

WFG ENERGY & UTILITY SERVICES GROUP

GM - Water Conservation Strategies

May 19, 2009



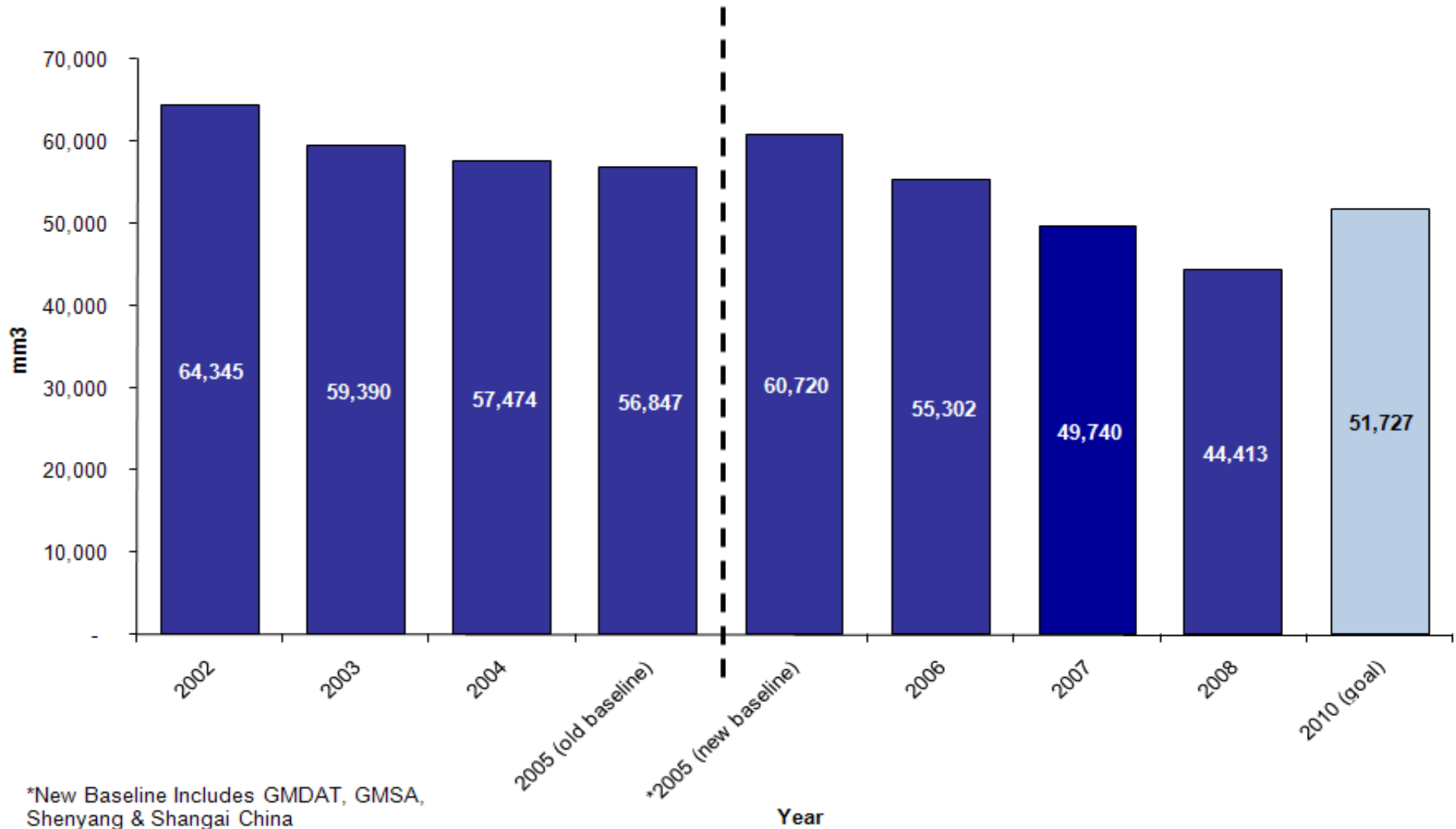
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Water Reduction Strategies - Outline

- GM water reduction performance
 - Goals/metrics
- Key Strategies
 - Best Practices
 - Cascade
 - Once thru to closed loop
 - Technologies
 - Thin film
 - Recycle/reuse (zero discharge)



GM GLOBAL WATER USE (million cubic meters - mm³)



