

Onsite Chlorine Generation

What We Have Learned

Margo M. Weigner, P.E. | Engineer

William L. McGinty, III | Owner

PA-AWWA

65th Annual Conference

Hershey, PA

April 25, 2013



Highlighted Project Bubbling Springs Well Station

Location: River Road, Conshohocken, PA

Ultimate Capacity: 2.4 mgd

Design Chlorine Demand: 3 mg/L

$$2.4 \text{ MG/day} \times 8.34 \text{ lb-L/mg-MG} \times 3 \text{ mg/L} = 60 \text{ lb/day}$$

75 lb/day unit was selected



Introduction How does it work?



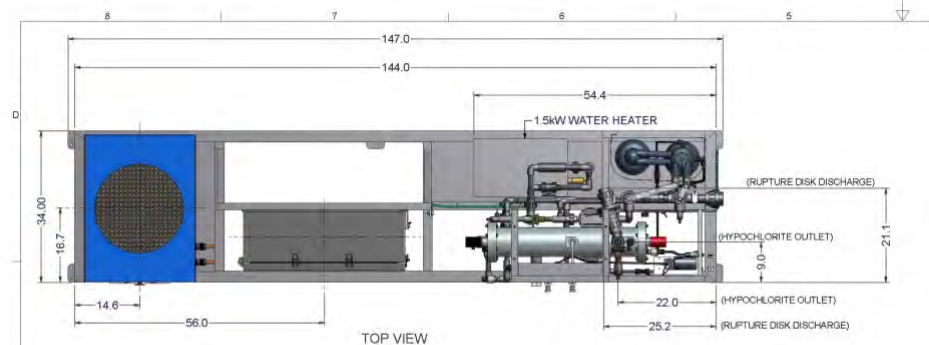
Introduction Three Main Topics

- Design
- Installation
- Operation

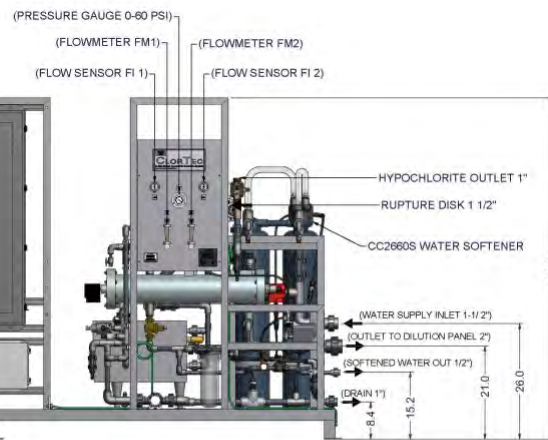
Design Severn Trent Services ClorTec®

Manufacturer's Drawings

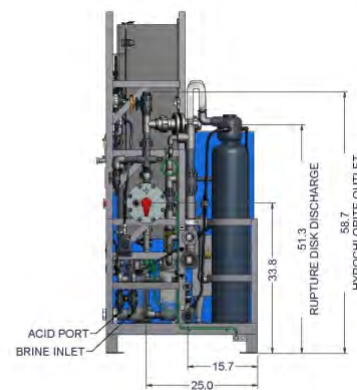
- Skid Arrangement
 - Footprint Dimensions
 - Height
 - Clearance



