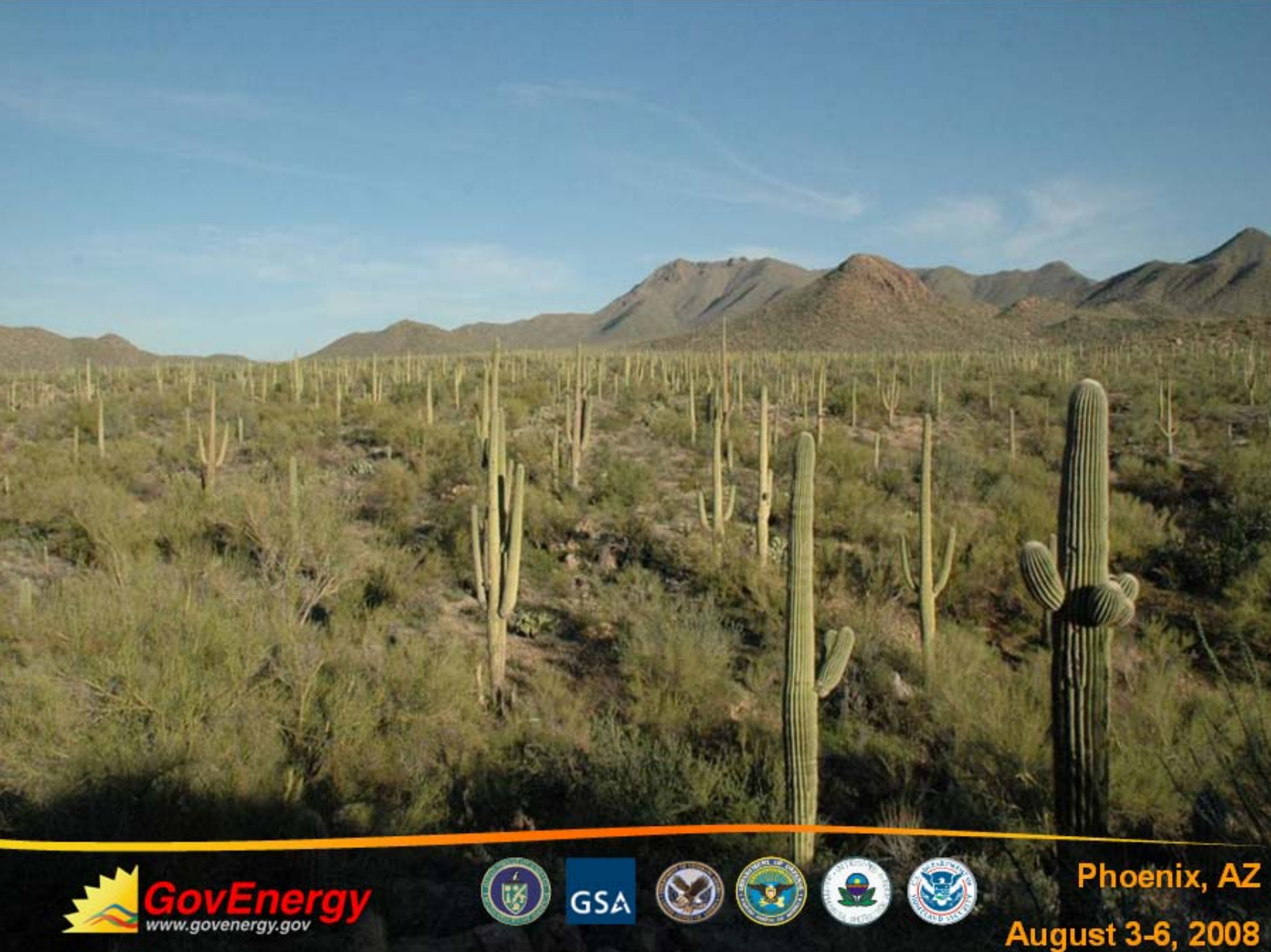
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GSA
Phoenix, AZ
August 3-6, 2008

Shipboard Energy Management Initiatives

Pilot Study

Navy Region Southwest

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Outline

- Background
- Pilot project objectives
- Pilot project activities
- Data analysis
- Conclusions

Not the pilot study environment


“Cold Iron” – Plants shutdown

Background

- Navy interest in reducing shore energy consumption
- Although mobility source:
  - Ships represent large shore demand
  - Significant shore utilities requirements
- Energy programs
    - Shore Energy
    - Naval Sea Systems Command (NAVSEA)
      - Underway fuel conservation program (ENCON)
    - Could shore energy principles apply to in port “cold-iron”