Water Reduction Strategies

- Usage Monitoring
 - GM2100 usage and production tracking
 - Departmental Metering
- Plant Management Involvement
- Site Water Audits
- Process Best Practice
- Cooling Tower Scorecard

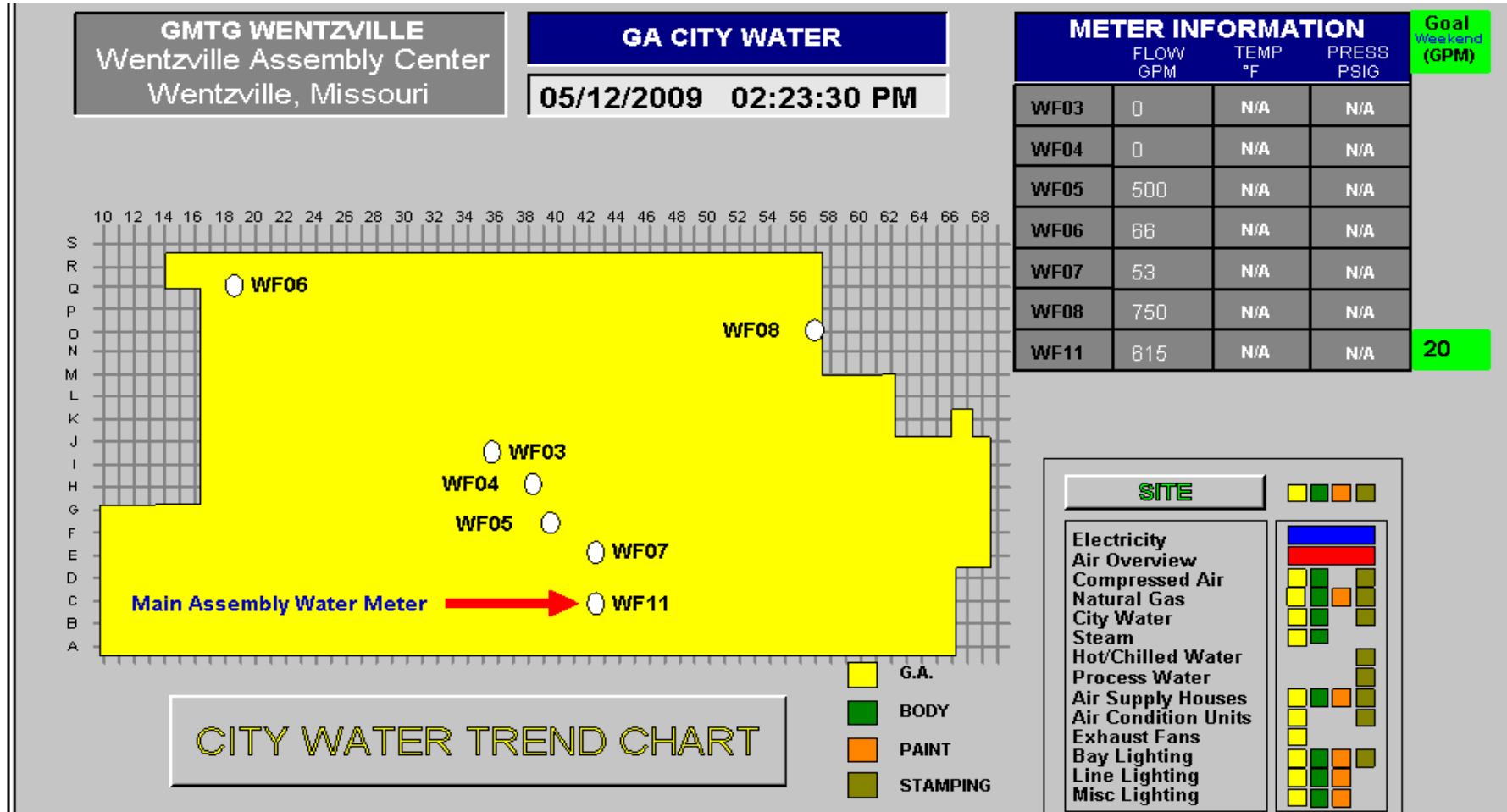


Usage Monitoring

- Corporate Bill and Production Monitoring (GM2100)
 - Plant Scorecards
 - Benchmarking
- Departmental Metering
 - Real-time usage tracking
 - Determine “Where and When”
 - Accountability for usage



