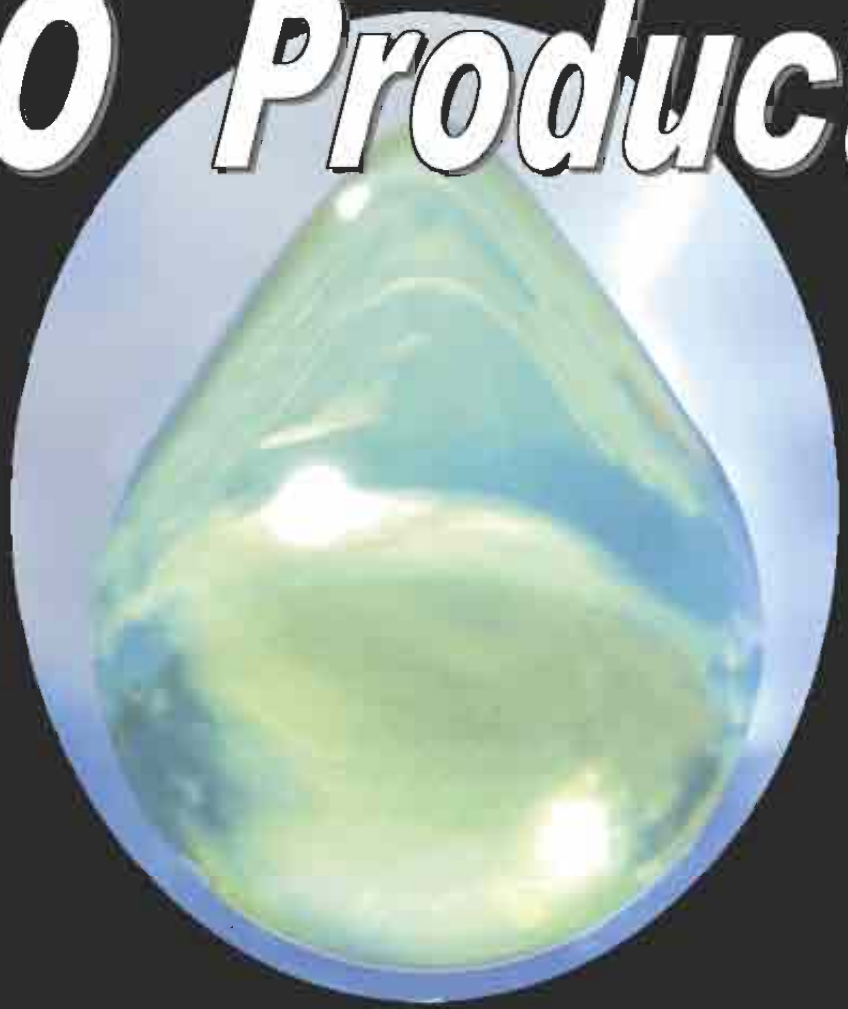
Water Section of Public Works

GILBERT
ARIZONA

a
H_2O Production



Gilbert Experience with SCADA

1. Conception
2. Visualization
3. Software Demo
4. Design
5. Bid Process
6. Construction
7. Training
8. Real World Application
9. Twelve Year Report Card