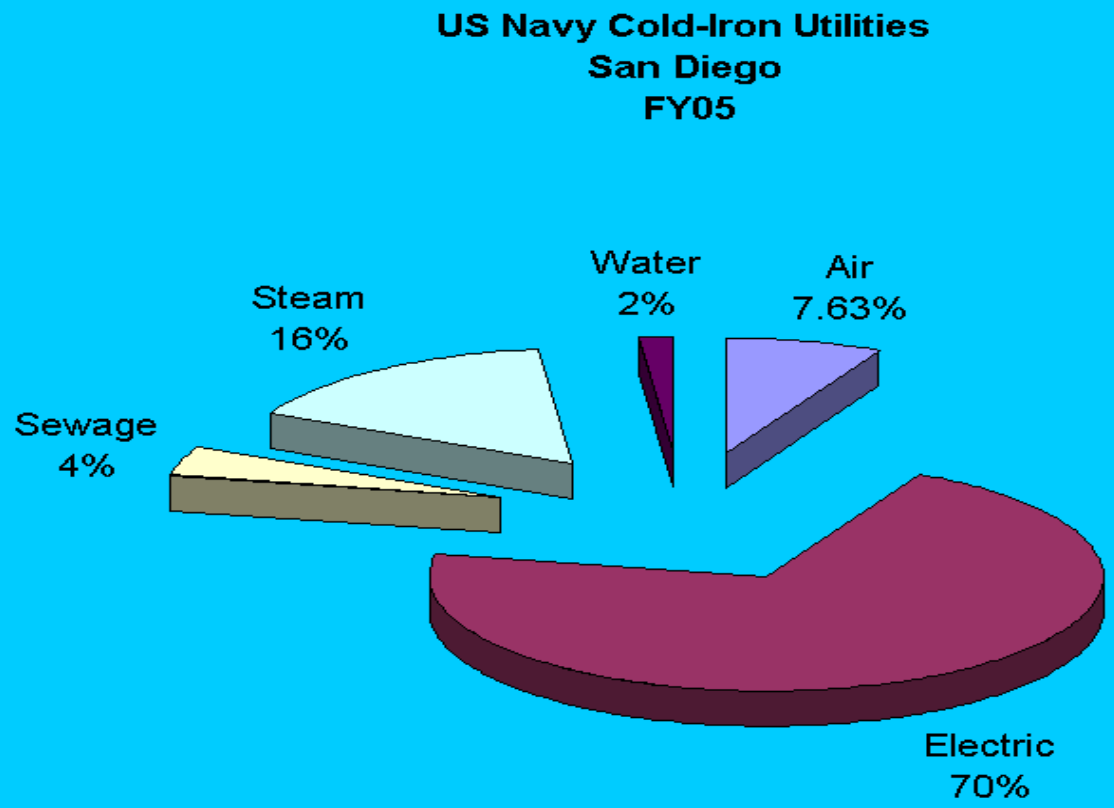
Shore Energy Program

- Network of energy management professionals
- Dedicated solely to energy issues
  - Monitor progress, reporting, identify energy conservation opportunities, develop projects and initiatives
- Proven success
- San Diego Fleet concentration area
  - 41 ships
  - Detailed consumption data

Utilities Data

- Navy has extensive network of meters
  - Metro San Diego has meters + analysis tools
- Routinely analyzed for trends and anomalies
- Shipboard data is also available
  - Used for billing
  - Opportunity for energy conservation tracking
  - Opportunity to further improve shipboard metering for other utilities

Utilities Data



Pilot Study Objectives

- Cold iron periods
  - Reduce utilities consumption/ demand
  - Reduce costs
  - Communicate requirement to key stakeholders
- Identify measures
  - Technically and economically feasible
  - Negligible impact to mission, schedule, safety, personnel
- Identify standardized procedures
  - Exportable to other Fleet areas
  - Ship Class specific

Pilot Project Activities

- Pier-side/ Shore
  - Delivery systems
  - Allocation/ estimating/ billing processes
  - Decommissioning processes
  - Living barges
- Shipboard
  - Review/ analysis of data
  - Engineering/ auxiliary systems
  - Securing equipment
  - Establish energy awareness and recognition programs

Equipment

- Auxiliary plant systems
  - Lighting
  - Air conditioning plants
  - Seawater fire pump systems
  - High pressure compressed air
  - Low pressure compressed air
  - 400 Hz motor generators