Plant / Department Water Meters



Management Involvement

- Plant Managers “Level 1” scorecard
- Reduction Goals Set for the Year
- Affects bonuses
- Ensures entire manufacturing site is engaged



Site Water Audits

- Review all major water users at a site
- Process-Level Water Balances
- Portable Water Meters for instantaneous, totalized and/or 24 hour flow measurement
- Review for “Best Practices”
- Recommendations to Plant Staff
 - Best Business Cases – Speak Their Language \$\$\$
 - Ease of Implementation



Best Practices

- Zinc Phosphate system – Pretreatment of “Body-in-White” before Paint and a Major Water User
- Best Practice Includes:
 - Cascade of Rinses to Minimize Water Usage
 - Automatic Conductivity Controls
 - Rinse Specification Changes
 - Conductivity
 - Acid number
 - Alkalinity
 - Job Present Sensors
 - Fill Line Location to Reduce “Short-Circuiting”



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Best Practice Water Savings Summary

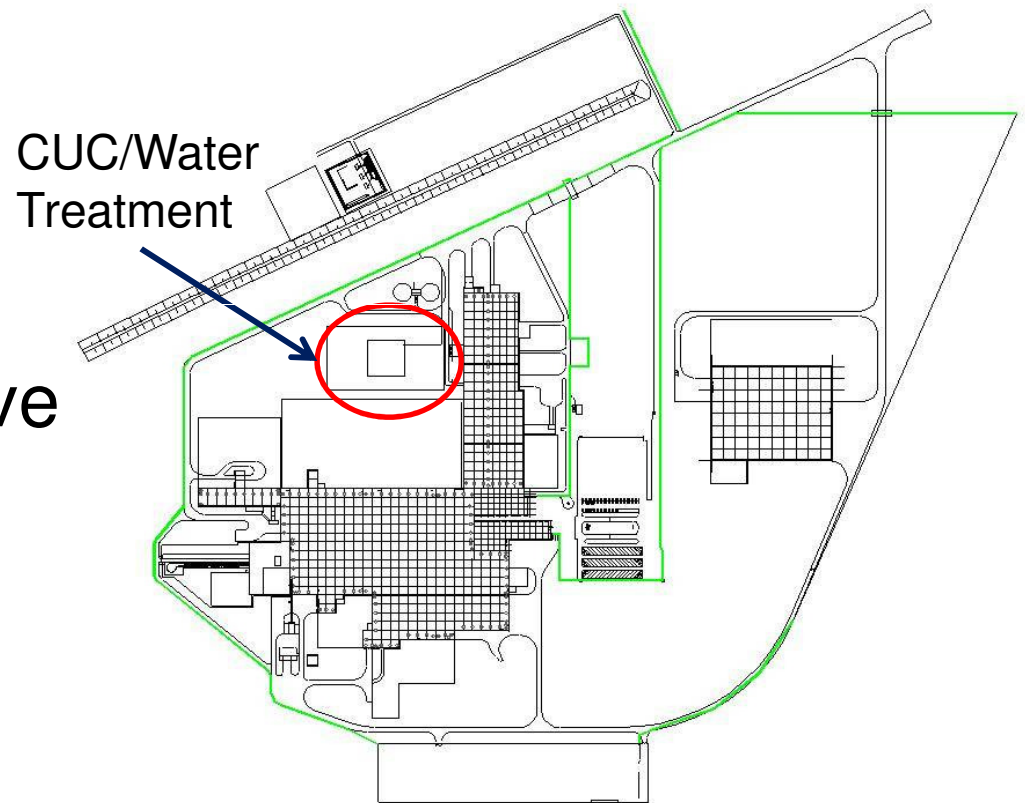
- Pretreatment and ELPO Cascading
 - Approximately 15 N.A. assembly plants
 - 172.5 M gal/yr
- Pretreatment rinse conductivity control
 - 90 M gal/yr
- Shutdown rinses during non-production
 - 37.5 M gal/yr
- Estimated total savings – 300 M gal/yr



