

G.R. BOWLER, Inc.

Marine & Industrial Control Services

# MARINE SYSTEMS

- Automatic Combustion Control
- Burner Management
- Auxiliary Control Loops
- Motor/Valve Control
- Alarm Monitoring/Annunciation
- Data Logging
- Automatic Throttle Controls
- Ballast Systems

# Solution Partners Program

- Siemens, Inc.
- Manufacturer
- World-wide support
- G.R. Bowler, Inc.
- Marine controls expertise

# Vessels

- SS Prince William Sound - ACC/BMS - propulsion boilers
- M/V NY Sun/Allegiance - ACC/BMS (Aux Boiler), IGS, Data Logger and computerized trending system
- SS Wright - APACS E-R console replacement & ACC/BMS systems
- SS Curtiss - APACS E-R console replacement & ACC/BMS systems
- SS Cape Nome - ACC & BMS systems
- M/V Cape Ray and Cape Race - Aux Boiler ACC and BMS systems
- LNG/C Matthew - APACS E-R Console and ACC/BMS systems
- USS Callaway – APACS **TOTAL** E-R Automation, ACC/BMS, Ballast & Automatic Throttle Control
- SS Anderson – APACS BMS and Microprocessor ABC Systems
- SS Clarke – APACS BMS and Microprocessor ABC Systems

# Stationary Plants

- Foster-Wheeler Environmental Test Facility utilizing: APACS ACC/BMS developed to provide in-depth analysis and data gathering
- Mt. Tom Power Generating Station - 100 Mega-Watt Plant - BMS for 16 burner, pulverized coal boiler. Recently added several auxiliary control systems, incl. Feedwater and Deaerator Systems
- Distrigas of Massachusetts – LNG Processing Plant – Engineering and maintenance of APACS/QUADLOG DCS and HMI PCs

# Scope (Purpose) for Automating Engine-room

- Assortment of Stand-Alone Systems
  - ACC, BMS, Throttle, Annunciation
- Throttle Control
  - Replace existing, obsolete GE control system with proven APACS DCS-type system



LNG/C Matthew - Boston Harbor

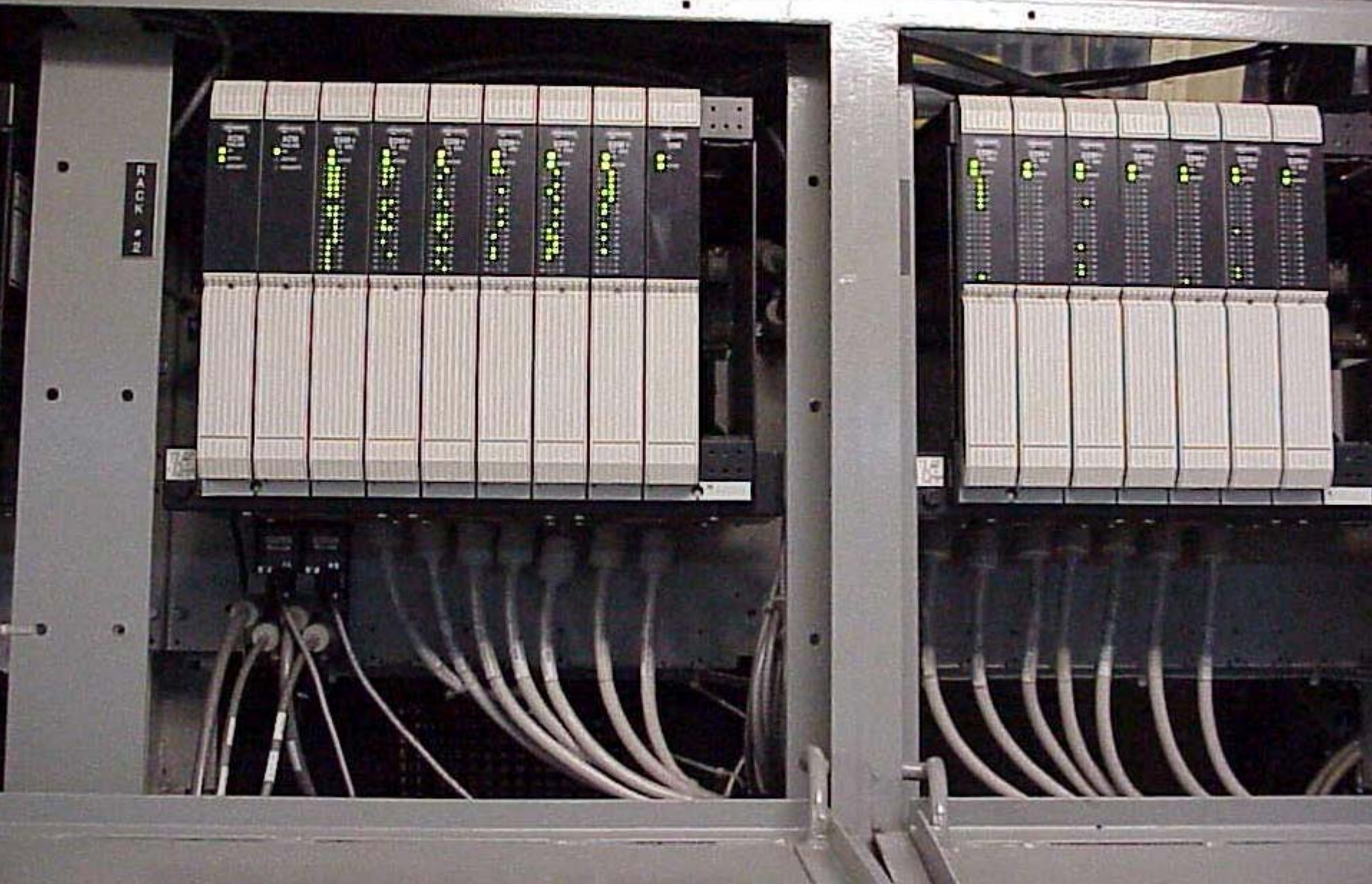
# LNG/C Matthew - ECR (As Found)



