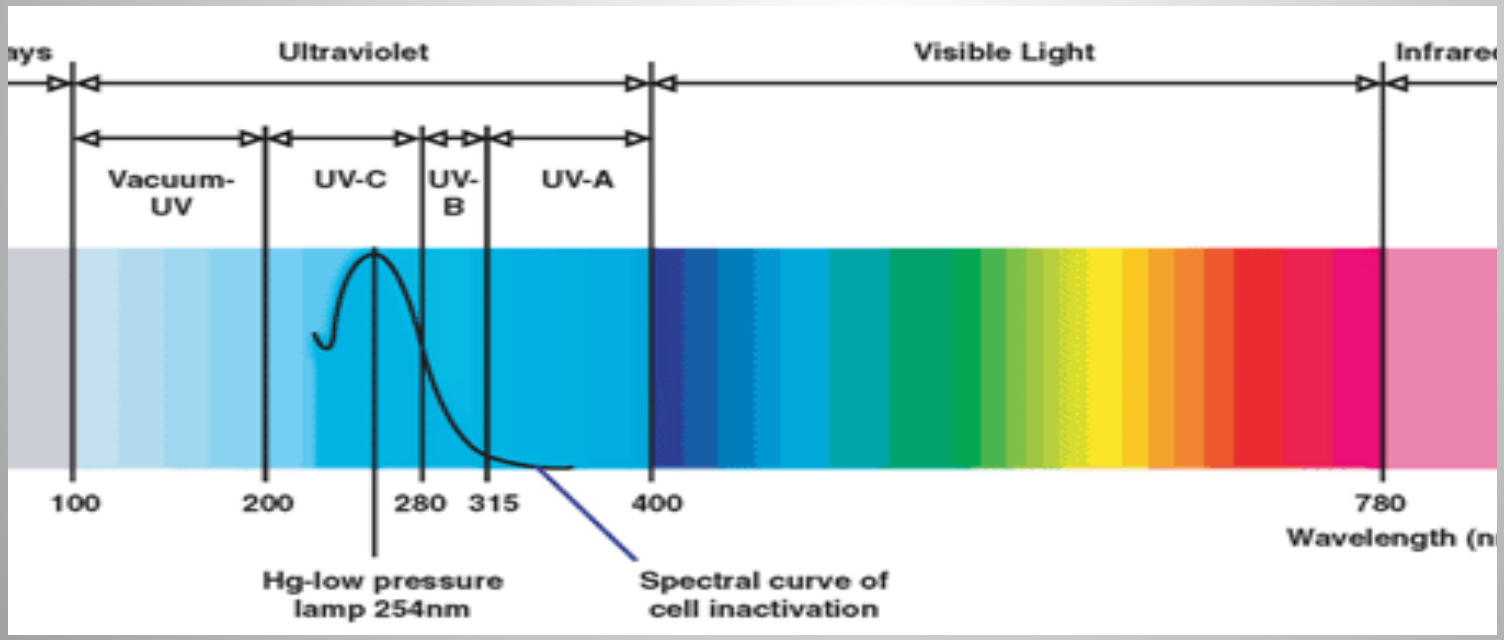
UV Light - General

- UVA – Long Waves causes skin to wrinkle
- UVB – Shorter Waves causes skin cancer
- UVC – Shortest Waves filtered by ozone layer



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What Comprises System?

- Major Components
  - Ultraviolet lamps
  - Quartz sleeves to protect lamps
  - Ballasts to drive the UV lamps
  - UV monitoring sensors

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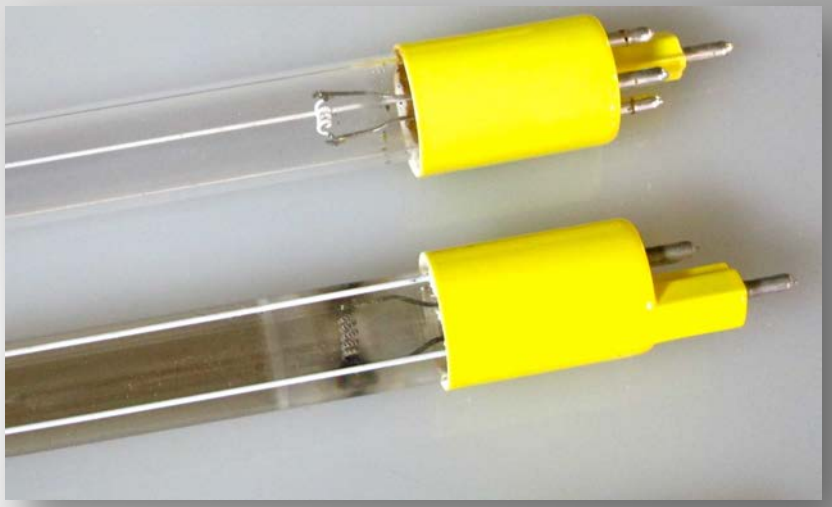
UV Lamps

