

# COMPLIANCE WARNING ALARMS AVOIDING EXCESS EMISSIONS

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FALL 2018 USER GROUP  
November 13th ★ 14th



## DEFINITION OF WARNING

- Cautionary advice.
- Advance notice of something
- Notice of a possible danger or problem, so that it can be prevented or avoided.
- To urge or advise to be careful; caution
- To notify, advise, or inform
- A statement or event that indicates a possible or impending danger, problem, or other unpleasant situation.



## GOAL

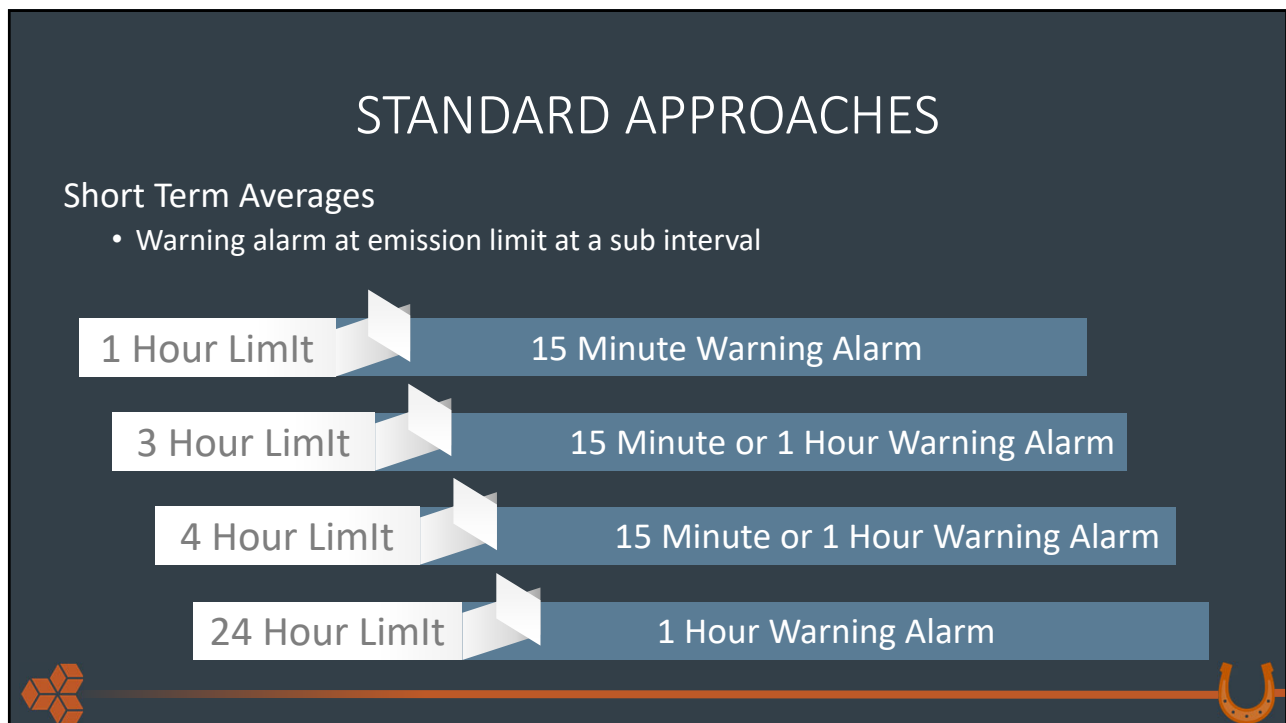
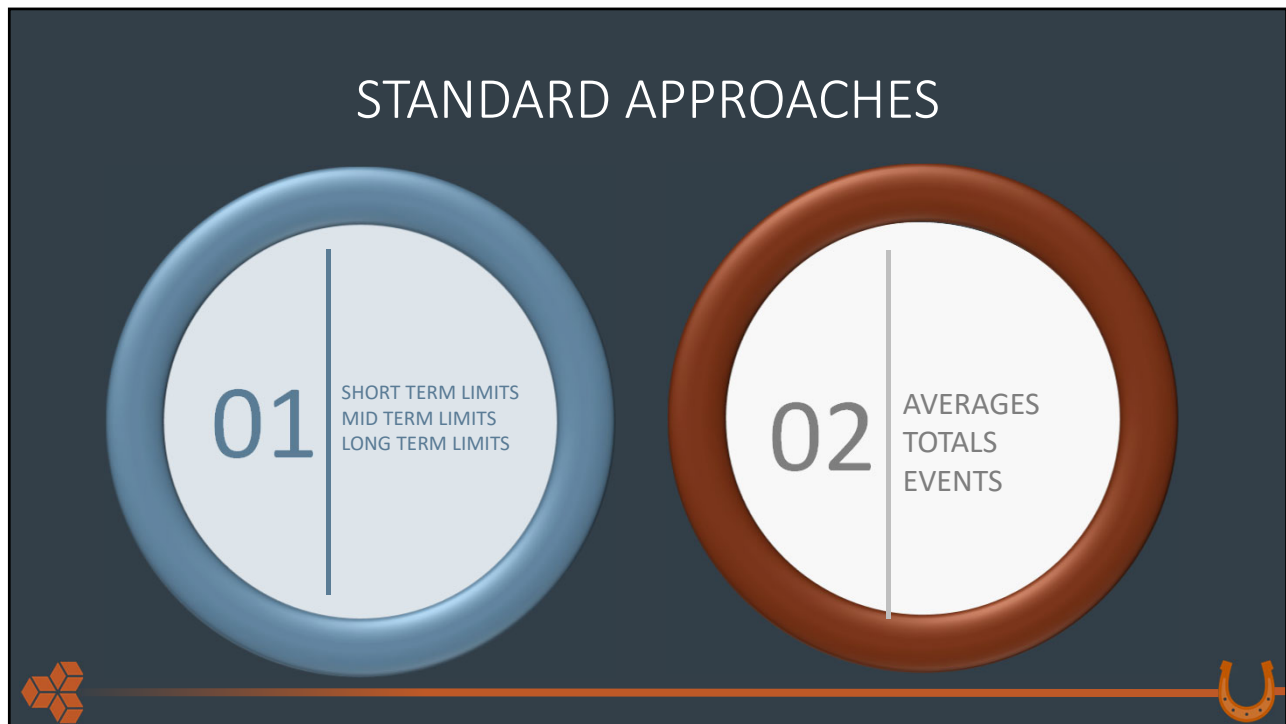
- Develop an alarm scheme that will provide notifications to the operators with the information they need to manage the facility.
- ***Care should be taken so that alarms are meaningful and that nuisance alarms are minimized.***