# LNG/C Matthew - After GRB Upgrade



# APACS DCS Equipment

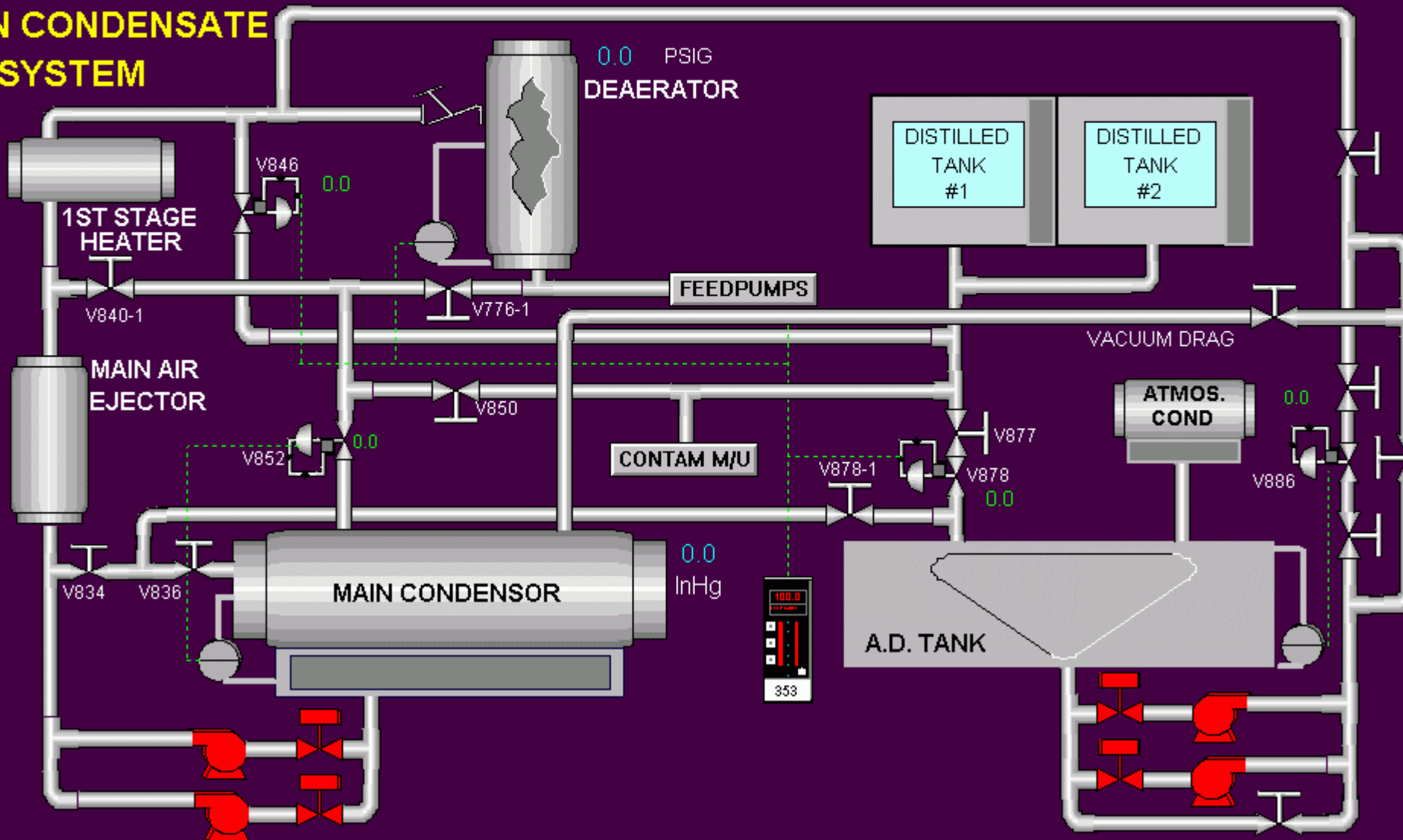


STBD BOILER	STBD PURGE	PORT BOILER	PORT PURGE	F.O. SERVICE	FEEDPUMPS	GAS CONTROL	SOOT
L.O. PUMPS	COND PUMPS	SEWAGE BURN	ENGINE TEMPS	SSTG TEMPS	OTHER TEMPS	BOILER PRESS	STEAM PRES'S
CONTAM GEN	MAIN COND SYS	LEVELS	OTHER PRESS.	Graphic 21	Graphic 22	Graphic 23	Graphic 24
THROTTLES	MANEUVER	Graphic 27	ENGINE RTDS	STBD COMB	Graphic 30	Graphic 31	Graphic 32

<b>System</b>	Report	Overview	<b>Graphic</b>	↓	Group	↓	Trend	↓	Point	Back	Print Screen	Alarm
U1	U2	U3	U4		U5		U6		U7	U8	U9	WATCHDOG

# AIR CONDENSATE SYSTEM



F.D. FANS	FEEDPUMPS	CIRC PUMPS	OVERBOARD	BLEEDS/DRAINS	DUMP/GUARD	CONDENSATE	ATMOS DRN
F.O. SERVICE	FRESH W COOL	SHAFT L.O.	MAIN ENG. L.O.	LUBE OIL	GAS CONTROLS	HOOD VENT	Group 16
OILTEMPS	CONTAM SYS	AUX EXHAUST	ADT LEVEL	STEAM SYST'S 1	STEAM SYST'S 2	DISTILLER STM	HOTWELL
Group 25	Group 26	Group 27	Group 28	Group 29	Group 30	Group 31	Group 32