- Low pressure
  - Standard and HO
  - High Intensity Amalgam
- 90%+ output in 254 nm
- 12,000 hrs maintain 95% output
- Rated in watts
- Converts to UVC watts (35%)
- Solarizes (Darkens) at end of lamp life



Glasco UV Lamps

- Low pressure – High Output
  - 155 watts - 52 UVC watts 33%
  - 12,000 hour lamp life
  - 90% end of lamp life output
- Low Pressure – High Intensity “Amalgam”
  - 320 watts - 110 UVC watts 34%
  - 12,000 hour lamp life
  - 95% end of lamp life output

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Quartz Sleeves

- GE Type 214 material
- Protects lamp
- Allows UVC light to pass through
- Can foul with minerals

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Electronic Ballasts

- Mercury (Hg) Vapor Lamps require a ballast to operate
- Converts line current into the proper voltage, amperage and waveform
- Provides proper warm up and cool down
- Built in protection and controls (input power quality correction, end of lamp life, dimming)
- Needs to be kept cool and dry
- Life >10 years
- Ballast Control Centers house ballasts

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Ballast Control Center

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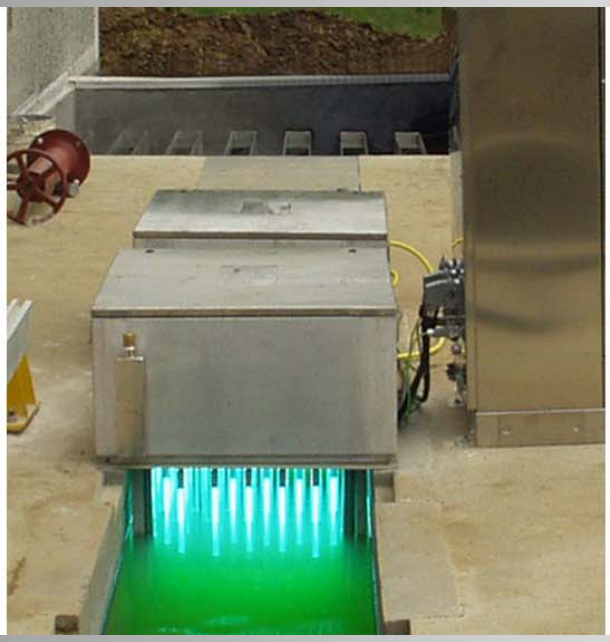
UV Monitoring

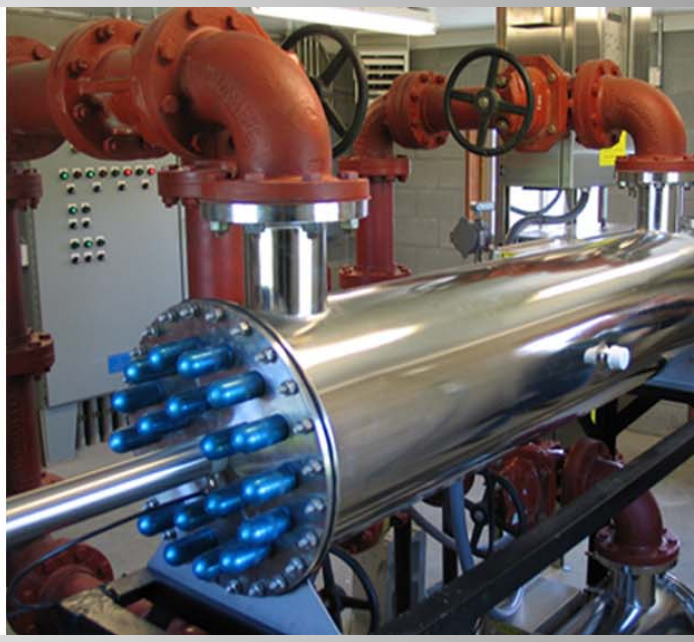
- A UV Sensor monitors output of a lamp offer lifetime (new 100%)
- Some sensors view an array of lamps and are auto cleaned - others monitor a single lamp
- Low UV reading may mean (lamps aging, fouled quartz or changes in wastewater quality)

Wastewater Configurations



GLOW Vertical “VC”

GLOW Horizontal “HC”



ILLUMINATION “IL”

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Vertical Open Channel “VC”

- About
  - Low pressure UV lamps (low pressure HO and Amalgam)
  - Automatic quartz cleaning
  - Sizes: 30” or 60” water level
  - Validated by HydroQual/HDR

