# ZoneProtector - Multipoint Gas Detection

## ----Gas Detection in Wastewater Treatment and Collection Facilities

### *Gas Detection and Alarm Requirement from NFPA 820*

NFPA 820, Standard for Fire Protection in Wastewater Treatment and Collection Facilities, establishes minimum requirements for protection against fire and explosion hazards in wastewater treatment plants. The requirements shall apply to new installations, additions or modifications made to existing facilities. The requirements shall be used by owners in a risk assessment to identify the areas of a treatment plant that are vulnerable to fire or other loss. Combustible Gas Detection, basically for Methane (CH4), is required in many areas. Hydrogen Sulfide (H2S) and Oxygen (O2) monitoring are also frequently used. Methane Gas detection points are placed near the roof of a structure. Oxygen and Hydrogen Sulfide detection points are usually placed in the breathing zone for human protection. Alarm Signaling for combustible gas detectors and ventilation are mandated by NFPA 820.

### *Ventilation Requirement from NFPA 820*

Most semi-enclosed and enclosed process areas in wastewater treatment facilities are classified as Class I, Division 1 or Division 2, Group D. Proper ventilation of an area may reduce classification to Division 2 or non-classified. Refer to NEC Article 500 and NFPA 496 for more information. NFPA 820 requires all the ventilation of the hazardous location need to be monitored.

**Collection Systems' Locations (from NFPA 820 Table 4.2.2 ):**

| Location | Area Class | Hazard | Fire Detection | Signaling |
|---|---|---|---|---|
| Residential Water Pump Station Wet Well | Div 2 or Unclassified | LEL (CH4 Flammable gases and floating flammable liquids) | | Audio/Visual Alarm, Locl/Remote |
| Sewage Pumping Station Wet Well | Div 1 or Div 2 | LEL, H2S, O2 | | Audio/Visual Alarm, Locl/Remote |
| Odor Control Facility | Div 2 or Unclassified | LEL | Yes | Audio/Visual Alarm, Locl/Remote |

**Solid Treatment Systems' Locations (from NFPA 820 Table 6.2.2 ):**

| Location | Area Class | Hazard | Fire Detection | Signaling |
|---|---|---|---|---|
| Scum-Handling Building | Div 2 or unclassified | LEL (CH4 Flammable gases and floating flammable liquids) | | Audio/Visual Alarm, Locl/Remote |
| Scum Pits, Pumping Area | Div 1 or Div 2 | LEL | | Audio/Visual Alarm, Locl/Remote |
| Sludge Thickener (Clarifier) | Div 1 or Div 2 | LEL, O2 | | Audio/Visual Alarm, Locl/Remote |
| Sludge Pumping Station Dry Well | Div 2 or unclassified | LEL, O2 | | Audio/Visual Alarm, Locl/Remote |
| Sludge Storage Wet Wells, Pit, Holding Tanks Area | Div 1 or Div 2 | LEL, O2 | | Audio/Visual Alarm, Locl/Remote |
| Sludge Blending Tanks and Holding Wells | Div 1 or Div 2 | LEL, O2 | | Audio/Visual Alarm, Locl/Remote |
| Anaerobic Digesters & Processing | Div 1 or Div 2 | LEL, O2 | | Audio/Visual Alarm, Locl/Remote |
| Underground (Piping) Tunnels | Div 1 or Div 2 | LEL | Yes | Audio/Visual Alarm, Locl/Remote |

### *What is required to have a gas detection system to meet the requirement?*

- Methane gas detectors shall be set to alarm at 10 percent of the lower explosive limit (LEL) in accordance with the manufacturer's calibration instructions and shall be connected to alarm signaling systems. Oxygen and H2S detectors should be set per OSHA requirements
- Controller to monitor gas concentration and Ventilation
- Audio/Visual Alarm