ACI

Filter

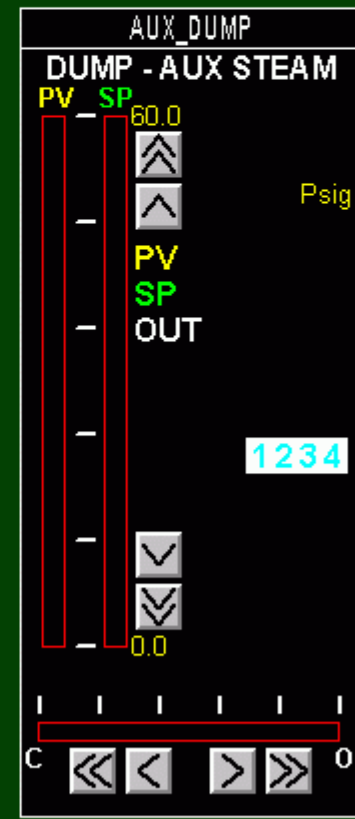
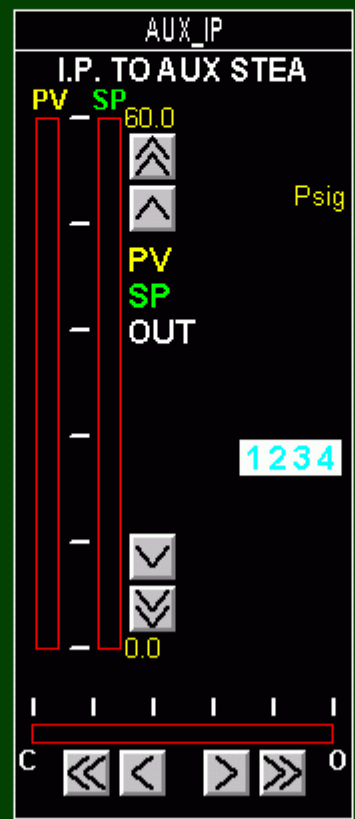
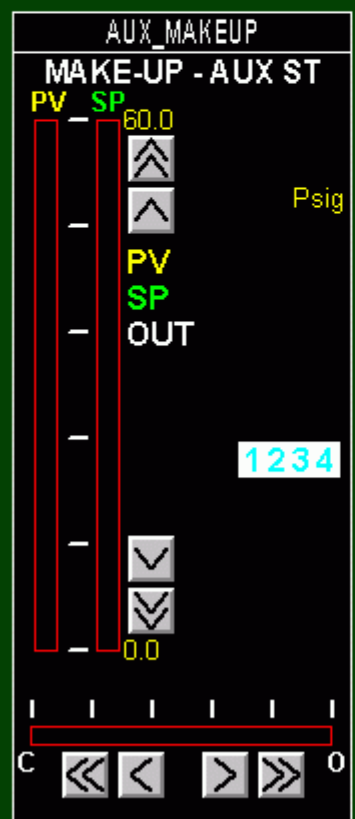
Go To

Alarm

WATCHDOG

System	Report	Overview	Graphic	Group	Trend	Point	Back	Print Screen
U1	U2	U3	U4	U5	U6	U7	U8	U9