Data Collection

- Utilities database
  - Very detailed electricity profiles of each ship
  - Measure impact of actions taken
- Further refined opportunities
  - Export to all ships, regardless of data collection capability

Living Barges

- Infrastructure on barges out-dated
- Good energy conservation opportunities
- Develop energy projects exactly like buildings
  - Lighting, HVAC, galley equipment
  - Incorporate incentives into calculations
  - Financed energy project potential
    - Payback with utilities funds over time

Living Barges

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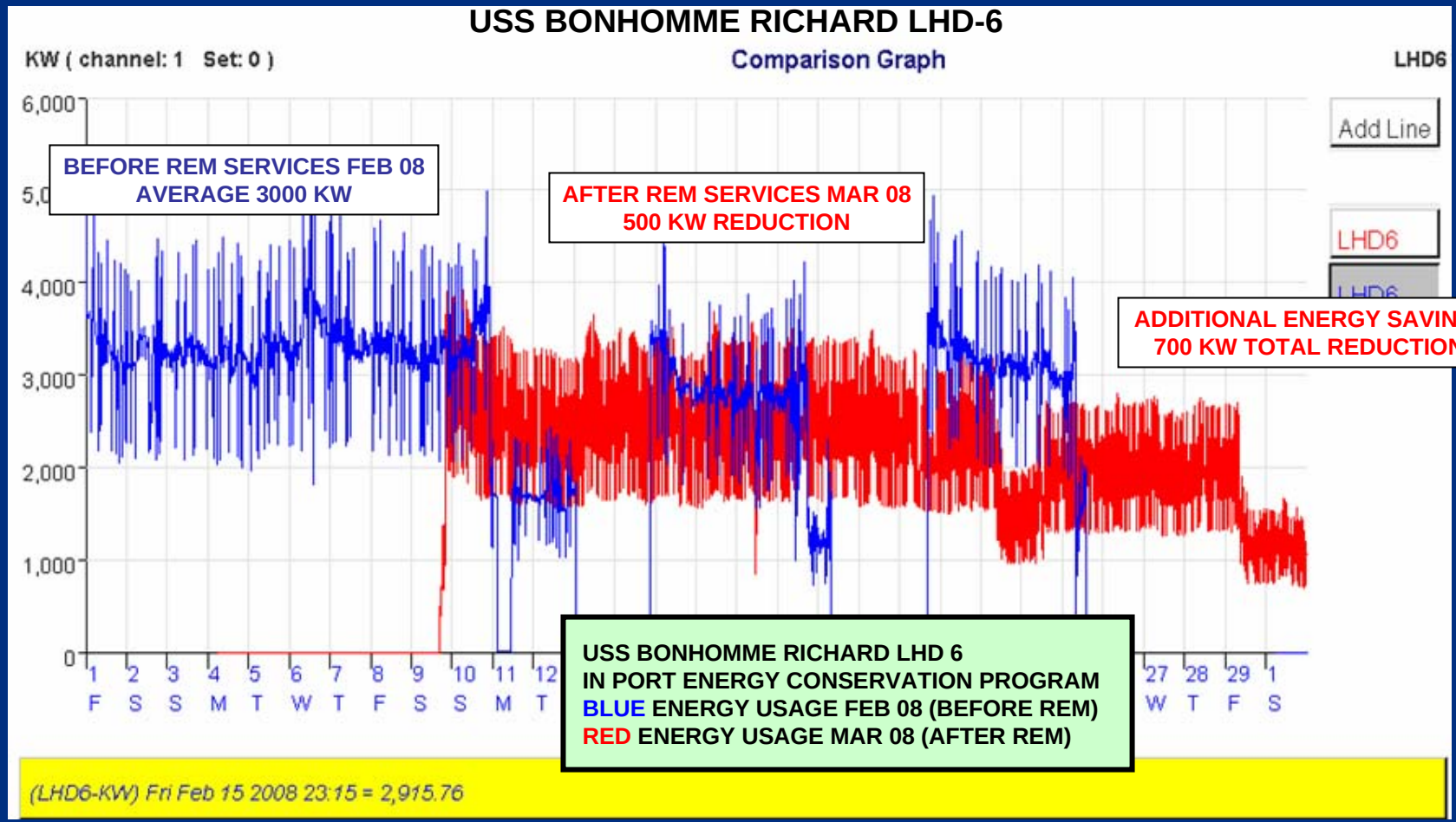
Improve Processes