## KEY CONSIDERATIONS

- Ensure that the alarm provides a ***timely*** notification.
- Ensure that the alarm provides an ***accurate*** notification.
- Ensure that the alarms are not a ***nuisance***.

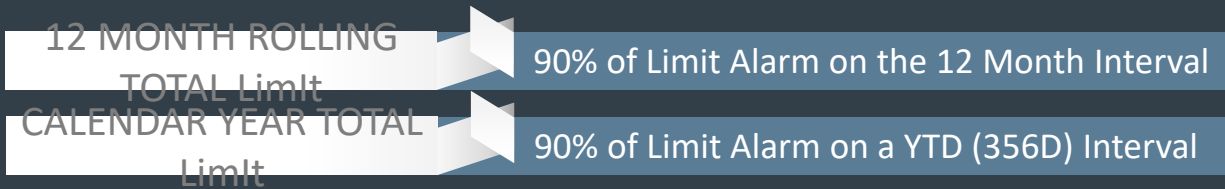




## STANDARD APPROACHES

### Long Term Averages/Totals

- Warning alarm at a percentage of the limit at the interval



## STANDARD APPROACHES

- Mid Term Averages
  - Warning alarm at emission limit at a sub interval
    - 30 day limit, 1 day warning alarm
    - 720 hour limit, 1 hour warning alarm
  - Warning alarm at a percentage of the limit at the interval
    - 30 day limit, 95% of limit alarm on the 30 day interval
    - 720 hour limit, 95% of limit alarm on the 720 hour interval



## ADVANCED APPROACHES

- Building – Current Average for the emissions interval
- Predictive – Predicted Average for the emissions interval
- Target – Value required to operate at for the emissions interval to be equal to the limit.
  - Alarm
  - Consoles
    - Building/Predictive – RED at User Set Value
    - Target – RED when  $< 0$
  - Dashboards
    - Building/Predictive/Target
      - ALERT and WARNING at User Set Values with both having user selected colors



## OPTIONS/OTHER CONSIDERATIONS

- E-Mail
- Re-Trigger
- StackVision Client / DCS
- Disable during Startup and Shutdown when SU/SD Exclusions Apply
- Operating Conditions (Fuel Type, Duct Burner, etc.)
- Alarm Message/Text



## EXAMPLE 1

- 1 Hour Excess Emissions
  - Critical Limits – Alarms set on 1 minute interval
    - Retrigger if in alarm > 15 consecutive minutes.
  - Non-Critical Limits - Alarms set on 15 minute interval
    - Retrigger (i.e. alarm on each 15 minute interval)



## EXAMPLE 2

- Emission Limit for total mass during a Startup Event
  - Alarm set at 80% of emissions limit
    - Startup Mass Building Total Calculated at the end of each clock minute
    - Under most conditions the alarm notification was sufficient for the operator to adjust as needed but it was found during certain conditions that the notification only provided for a few minutes to elapse prior to a non-compliance event.
      - Alarm set to 60% of the limit.



## EXAMPLE 3

- Emission Limit for NOX Corrected to 15% O2 1 Hour Average
  - Alarm on 15 minute interval greater than the emission limit
    - Set to retrigger
    - Determined that the alarm didn't provide timely notification and was a nuisance under certain operating conditions.
      - Added a "building" average in the data controller with the warning alarm based on the current average.



## Alarm Message Example

- NOX High Warning
  - Lacks details, Is this enough information for the operator?
- Warning - NOX ppmc 15m > x.x
- NOX @ 15% O2 – 1 Day High Warning
- NOX ppmc 30D AVERAGE AT 95% LIMIT
- NOX TONS YTD HIGH WARNING





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QUESTIONS?