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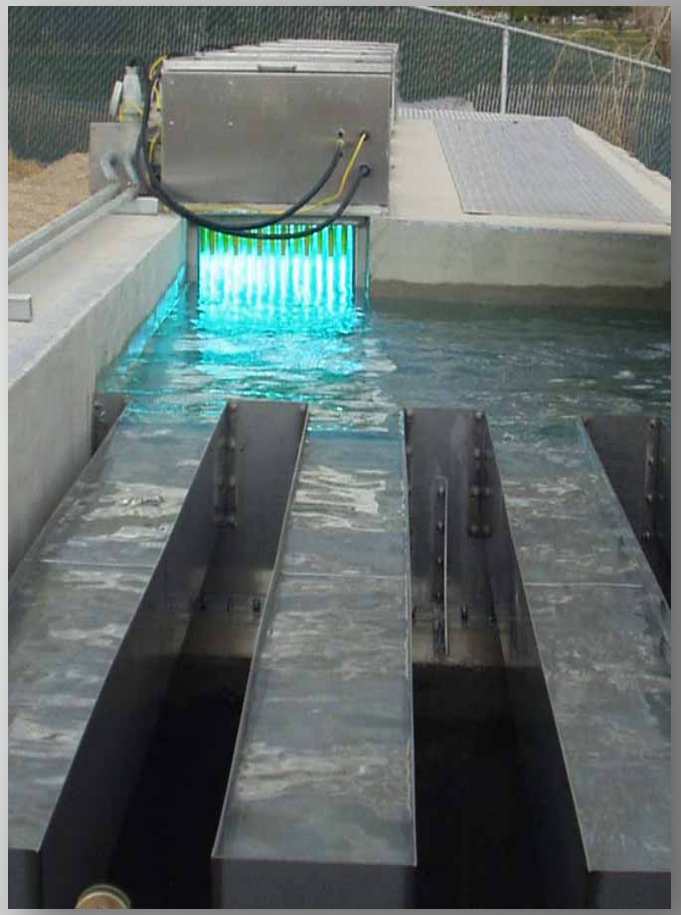
Vertical Benefits

- Benefits
  - Treats 30” or 60” water level
  - Biologically Validated
  - Easy lamp change – no seals
  - Automatic quartz cleaning
  - Flow and dose paced – energy save
  - Small footprint
  - Retro fit chlorine contact channels