Gilbert Experience with SCADA

1. Conception

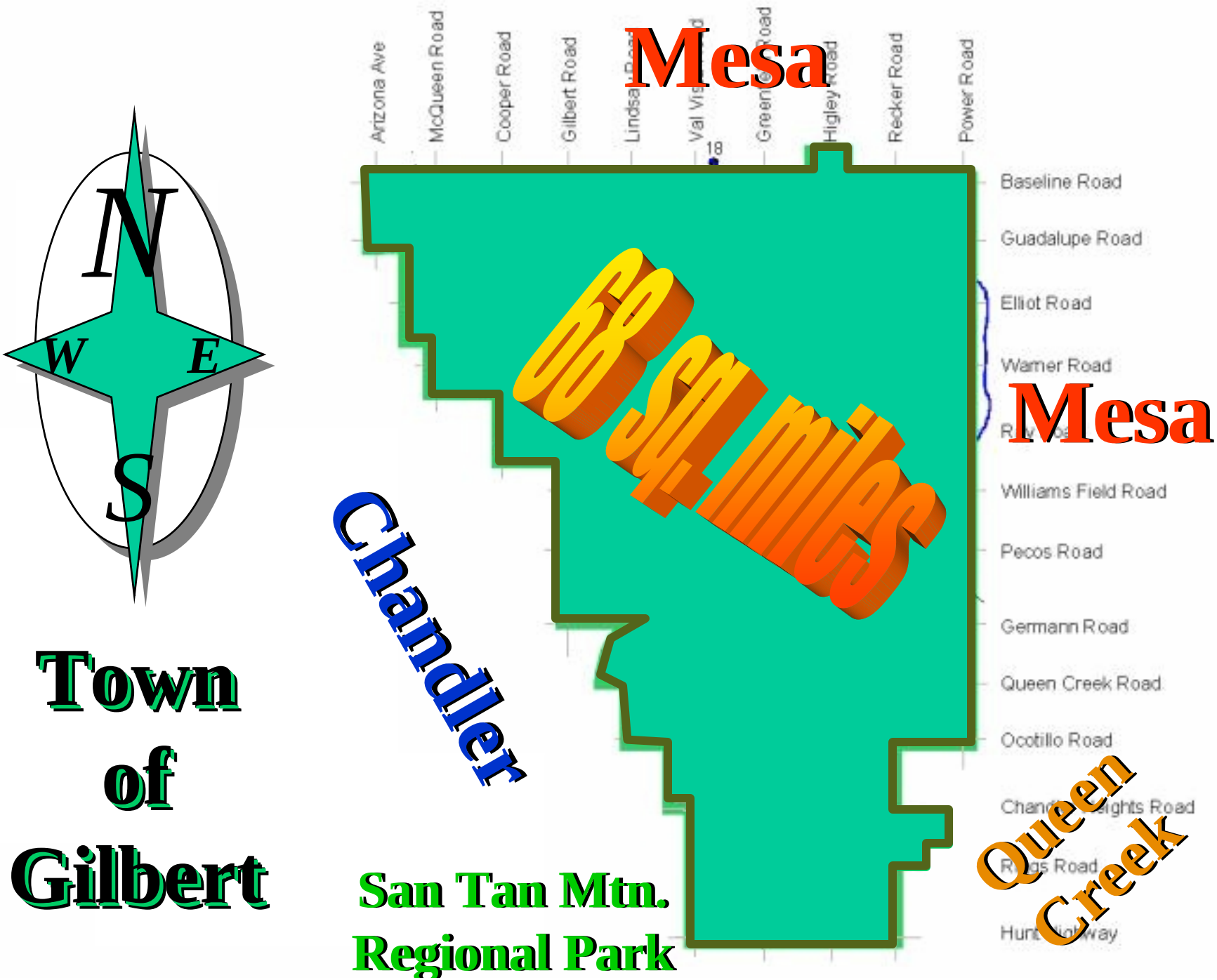
Gilbert Experience with SCADA

Where is Gilbert, AZ ??????????