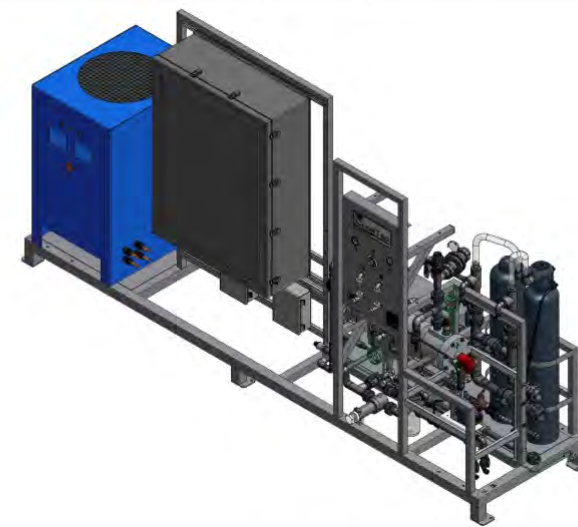
TOP VIEW



FRONT VIEW



SIDE VIEW



ISOMETRIC VIEW

DRAWING STATUS:		NOTICE OF CONFIDENTIALITY	
SEVERN TREAT WATER PURIFICATION, INC.		THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION THAT IS THE SOLE PROPERTY OF SEVERN TREAT WATER PURIFICATION, INC. AND IS TO BE RETURNED TO SEVERN TREAT WATER PURIFICATION, INC. UPON REQUEST. THE CONTENTS MAY NOT BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN CONSENT OF SEVERN TREAT WATER PURIFICATION, INC.	
CLORTEC®		TOLERANCES	
IRENT		ALL DIMENSIONS ARE IN INCHES (IN) AND MILLIMETER (MM)	
SERVICES		FUNCTIONS	
UAT		A1 1/2" A1 1/2"	
Severn Treat Water Purification, Inc.		A 1/2" A 1/2"	
2660 Columbia Street		A 1/2" A 1/2"	
Torrance, California 90503 USA		A 1/2" A 1/2"	
Tel: 310-618-9700 Fax: 310-618-1384		A 1/2" A 1/2"	
www.severntreatservices.com		A 1/2" A 1/2"	
CUSTOMER: A.A. MEYERS		PROJECT: AQUA PA-SUBBLING SPRINGS STATION	
TITLE: CT-75 (75 LBSOAY) SKID MOUNTED OSHG SYSTEM OVERALL DIMS: 147" W x 34" D x 76.75" H		REV: D	
PREPARED BY: ATREVI(NH) DATE: 3/21/12		DWG NO.: CP00203-GA-02	
CHECKED BY: CMAQUIRAN DATE: 3/21/12		JOB NO.: CP00203	
APPROVED BY: MWYTRICK DATE: 3/21/12		REV: D	



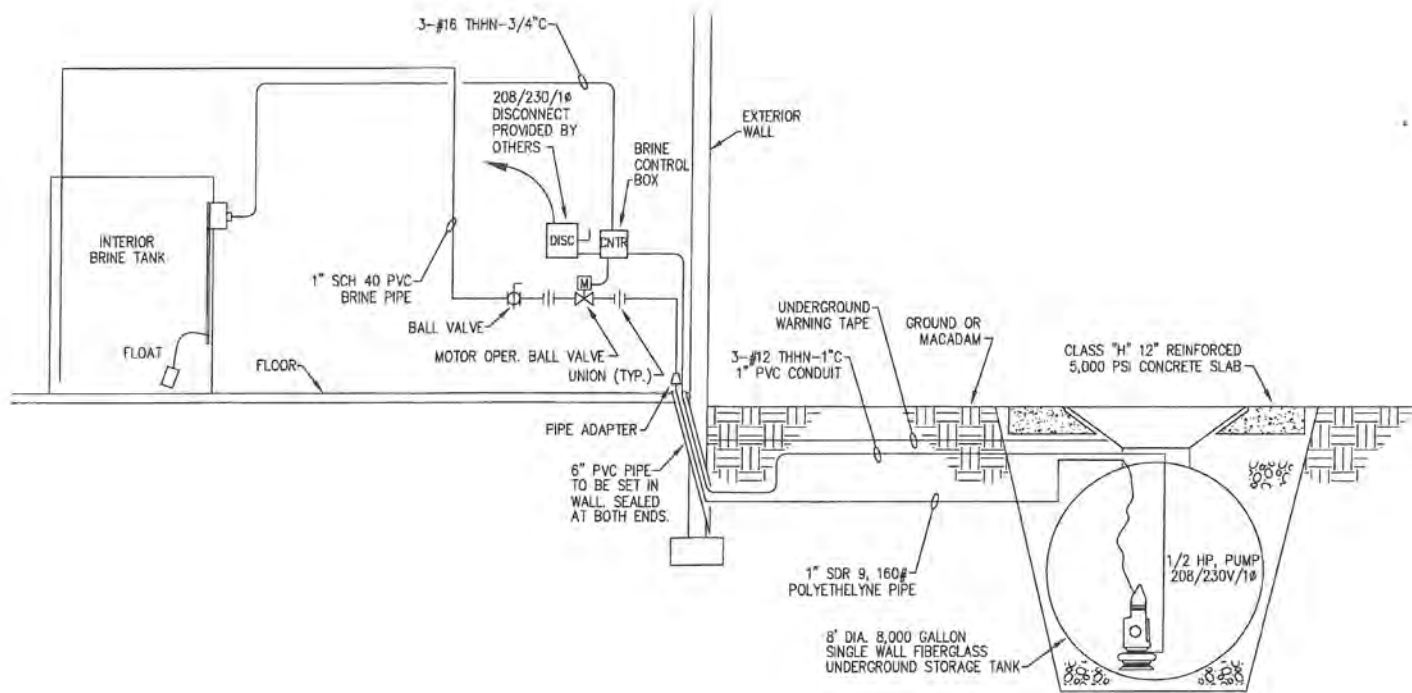
Fig. 2a - Typical medium size (CT-75 to CT-300) Hypochlorite generator system mounted on a blue powder coated skid frame



