

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



**ENGINEERING & TECHNICAL
SERVICES**

Brian Petermann

(913)681-2881

www.segainc.com



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Sega Inc.

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



**Employee-owned
Company
Founded in 1973**

**60,400 ft² headquarters located on 12.5
acres in Overland Park, Kansas**



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

Not Push Button, to be sure!

Get set – GO!

- Rumor (start now?)
- Qualifications (start now?)
- Specification (start now?)
- Bid analysis (start now?)
- Selection (surely start now, right?)
- Contract (fur 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 forget da DAHS
 - Equations/programming
 - Averaging times
 - Tracking/Reports

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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



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

QUESTIONS



bpetermann@segainc.com



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