### *Cost Effective Solution from R.C. Systems -- ZoneProtector*

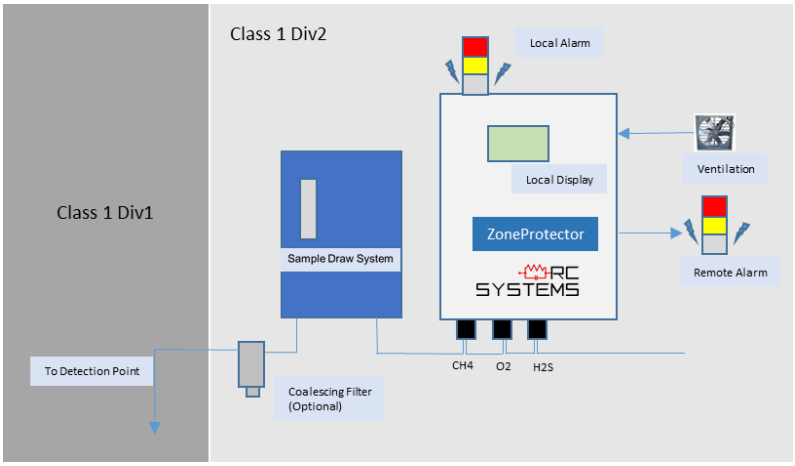
ZoneProtector is an integrated gas detection unit that meets NFPA 820 requirements. It has up to 4 channels to allow a combination of gas detection and ventilation monitoring signals. The sensors may be directly attached to the controller with a sampling pump unit to drawing the gases from the detection points, or, may be mounted remotely at each detection point. One input channel can be used to monitor the ventilation system. The unit is equipped with audible/visual alarms and also provides configurable relays for remote alarms.

## Liquid Treatment Systems' Locations (from NFPA 820 Table 5.2.2 ):

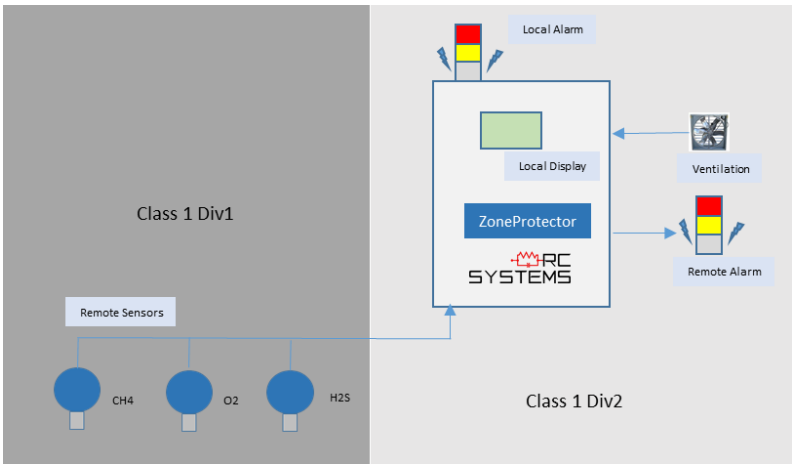
| Location | Area Class | Hazard | Fire Detection | Signaling |
|---|---|---|---|---|
| Diversion/Control Structure | Div 1 or 2 | LEL (CH4 Flammable gases and floating flammable liquids) | | Audio/Visual Alarm, Locl/Remote |
| Coarse and Fine Screen Facilities | Div 1 or Div 2 | LEL, H2S, O2 | | Audio/Visual Alarm, Locl/Remote |
| Flow Equalization Tanks Area | Div 1 or Div 2 | LEL | | Audio/Visual Alarm, Locl/Remote |
| Grit Removal Tanks area | Div 1 or Div 2 | LEL, H2S, O2 | | Audio/Visual Alarm, Locl/Remote |
| Pre- Aeration Tanks Area | Div 1 or Div 2 | LEL, H2S, O2 | | Audio/Visual Alarm, Locl/Remote |
| Primary Sedimentation Tanks | Div 1 or Div 2 | LEL, H2S, O2 | | Audio/Visual Alarm, Locl/Remote |



## Gas Detection Strategy 1: ZoneProtector With Sample Draw System:




## Gas Detection Strategy 2: ZoneProtector With Remote Sensor




| Specification | |
|---|---|
| POWER SUPPLY | 100-240VAC / 10-30VDC, 50W |
| INPUTS | 4 Channel 4~20mA/DI |
| STANDARD ALARM RELAYS | 2x5 amp 30VDC or 250VAC resistive Form C |
| OPTIONALl ALARM RELAYS | 6x 5 amp 30VDC or 250VAC resistive Form C |
| ANALOG OUTPUTS (OPTIONAL) | 10 bit 4-20mA output |
| SERIAL PORT (OPTIONAL) | Modbus Master/Slave RS-485 port |
| DISPLAY | 128 x 64 pixel graphic LCD with backlight |
| | 6x discrete LED' |
| AMBIENT TEMPERATURE | -25 to +60 degrees C |
| APPROVALS | CSA C22.2 No 1010.1 and C22.2 No.152 for combustibles and ISA S82.02; |
| | UL 1604 / C22.2 No 213 (NEMA 4X = Division 2 Groups A,B,C,D, |
| | EN55011 and EN61000 (CE Mark) |