Design Severn Trent Services ClorTec®

Manufacturer's Drawings

- P&ID
 - What's coming in?
 - What's going out?



TITLE: AUTOBRINE SYSTEM DRAWING		PROJECT NO.
BUBBLING SPRINGS WELL PROJECT AT AQUA, PENNSYLVANIA		177777
		DATE:
		3/18/12
SCALE:		NO SCALE
SHEET NO.		WS-1
AUTOBRINE -THE CIPIC COMPANY SALT- 249 WEST BODSVILLE ROAD, LANCASTER, PA 17601 TELE (717) 396-0500 FAX (717) 396-0506		

Underground Brine tank in driveway



Underground Brine tank in driveway when done



Remote notification of level



Installation / Construction Requirements

Room Design

- Plumbing
 - Drains
- Ventilation
 - Air Changes
- Hydrogen Vent Stack
 - Specifics
- Hydrogen Detection
- Controls
 - Integrated with Station PLC



Operation of OSGs: It is not just mixing Salt and Water

OSGs use 3 pounds of salt+15 gallons of softened water + 2kWh of electrical energy to make one pound chlorine.

- Brine Solutions are about 2.8 pounds of Salt per gallon
- Water must be softened to less than 51.3 mg/l or 3 grains of hardness
- Salt Specifications
 - Calcium & Magnesium as Calcium <8.0ppm
 - Moisture <0.020%
 - Sodium Chloride 99.99%

ClorTec® unit at work



The MIOX® unit at Bell Tavern



A MIOX® and ClorTec® Cell



Finished 0.8% Sodium Hypochlorite Bulk Tank at Bubbling Springs Well



Operational Cost Comparison at Bubbling Springs Well Station		
Water pumped out to system	2MGD	
Amount of sodium hypochlorite per day	18.2 Pounds	
Cost of small bulk delivered	\$2.09 Gallon	
Total for cost of the bulk sodium hypochlorite	\$38.04/day	
OSG Electricity cost	\$0.14 kWh	
Electrical use	36.4 kWh/day	
Daily Electric cost	\$5.10	
Daily Brine cost	\$13.28	
Daily Dry Salt cost	\$7.30	
Savings of OSG with Brine to Sodium Hypochlorite		\$20.00 per day
Savings of OSG with Dry Salt to Sodium Hypochlorite		\$25.64 per day

Daily Cost Savings at Current
Chlorine Demand

Operational Cost Comparison at Bubbling Springs Well Station		
Water pumped out to system	2MGD	
Amount of sodium hypochlorite per day	75 Pounds	
Cost of small bulk delivered	\$2.09 Gallon	
Total for cost of the bulk sodium hypochlorite	\$156.75/day	
OSG Electricity cost	\$0.14 kWh	
Electrical use	150.0 kWh/day	
Daily Electric cost	\$21.00	
Daily Brine cost	\$54.75	
Daily Dry Salt cost	\$30.08	
Savings of OSG with Brine to Sodium Hypochlorite		\$81.00 per day
Savings of OSG with Dry Salt to Sodium Hypochlorite		\$105.67 per day

Possible Maximum Savings

This is with the OSG unit making the maximum amount of Chlorine of 75 pound a day.

Advantages to using an OSG

- **Environmentally Safer**
- **Cost Effective**
- **Steady Chemical State**
- **Easy to Maintain**

Acknowledgements

- Bill McGinty, Aqua, Manager of Treatment/QC
- Mike Convery, Aqua, Project Manager
- Dave Pyrzs, Pyrzs Water, Vendor
- Severn Trent Services, Manufacturer
- Cope Salt Company, Supplier
- Joey Koehler, Allan A. Myers, Contractor/Installer

Questions / Comments





www.ghd.com