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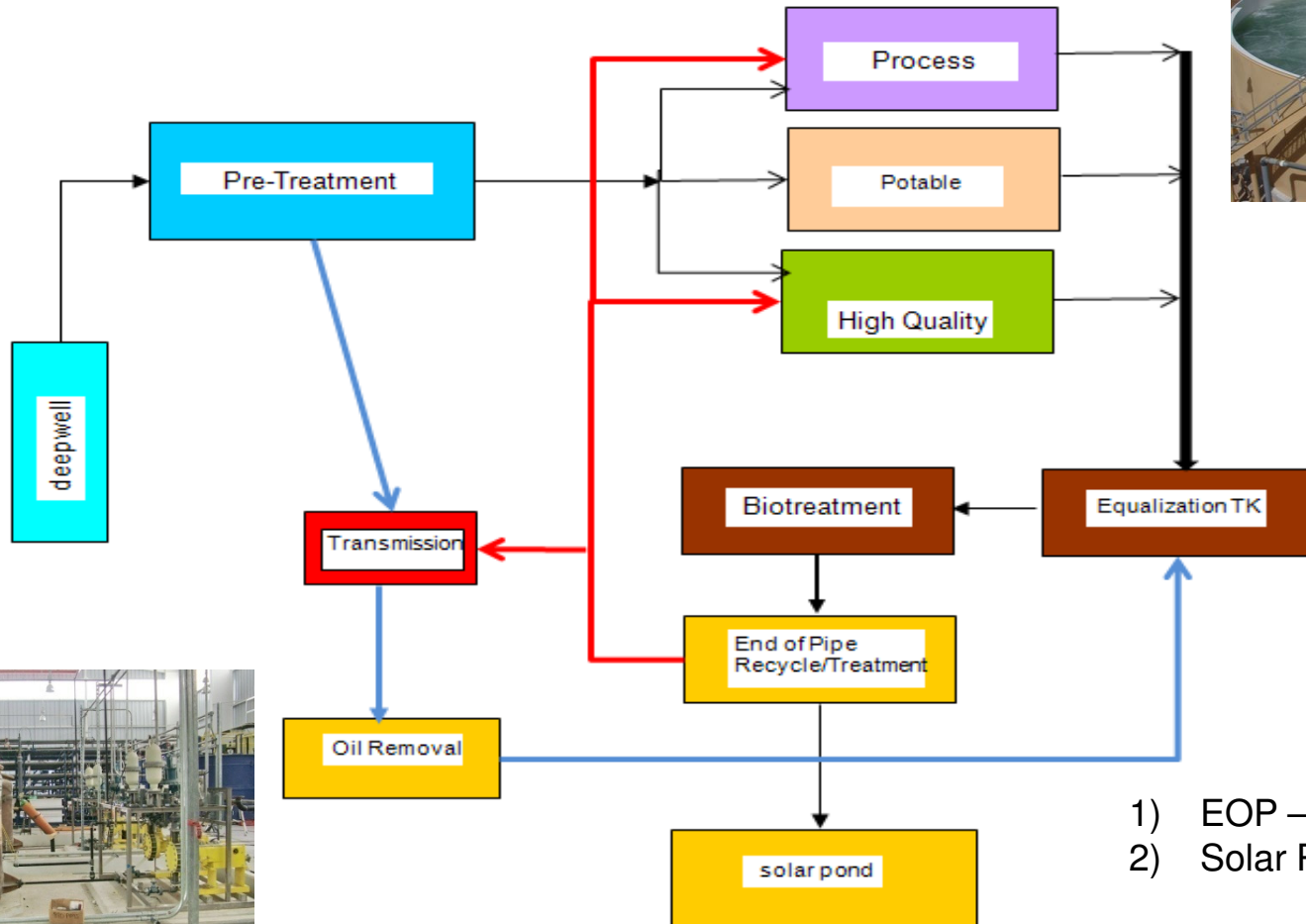
San Luis Potosi

- Newly commissioned GM assembly plant in San Luis Potosi, MX – commissioned June 2008
- Site location:
 - 7000 ft above sea level
 - Wells at 600 meters deep
 - Desert conditions
- Task, build an automotive assembly complex with
 - limited water resources
 - no discharge location



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*"Zero Discharge" -
Process of Choice for Cactus*



- 1) EOP – Recycle Rate = 90%
- 2) Solar Pond Rate = 10%



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Funding Strategies

- Currently payback does not warrant spending Capital on water conservation initiatives
- Capital driven more by facility location, as was the case in San Luis Potosi
 - No discharge location
 - Limited water resources, wells 600 meters deep
- Focus should be on opportunities within the process to reduce for minimal to no cost



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Lessons Learned

- Chemical feed system operations – crucial
- Varying wastewater quality and quantity
- Detailed standard operating procedures
- Develop a water task force