- Utilities allocations
- Credits
- Funding streams:
  - Regular cold-iron vs. maintenance availability periods
  - Compressed air: direct ship use vs. contractor use
    - Living barges
  - Decommissioned ships

Decommissioned Ship

- Reduced lighting loads
- New process for reporting/ tracking utilities

Load Comparison



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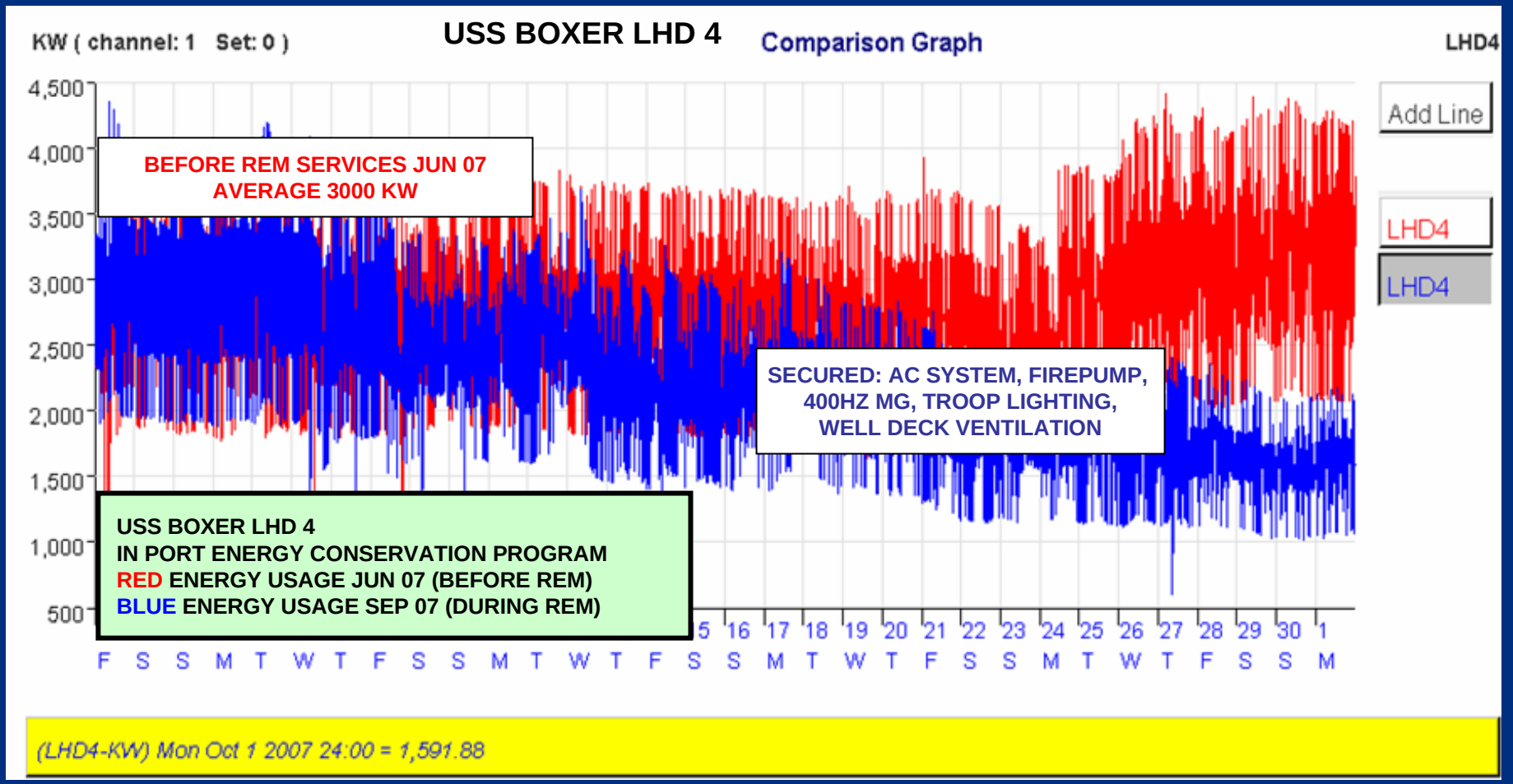
Load Comparison



Energy/ Cost Savings

August 2007 – May 2008

- $4M
- 50,000 MBTUs
- 14,000,000 kwh

Conclusions

- Significant energy reduction and cost saving achieved
- Key stakeholders very receptive to program objectives
- Shipboard personnel proactive in setting ship-class standards
- Expanded metering capability and awareness provides consistent improvement
- No impact to mission, schedule, safety or quality of life