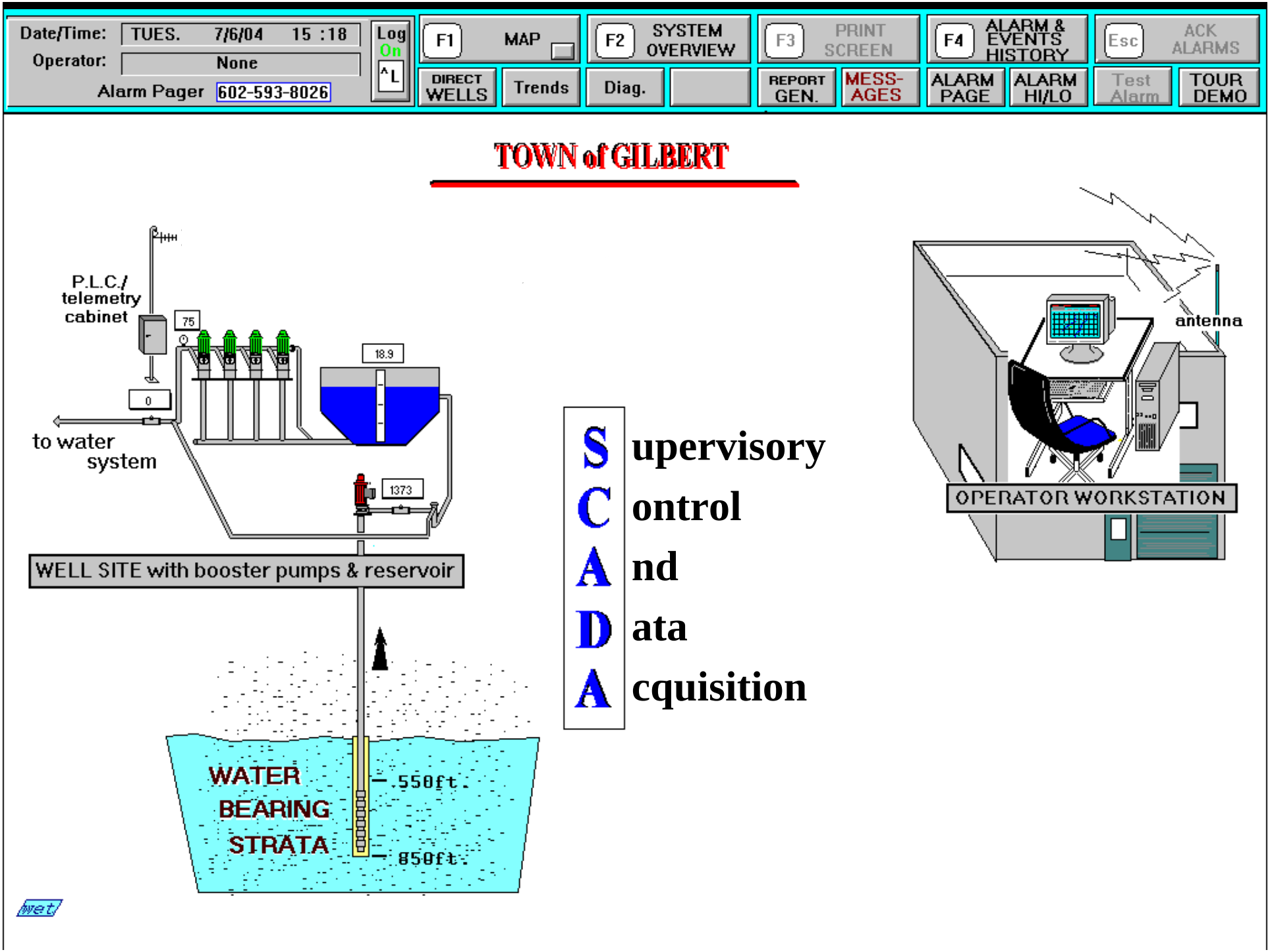
GILBERT
ARIZONA

TOWN OF GILBERT

TOWN OF GILBERT
WATER TREATMENT PLANT
2865 EAST GUADALUPE ROAD


N
W
E
S
Town of Gilbert
Mesa
Mesa
68 sq. miles
Chandler
Queen Creek
San Tan Mtn. Regional Park
Arizona Ave
McQueen Road
Cooper Road
Gilbert Road
Lindsay Road
Val Vista Road
Greenfield Road
Higley Road
Recker Road
Power Road
Baseline Road
Guadalupe Road
Elliot Road
Warner Road
Williams Field Road
Pecos Road
Germann Road
Queen Creek Road
Ocotillo Road
Chandler Heights Road
Riggs Road
Hunt Highway
18