# AUX EXHAUST STEAM SYSTEM

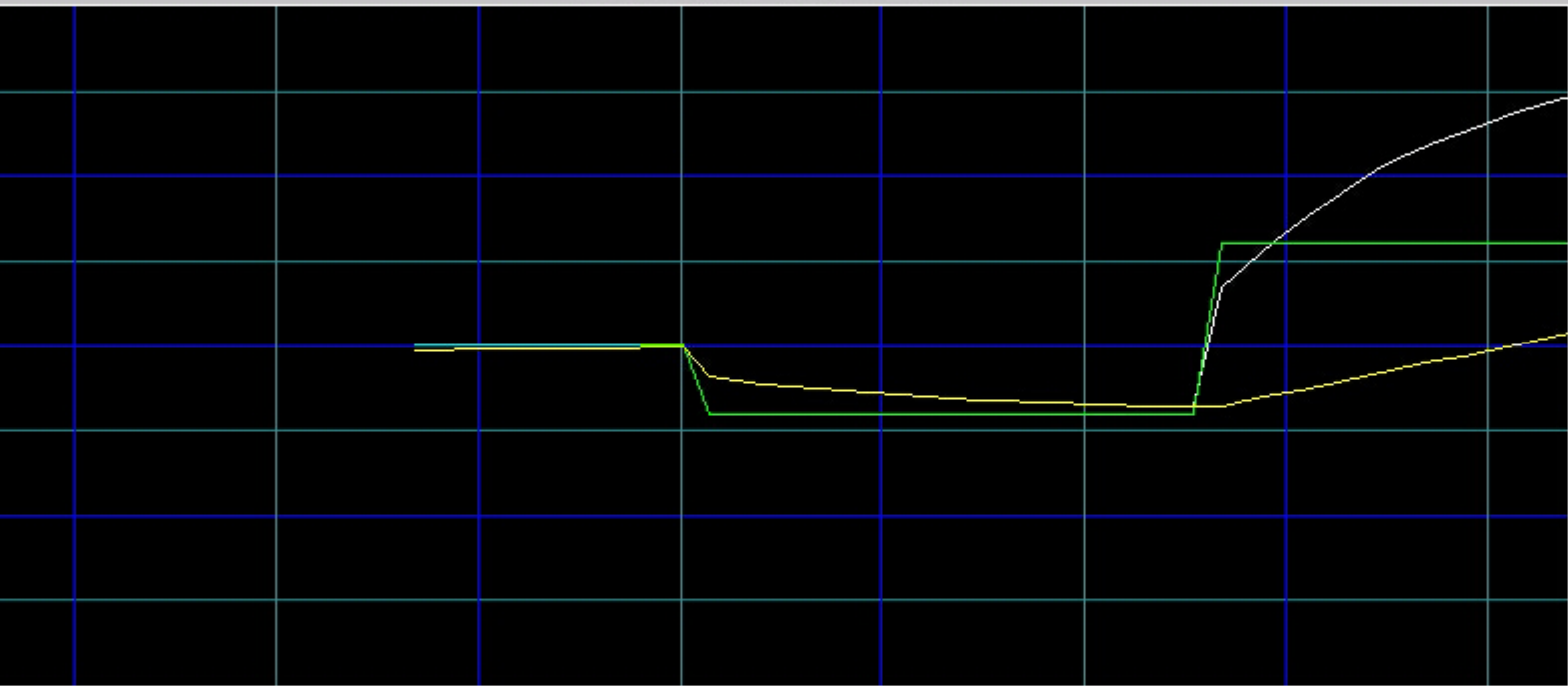


Time	State	Class	Type	Pri	Cmt	Name	Group	Val	Limit
16:01	UNACK	DSC	DSC	1	CONTROL SIM TEST	TESTLOOP-A1	\$System	HIGH	HIGH
15:54	ACK	DSC	DSC	1	DRUM LEVEL LO-LO TRIP	DRUM_LO_LO-A1	\$System	ALAR	ALAR
15:54	ACK	DSC	DSC	1	Backup I/O Server Health	TAGSERVER1B_ALIVE	\$System	DEAD	DEAD

System Report Overview Graphic Group Trend Point Back Print Screen Alarm

U1 U2 U3 U4 U5 U6 U7 U8 U9 U10

## CONTROL SIM TEST



TESTLOOP

CONTROL SIM TEST

PV █

SP █

OUT █

ESP █

1000

52.0

65.0

87.0

0.0

↑
↑

↓
↓

←
→

15:55:00

LIMITS	Setpoint	Output
High	100.00	100.00
Low	0.00	0.00

16:00:00

SETPOINT RAMP

Status: NOT RAMPING

Target: 0.00

Time: T#000ms

Rate: 0.00 EU/Min

ALARMS IN-SERVICE

Type	Status	Limit	Deadband
1: HIGH	ENABLED	52.00	0.5
2: LOW	ENABLED	5.00	0.5
3: ABSOLUTE_DEV	ENABLED	100.00	0.5
4: NONE	ENABLED	0.00	0.5

TUNING


Gain	<span style="border: 1px solid black; padding: 2px;">0.500</span>	TD	<span style="border: 1px solid black; padding: 2px;">0.00</span>