Conclusions

- Potential exists across all Navy Fleets
- Procedures can be developed/ exported
- Program requires refinement
  - Only one year in process
  - Communication/ standardization continue
- Expand beyond engineering/ auxiliary plants
  - Electronic/ communication systems potential

Questions

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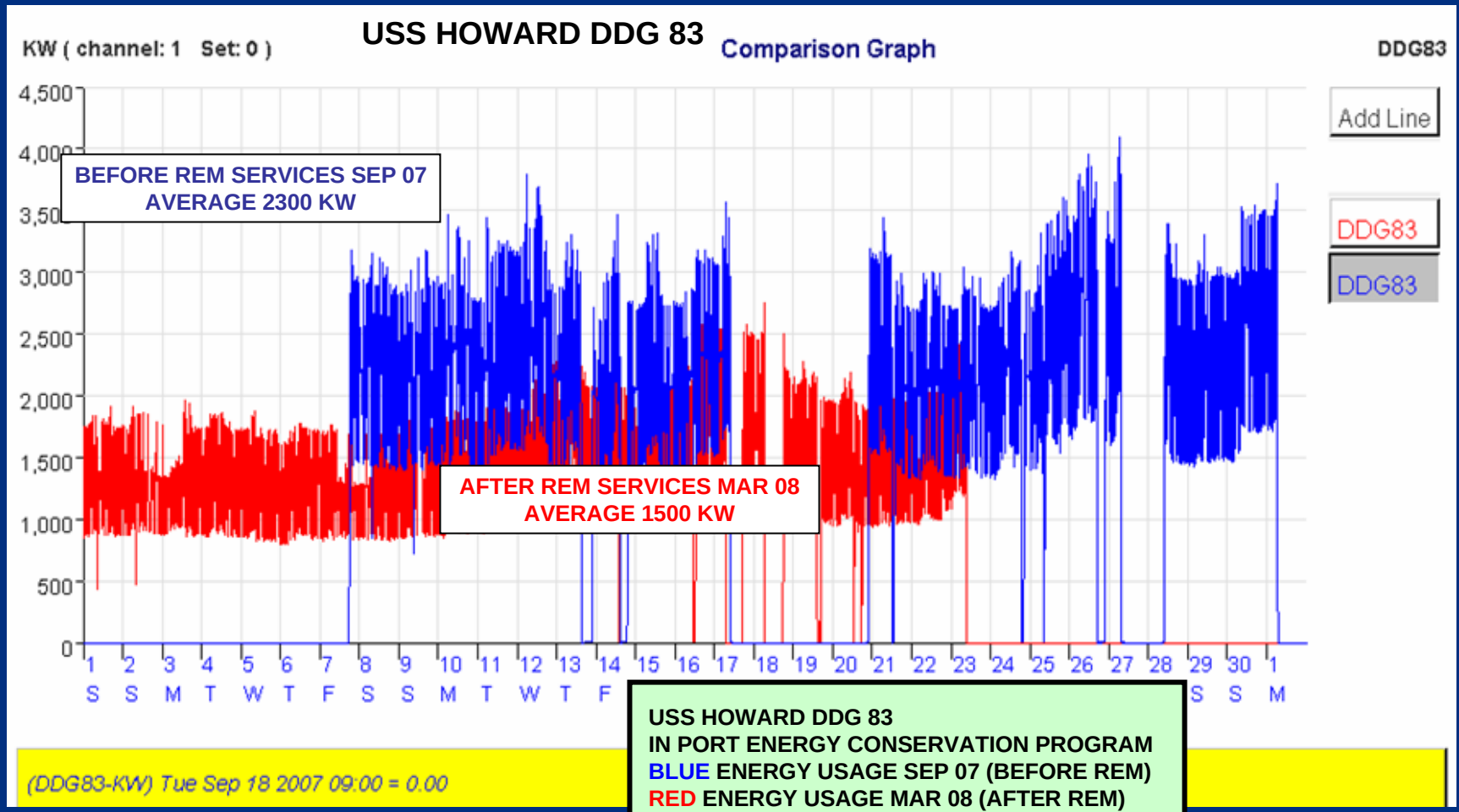
Backup Data