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Vertical Module

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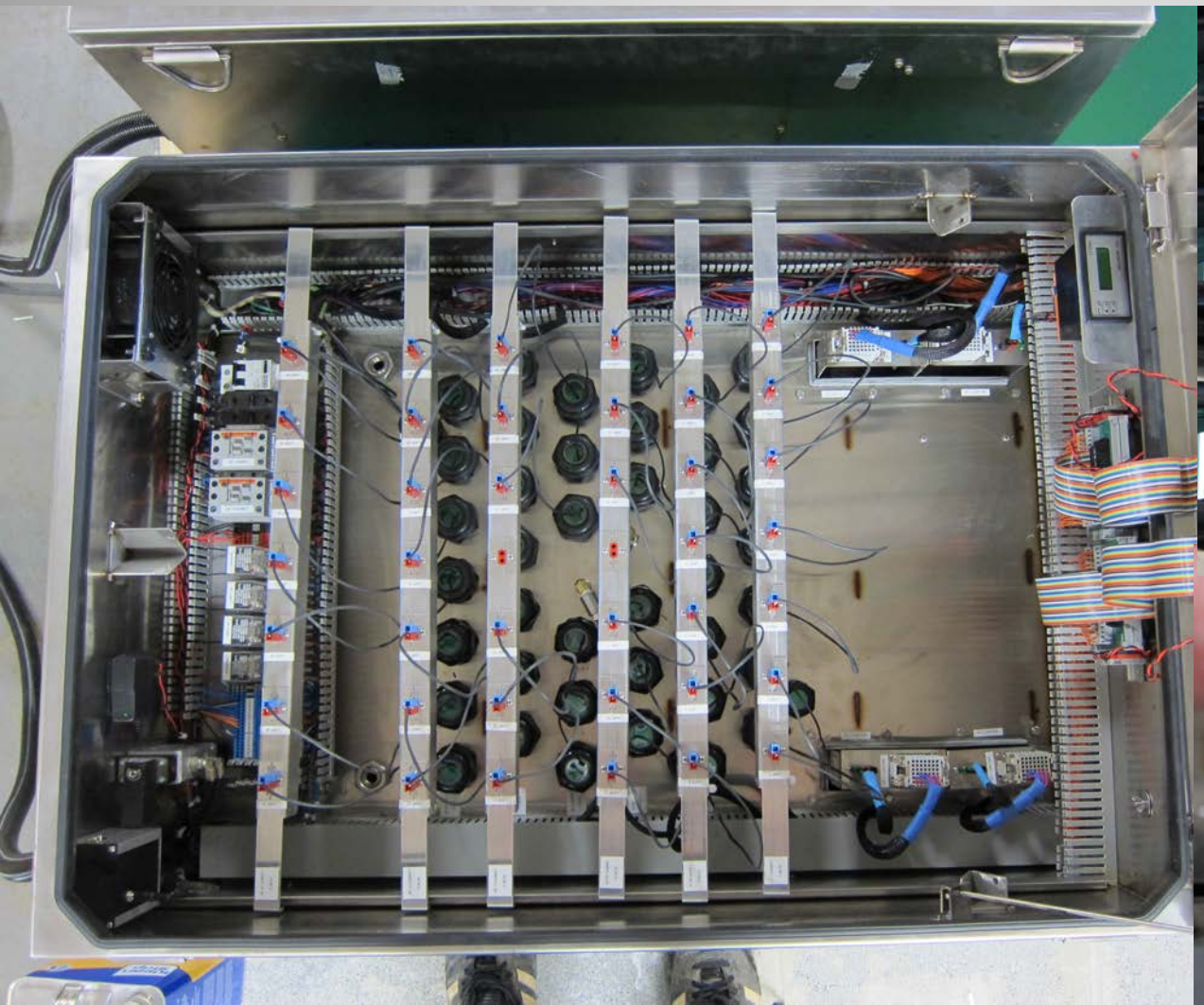
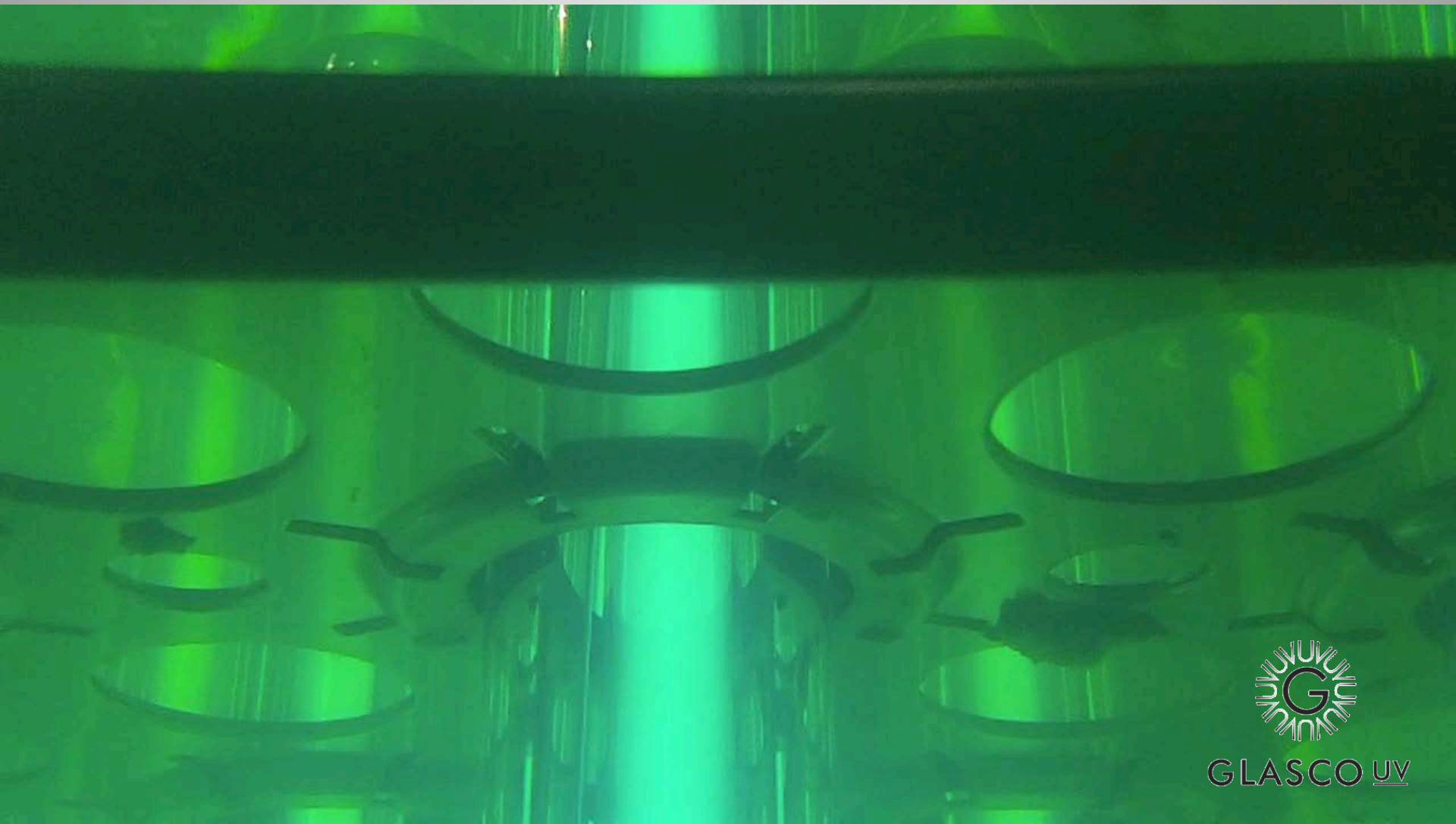
Maintenance – Lamp Change