DG	<span style="border: 1px solid black; padding: 2px;">0.70</span>	DG	<span style="border: 1px solid black; padding: 2px;">10.00</span>

F.D. FANS	FEEDPUMPS	CIRC PUMPS	OVERBOARD	BLEEDS/DRAINS	DUMP/GUARD	CONDENSATE	ATMOS DRN	 <input type="button" value="Filter"/> <input type="button" value="Go To"/> <input type="button" value="Alarm"/>				
F.O. SERVICE	FRESH W COOL	SHAFT L.O.	MAIN ENG. L.O.	LUBE OIL	GAS CONTROLS	HOOD VENT	Group 16					
OILTEMPS	CONTAM SYS	AUX EXHAUST	ADT LEVEL	STEAM SYST'S 1	STEAM SYST'S 2	DISTILLER STM	HOTWELL					
Group 25	Group 26	Group 27	Group 28	Group 29	Group 30	Group 31	Group 32					
<b>System</b>	<b>Report</b>	<b>Overview</b>	<b>Graphic</b>	↓	<b>Group</b>	↓	<b>Trend</b>	↓	<b>Point</b>	<b>Back</b>	<b>Print Screen</b>	<b>Alarm</b>
U1	U2	U3	U4	U5	U6	U7	U8	U9	<b>WATCHCA</b>			

## STARBOARD F.D. FAN

## PORT F.D. FAN

**FD1\_SLOW**




OUT

AUTO (SEQ)  
 MAN (OPER)

START TIME:

STOP TIME:

**FD1\_FAST**




OUT

AUTO (SEQ)  
 MAN (OPER)

START TIME:

STOP TIME:

**FD2\_SLOW**




OUT

AUTO (SEQ)  
 MAN (OPER)