USS HOWARD DDG 83
KW (channel: 1 Set: 0)
Comparison Graph
DDG83
Add Line
DDG83
DDG83
BEFORE REM SERVICES SEP 07
AVERAGE 2300 KW
AFTER REM SERVICES MAR 08
AVERAGE 1500 KW
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
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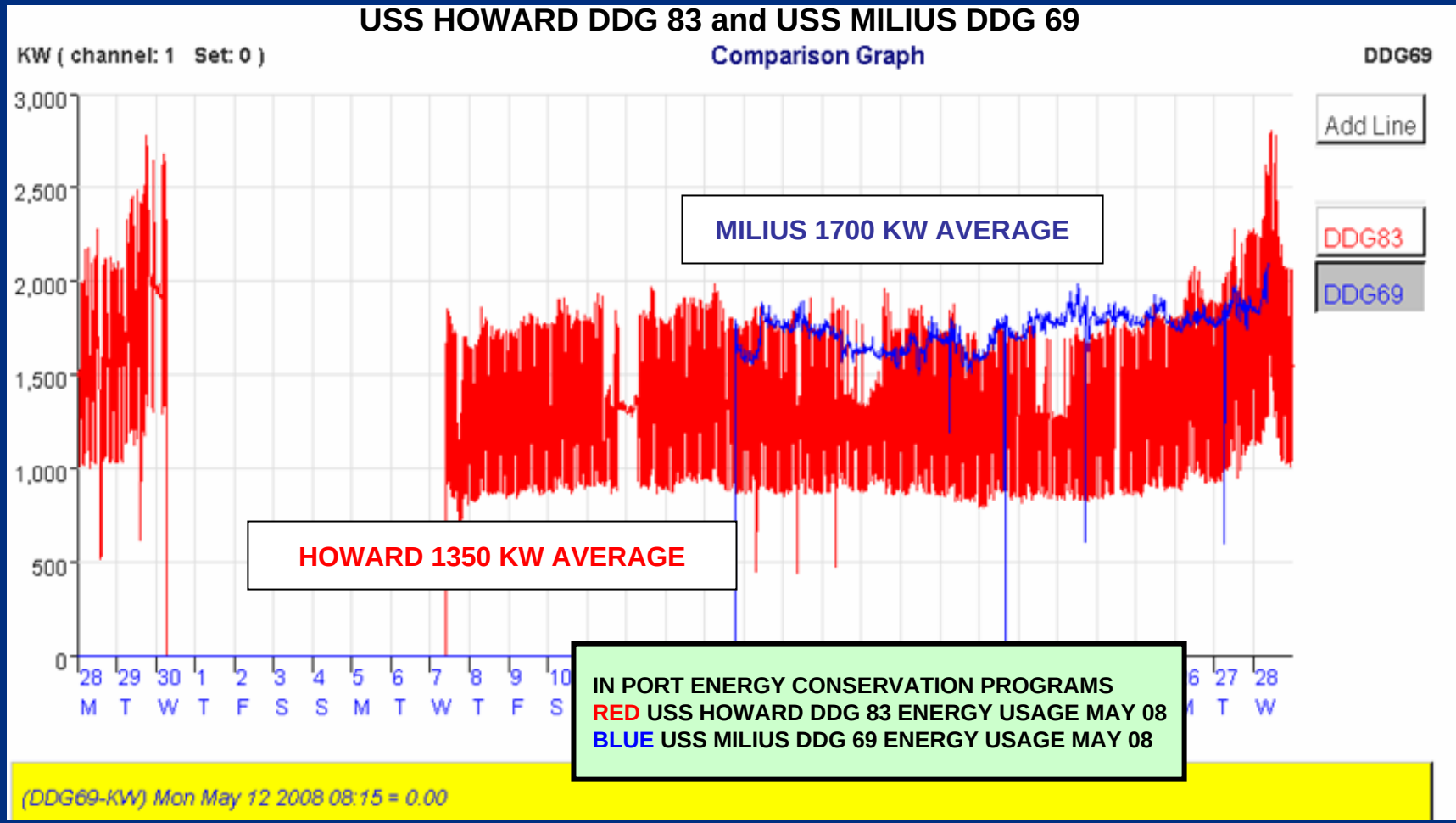