Vertical Quartz Cleaning



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Brockton MA - 60 MGD

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10 year Operational Plant (NC - USA)

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GLOW Horizontal Low Flow

- Up to 1+ MGD
- Stainless steel channel or can be embedded into concrete
- Remote Ballast Control Center
- Horizontal modules
- UV monitoring
- Optional automatic cleaning


GLOW-5000
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GLOW-6000

- Millions of gallons per day
- Amalgam lamp technologies (320 & 450 Watts)
- Stainless steel or concrete channel
- Remote Ballast Control Center
- Horizontal modules
- UV monitoring
- Optional automatic cleaning

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GLOW Horizontal Large Flow

- Up to Millions of Gallons per Day
- Concrete channels by others
- Remote Ballast Control Center
- Horizontal modules
- UV monitoring
- Optional automatic cleaning
- Optional PLC control

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Horizontal Module

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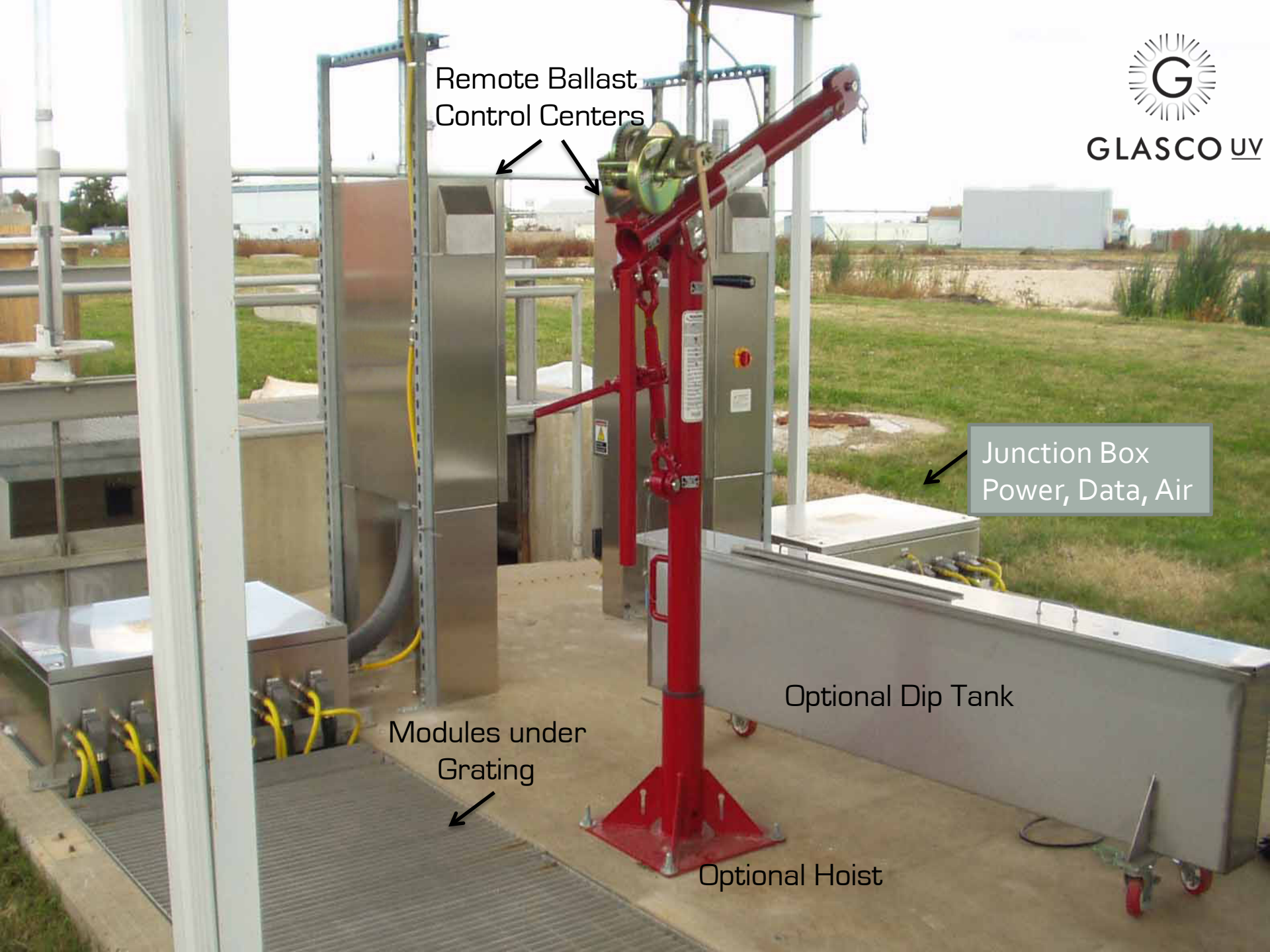
Remote Ballast
Control Centers
Junction Box
Power, Data, Air
Optional Dip Tank
Modules under
Grating
Optional Hoist
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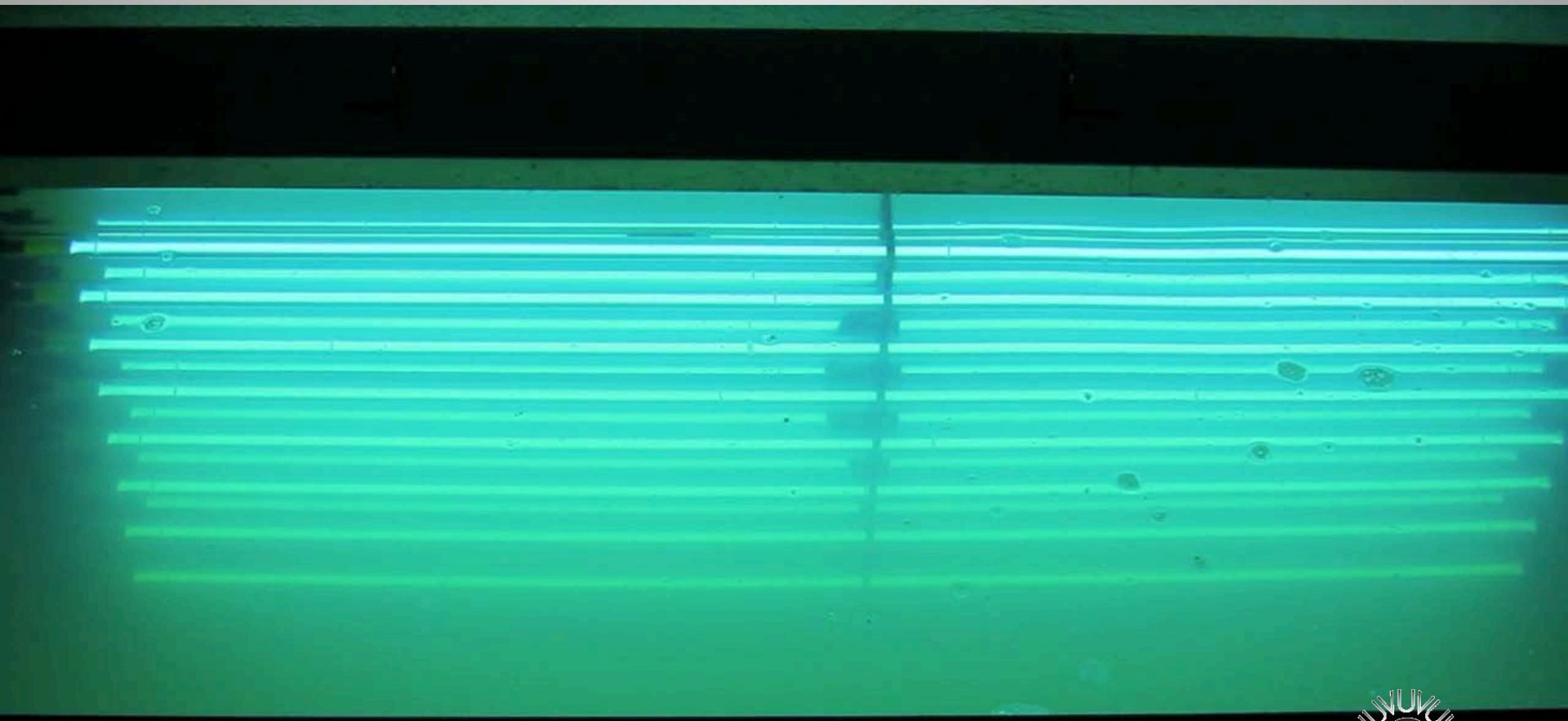
Horizontal Quartz Cleaning