START TIME:

STOP TIME:

**FD2\_FAST**



OUT

AUTO (SEQ)  
 MAN (OPER)

START TIME:

STOP TIME:

e	Time	State	Class	Type	Pri	Cmt	Name	Group	Val	Limit
99	15:41:40.5	UNACK	DSC	DSC	1	Primary I/O Server Health	TAGSERVER1_ALIVE	\$System	DEAD	DEAD
99	15:41:40.5	UNACK	DSC	DSC	1	Backup I/O Server Health	TAGSERVER1B_ALIVE	\$System	DEAD	DEAD
99	15:41:28.0	UNACK	VALUE	LO	1		define	\$System	0	20
99	15:41:28.0	UNACK	DSC	DSC	1	R22 Coil Outlet Temp Low Alarm	TT2LoAlarm	\$System	OFF	OFF

ACK

Filter

Go To

System Report Overview Graphic ↓ Group ↓ Trend ↓ Point Back Print Screen Alarm

U1 U2 U3 U4 U5 U6 U7 U8 U9 WATCHCA

# THROTTLE CONTROLS

## TRANSFER CONTROL

BRIDGE E.R.

ENGINEER ROOM HAS CONTROL  
AUTO/HANDWHEEL

## RESET THROTTLES

PNEUMATIC FAILURE!!  
HYDRAULIC FAILURE!!

HANDWHEELS

Auto Hand

RESET

## THROTTLE POSITION:

ASTERN AHEAD

1ST STAGE STEAM PT147 0.0  
ASTERN STEAM CHEST PT148 0.0

TURNING GEAR:  
ENGAGED

## SHAFT SPEED:

TACH A: -110.0 RPM  
TACH B: -110.0 RPM

L.O. TO MAIN BEARINGS  
0.0 Psig

EMERGENCY  
HANDWHEELS  
DISENGAGED

ASTERN HANDWHEEL:

AHEAD HANDWHEEL:

TURBINE TRIP OIL PRESSURE

ASTERN THROTTLE VALVE:  
OPEN

AHEAD THROTTLE VALVE:  
OPEN

LOW OIL PRESSURE TRIP

TOTAL SHAFT REVOLUTIONS:  
0.0

THROTTLE TESTING

L.O. BOOSTERS

L.O. BOOST PUMP

CHARGE PUMP 1: 0.0 Psig

CHARGE PUMP 2: 0.0 Psig

IP BLEED

HP BLEED

LP BLEED

STEAM CHEST

1ST STAGE DRAIN

ASTERN GUARDIAN

Time	State	Class	Type	Pri	Cmt	Name	Group	Val	Limit
16:05	UNACK	DSC	DSC	1	Backup I/O Server Health	TAGSERVER1B_ALIVE	\$System	DEAD	DEAD
16:05	UNACK	DSC	DSC	1	DRUM LEVEL LO-LO TRIP	DRUM_LO_LO-A1	\$System	ALAR	ALAR
16:05	UNACK	DSC	DSC	1	CONTROL SIM TEST	TESTLOOP-A1	\$System	HIGH	HIGH

Silence  
Acknowledge  
Filter  
Go To

System Report Overview Graphic Group Trend Point Back Print Screen Alarm

U1 U2 U3 U4 U5 U6 U7 U8 U9 U10

Alarm Sequence Summary

Time	State	Class	Type	Pri	Cmt	Name	Group	Val	Limit
16:05	UNACK	DSC	DSC	1	Backup I/O Server Health	TAGSERVER1B_ALIVE	\$System	DEAD	DEAD
16:05	UNACK	DSC	DSC	1	DRUM LEVEL LO-LO TRIP	DRUM_LO_LO-A1	\$System	ALAR	ALAR
16:05	UNACK	DSC	DSC	1	CONTROL SIM TEST	TESTLOOP-A1	\$System	HIGH	HIGH

Acknowledge  
Select  
Alarms

Acknowledge  
Display  
Alarms

LNG/C Matthew - Alarm Summary Graphic

# G.R. BOWLER, Inc.

- Experienced Marine Automation Systems-  
design, development, installation and  
service.
- Experienced with LNG applications.
- Support from Siemens, Inc. allows us to  
insure world-wide service and support.
- GRB, Inc. has reliable, efficient systems in  
service - We can deliver!

# G.R. BOWLER, Inc.

We will

Deliver

For

You!