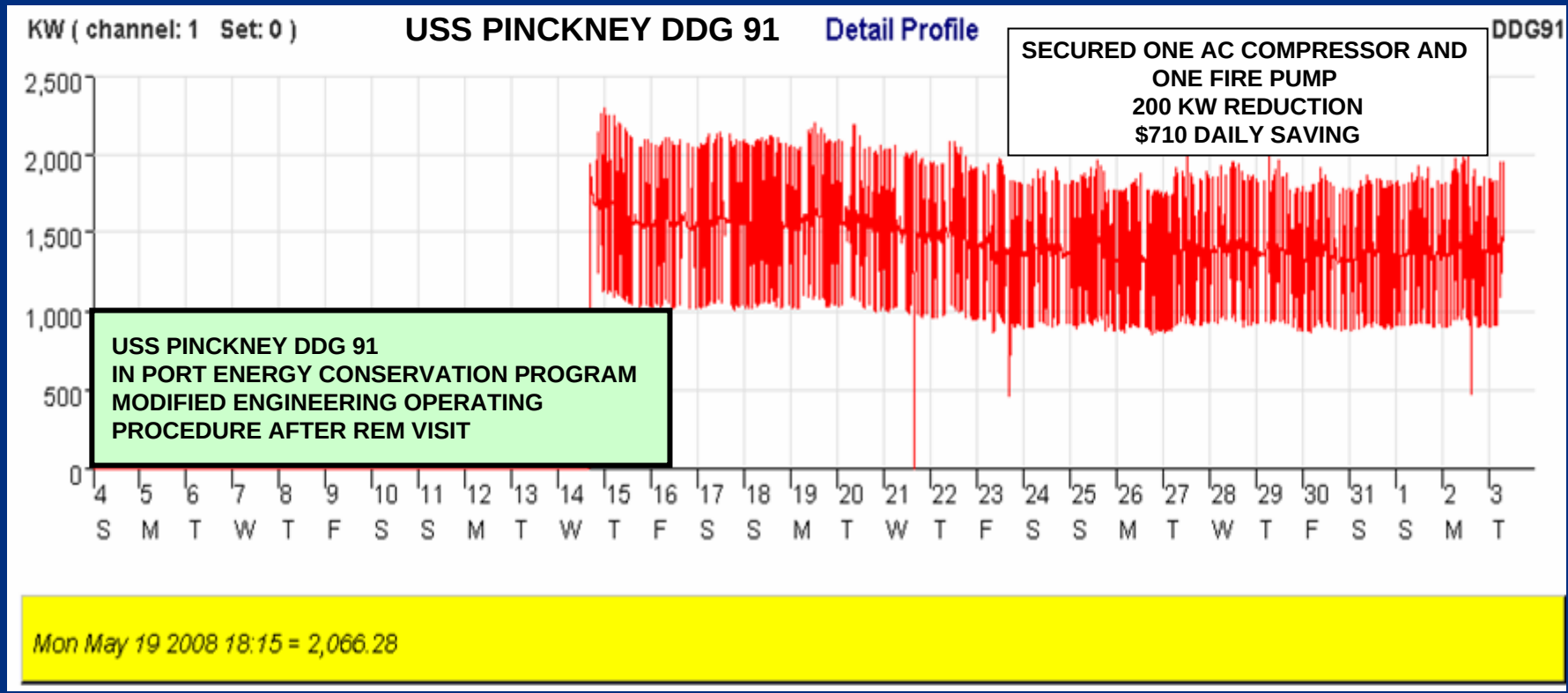
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 1
S S M T W T F S S M T W T F S S M
(DDG83-KW) Tue Sep 18 2007 09:00 = 0.00
USS HOWARD DDG 83
IN PORT ENERGY CONSERVATION PROGRAM
BLUE ENERGY USAGE SEP 07 (BEFORE REM)
RED ENERGY USAGE MAR 08 (AFTER REM)