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Horizontal Lamp Change

- Modules removed from effluent
- O-ring seal undone
- Quartz removed, lamp removed
- New lamp is installed
- Seal redone
- Placed back in operation

10 year Operational Plant (NJ - USA)


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Illumination Wastewater “IL”

- Up to 4 MGD per vessel
- Low pressure HO and Amalgam UV lamps
- Remote Ballast Control Center
- UV monitoring
- Optional automatic cleaning
- Biologically validated by HydroQual

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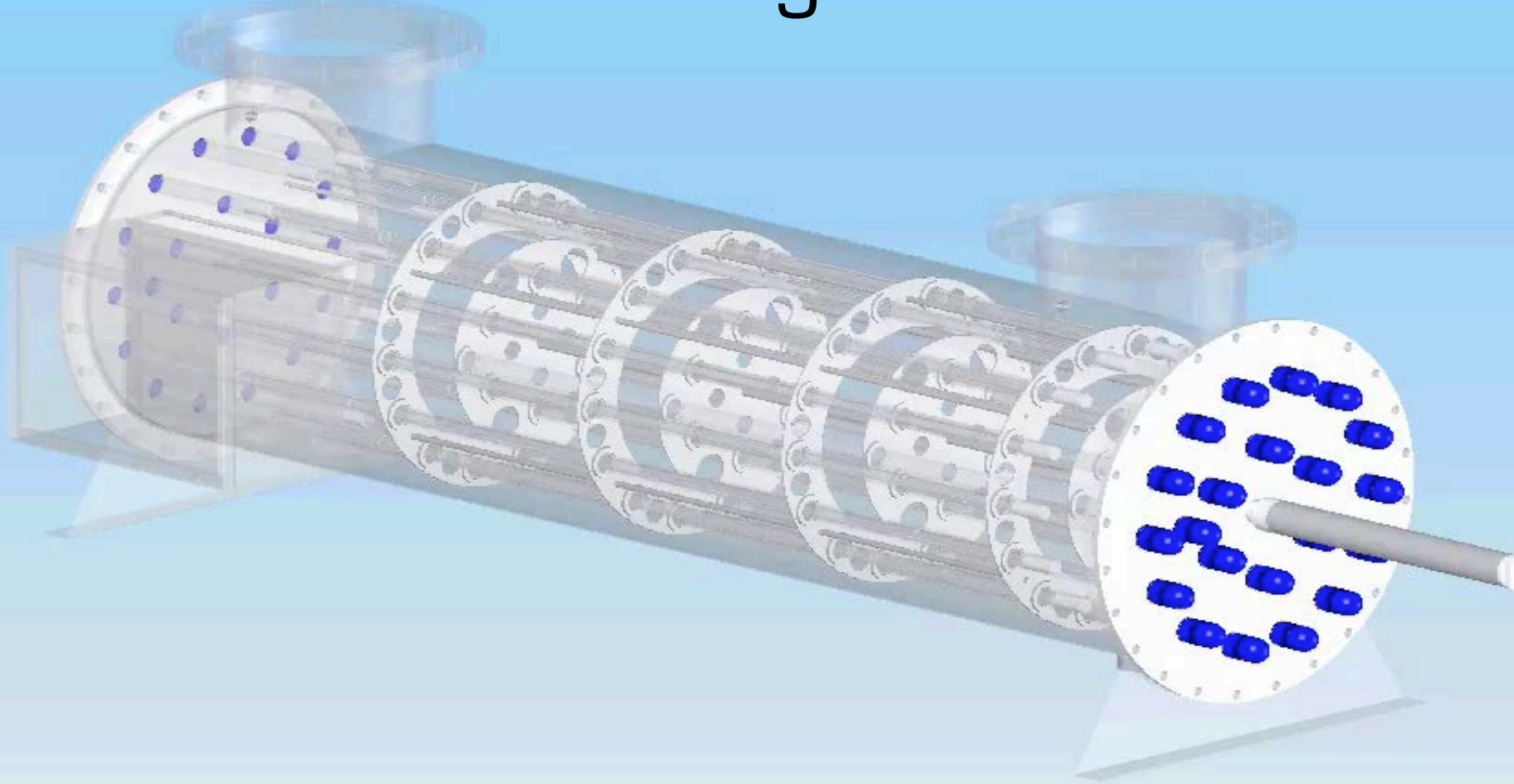
DANGER

