# Tips for Successful Integration of your CEMS from a Consultant's Perspective



ENGINEERING & TECHNICAL SERVICES

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## Sega Inc.

## An Engineering and Technical Services Firm Dedicated to the Production & Distribution of Energy



60,400 ft<sup>2</sup> headquarters located on 12.5 acres in Overland Park, Kansas

Employee-owned Company Founded in 1973





### Sega Inc. – Focus Areas

- Power Generation
  - New Generation (Electric and Steam)
  - Retrofit (Plant Betterment)
- Control Systems
- Power Delivery
- Air Quality Control & Environmental
- Biomass & Renewable



## Sega Inc. - New Generation

#### **Steam**

- Pulverized Coal
- Circulating Fluid Bed
- Bubbling Fluid Bed
- Package Boilers
   Natural Gas-Fired
   Fuel Oil-Fired
- Stoker

#### **Electric**

- Steam Turbines
   Condensing
   Extraction
   Backpressure
- Combustion Turbines
   Frame
   Aeroderivative
- IC Engines



## Sega Inc. - Plant Betterment

- Cooling Towers
- Coal Handling
- NSR/PSD Support
- Water Treatment
- Mill Inerting
- Ash Handling
- Condition Assessments
- Burners and Ignitors

- Control Upgrades
- Performance Monitoring
- Emission Control Upgrades
- BOP Equipment
- Electrical Upgrades
- CEMs
- Fuel Conversions
- FD and ID Fan Upgrades



## Sega Inc. - Control Systems

- Conceptual Studies
- Control Hardware Specifications
- Installation Design (Mechanical/Electrical/Structural)

#### **Sega Inc. Differentiators**

- Application Software
- Field Checkout and Startup
- Operator Training





## The CEMS Journey

#### **GOALS**

- A beginning and an end
- A destination
- Avoid delays
- Stay on budget
- Success





## The CEMS Journey

**Potential Problems** 

Experienced Navigator







#### The CEMS "TREK"

I'm No Captain Kirk, but hopefully my tips from experience will help your "Trek"





## **Agenda**

- Alpha and Omega Did I miss the starting gun?
- Applicability What was it we need again?
- Specification You want fries with that?
- Selection Caution, you've entered the no spin zone!
- Design You didn't say you wanted two of those!
- FAT Just 42 more tests to go before happy hour!
- Installation Let go of my Eggo!
- Shakedown Funny; it worked fine in the shop.
- Certification 99 bottles of gas on the wall, 99 bottles of gas...
- Completion Are we there yet???



## Alpha and Omega

#### Get set - GO!

- Rumor (start now?)
- Qualifications (start now?)
- Specification (start now?)
- Bid analysis (start now?)
- Selection (surely start now, right?)
- Contract (fur sure!)

#### Not Push Button, to be sure!



#### Make it Stop!!

- Power up (done now?)
- RATA (done now?)
- Certification (done now?)
- Change orders (done now?)



## **Applicability**

#### Not a Guessing Game!

#### Know what you need!

- Project definition
- Regulatory review
  - Current rules
  - Proposed rules
- Permit review
- Consult with the vendors
- Consult with the owners
- Agreement





## **Specification**

#### Don't you love specs!?

- Define owner's need
  - Schedule
  - Equipment
  - FAT
- Simple vs complex
- Templates
  - Project specific
  - Owner specific
  - Vendor
- Discuss with vendor(s)
- Owner review
- Vendor list



"Whatever the heck it is, it's built exactly to specifications."



#### **Selection**

#### **Curves Ahead!**

- Careful review
  - Apples to apples
  - Low balling
  - Hidden costs
  - Fine print
- Request information
  - Corrections
  - Adjustments
- Bid analysis
- Selection basis
  - Cost only
  - Confidence



"We don't discriminate per sé— we just don't hire Lyle Lovett lookalikes."



## Design

#### **Like Herding Cats!!**

- Communication
  - Take a memo please.
- Information flow
- Integration issues
- Change management
  - Nothing will change; change will continue.
- Drawing review
  - Internal, owner, revs.
  - Who's on first?
- How's the schedule?



## **Agenda**

- Alpha and Omega
- Applicability
- Specification
- Selection
- Design
- Factory Acceptance Test
- Installation
- Shakedown
- Certification
- Completion



## **Factory Acceptance Test**

#### Show 'n Tell Time!

- Scheduling
- Pre-test procedure
  - Test as much as you can
- Check list
- Simulate reality
  - Test drive the equipment
- Detailed to-do list w/schedule
- Don't ferget da DAHS
  - Equations/programming
  - Averaging times
  - Tracking/Reports

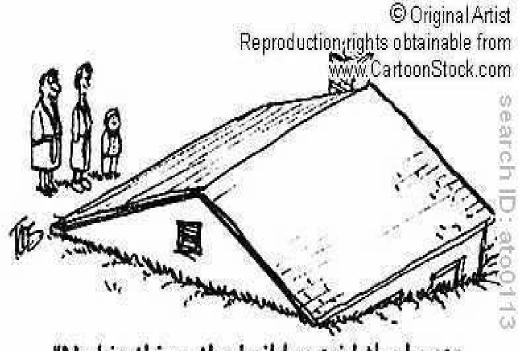




#### Installation

#### There's no "I" in "Team"

- Delivery and storage
  - Turn up the AC please
- Coordination
  - Schedule
  - Who's doing what?
  - Terminations
- Temporary vs permanent
- Goody; another trip to LA!
- Issue resolution



"No big thing, the builder said the house would do a little settling."



#### **Shakedown**

#### That's why they call it Shakedown!

- Do they have to run CEMs all the time?
- Does someone know how to run this?
- Was that bus blackout bad for it?
- We've lost communications again!
- Calibration fail again?
- Hey, I'm just the operator.
- Hi Ho, Hi Ho, its 10 more tests to Go!
- Move the probe? Say it ain't so Joe!
- Who's in charge here?
- Stay calm, I have it all under control.
- Help Mr. Wizard!



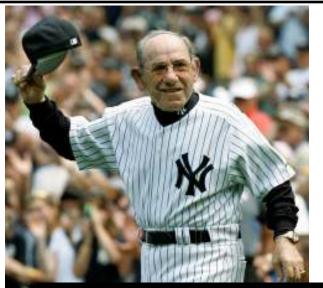




#### Certification

#### It's not over 'til it's over

- Explain the list and schedule
  - Save the easy one to last
  - Coordinate operation
- OK, who's got the gas??
- 7-day = 8-day. Huh?
- The evil RATA
  - Make sure you will pass
  - Stratification/cyclonic flow
  - Get agency buy-in
  - Steady as she goes
- Test report coordination
- Follow-up







## Completion

#### The Eternal Punch List

- Connections (no leaks)
- Clean-up (What's this for?)
- Spare parts (check contract)
- Training
- Check all DAHS functions
- Agency agreement
- On-going maintenance agreement
- Change order agreement
  - Cost/Schedule
- Plant mod. may require RATA
- CEMs mod. may require recertification





#### The End