USS HOWARD DDG 83 and USS MILIUS DDG 69





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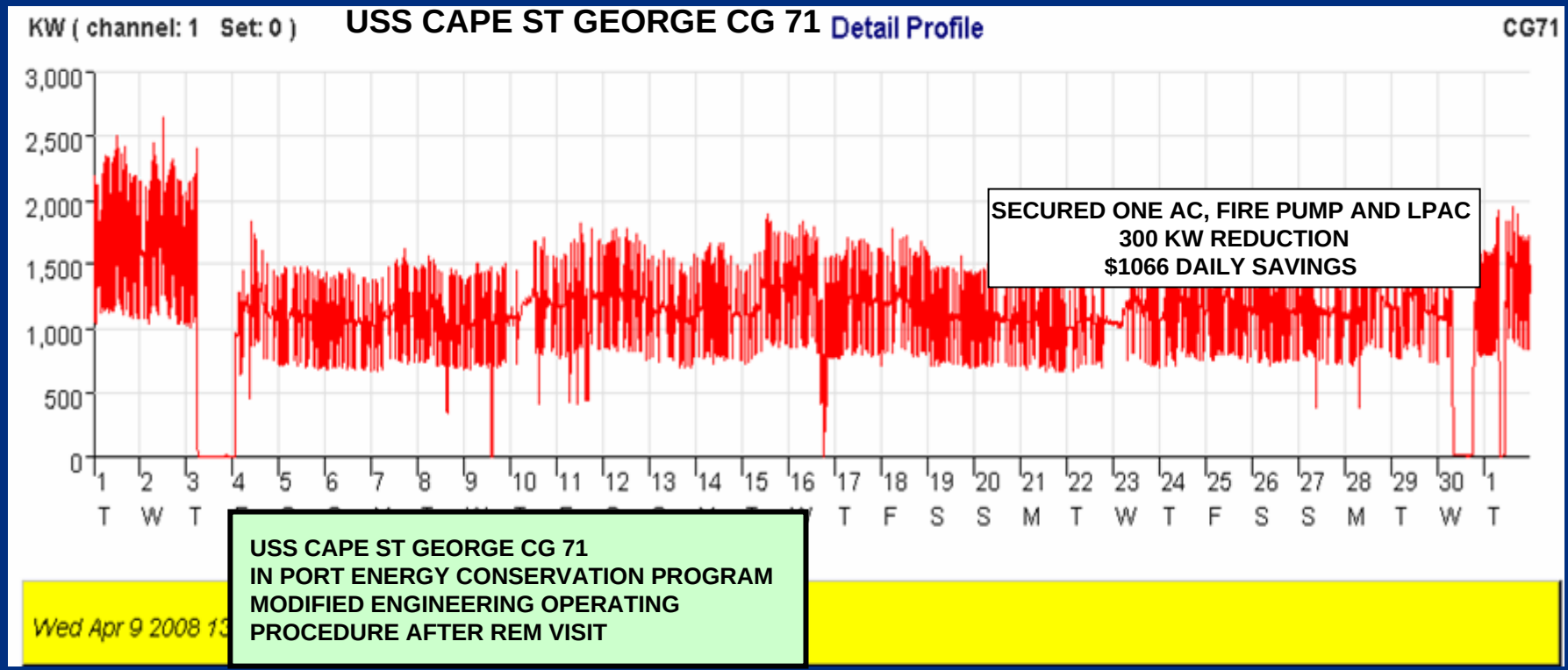
KW (channel: 1 Set: 0)
USS CAPE ST GEORGE CG 71 Detail Profile
CG71
3,000
2,500
2,000
1,500
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0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 1
T W T T F S S M T W T F S S M T W T
SECURED ONE AC, FIRE PUMP AND LPAC
300 KW REDUCTION
$1066 DAILY SAVINGS
USS CAPE ST GEORGE CG 71
IN PORT ENERGY CONSERVATION PROGRAM
MODIFIED ENGINEERING OPERATING
PROCEDURE AFTER REM VISIT
Wed Apr 9 2008 13

TYPICAL ELECTRICAL USAGE (20 DAYS IN PORT)

EQUIPMENT	IN PORT OPERATION	USAGE PER UNIT	DAILY COST	DESIRED REDUCTION	DAILY SAVINGS	MONTHLY SAVING
DDG/CG CLASS						
AC SYSTEM (250 TON)	2	195 KW	$1,380	1	$690	$13,800
FIRE PUMP 1000 GPM	2	84 KW	$596	1	$298	$5,820
HPAC	1	27 KW	$96	0		
LPAC	2	32 KW	$228	1	$114	$2,280
400HZ MG	1	135KW	$460	0		
LHA/LHD CLASS						
AC SYSTEM (400 TON)	2	327 KW	$2,322	1	$1,161	$23,220
FIRE PUMP 2000 GPM	2	173 KW	$1,228	1	$614	$12,280
HPAC	1	31 KW	$110	0		
LPAC	2	32 KW	$228	1	$114	$2,280
400HZ MG	2	135KW	$920	0		
FFG CLASS						
AC SYSTEM (80 TON)	2	54KW	$384	1	$192	$3,840
FIRE PUMP 1000 GPM	2	84KW	$596	1	$298	$5,960
HPAC	1	27KW	$192	0		
LPAC	2	17KW	$120	1	$60	$1,200
400HZ MG	1	135KW	$460	0		

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