Automatic Cleaning



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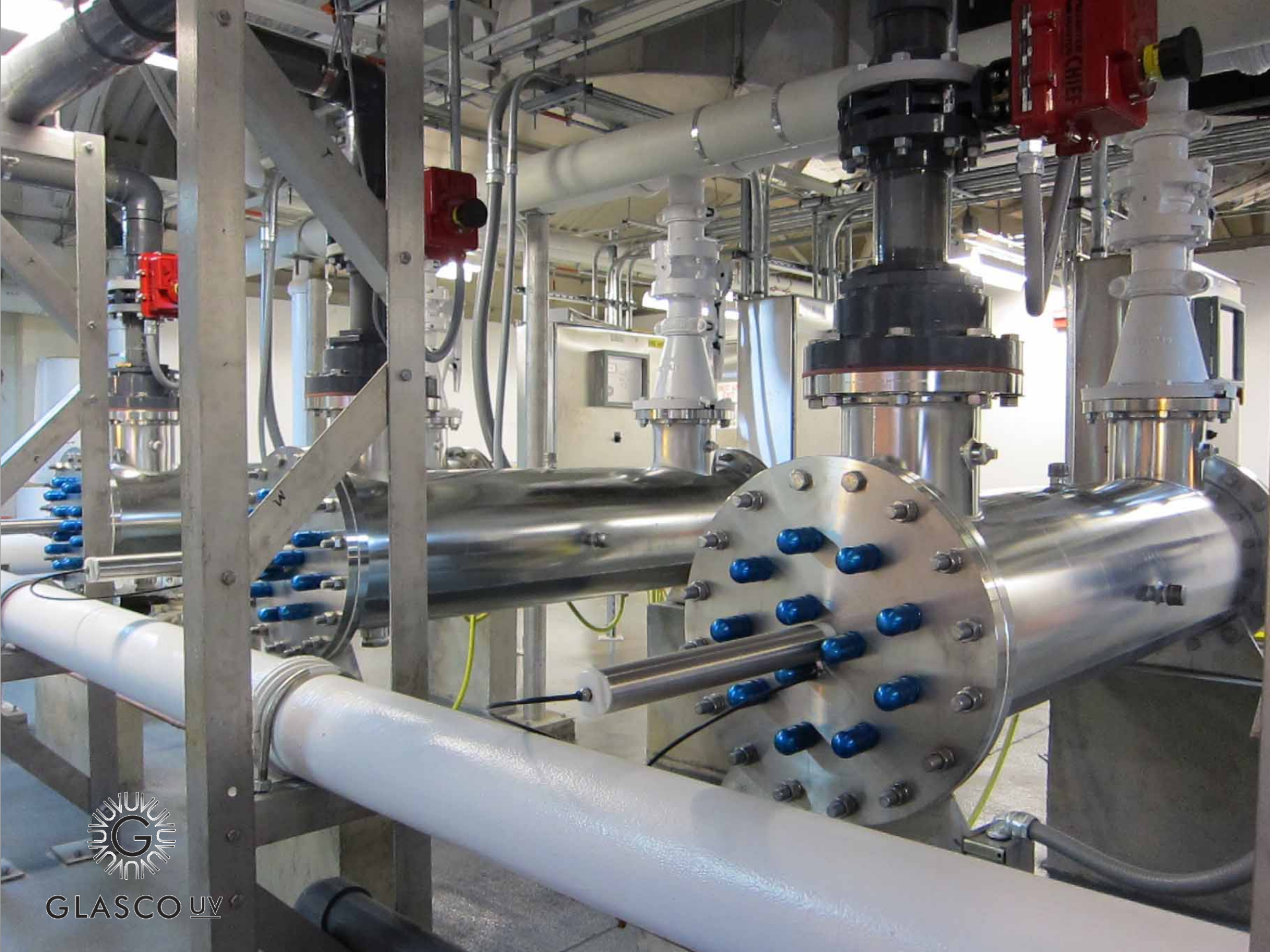
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Drinking Water – SUN Series

- Flows up to 2.0 MGD
  - 20 amalgam 320 W lamps
  - Validated - 2.0 MGD 70% UVT
  - DVGW - UV monitoring
  - High heat monitoring
  - PLC controls
  - Automatic or manual quartz cleaning

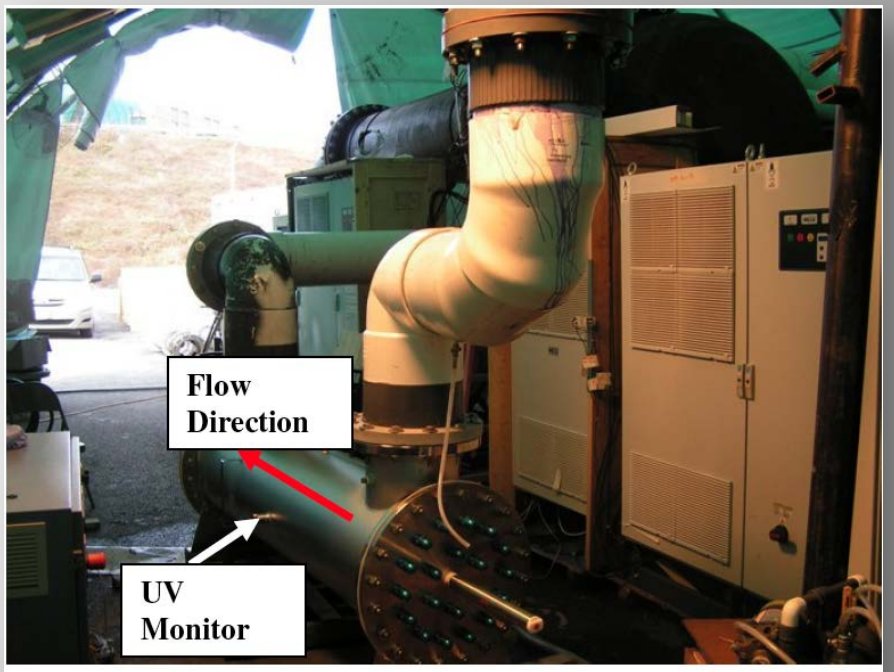

Figure 1-5. Siemens SUN-20E-A300-AW on the Test Stand

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Inline Wastewater - Inline LS

- Light Speed 4000 and 8000
- Medium pressure
  - 4,000 watts
  - 8,000 watts

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For further information

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