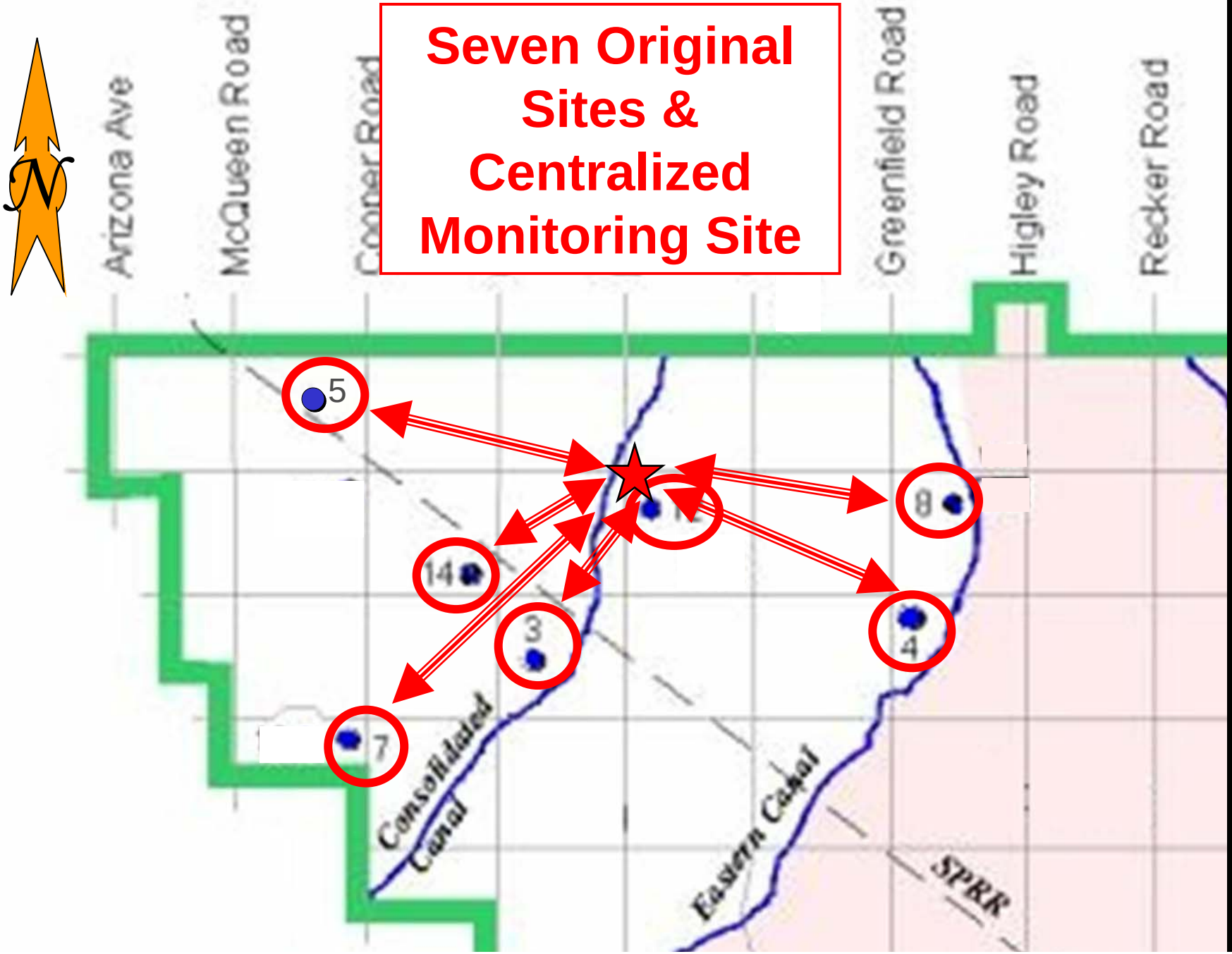
Town of Gilbert
Historical
Water Tower
Circa 1925


Date/Time: TUES. 7/6/04 15 :18
Operator: None
Alarm Pager 602-593-8026
Log On
^L
F1 MAP
F2 SYSTEM OVERVIEW
F3 PRINT SCREEN
F4 ALARM & EVENTS HISTORY
Esc ACK ALARMS
DIRECT WELLS
Trends
Diag.
REPORT GEN.
MESS-AGES
ALARM PAGE
ALARM HI/LO
Test Alarm
TOUR DEMO
TOWN of GILBERT
P.L.C./ telemetry cabinet
75
18.9
0
to water system
1373
WELL SITE with booster pumps & reservoir
WATER BEARING STRATA
550ft.
850ft.
SCADA
Supervisory
Control
and
Data
Acquisition
antenna
OPERATOR WORKSTATION
wet

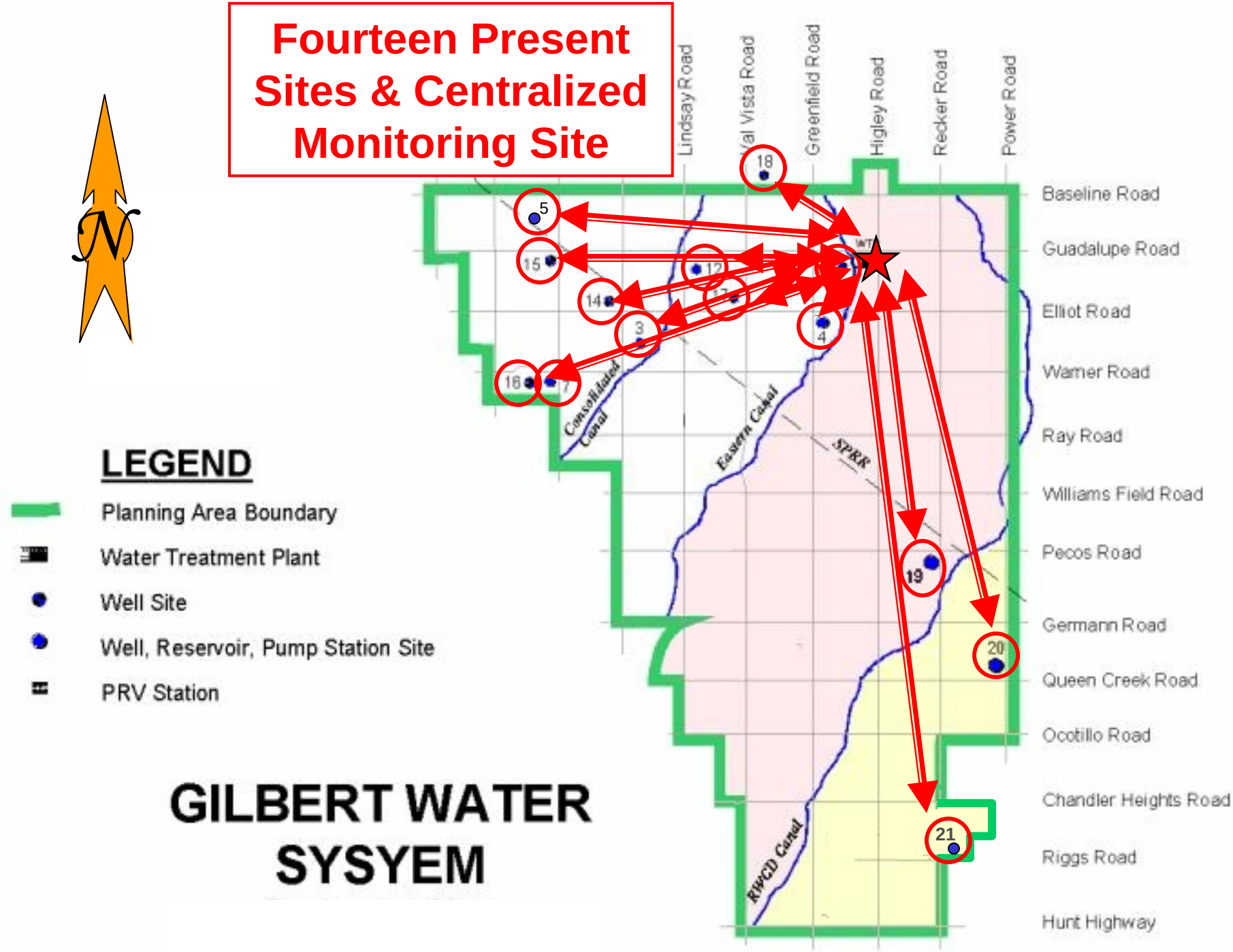
Reasons to Incorporate SCADA

1. Public Works Director read about SCADA in a professional journal.
2. Recognized growth of the Town of Gilbert; 25,000 in 1990 to 100,000 by new millennium
3. Affordability of the new technologies in 1990; ie PC's, programmable logic controller (PLC), radio transmitters/receivers and digital/analog instrumentation.
4. Human/Machine interface advancements; computer software applications and operating systems.
5. Acceptance within the Water Industry of this revolutionary methodology; SCADA vs. RTU

Seven Original Sites & Centralized Monitoring Site



Fourteen Present Sites & Centralized Monitoring Site



FLAT
Gilbert Terrain

Gilbert Experience with SCADA

2. Visualization
4. Design

- Non-proprietary (all components)
- Graphics, Graphics and more Graphics
- State-of-the-Art
- “To IS or Not to IS”

Gilbert Experience with SCADA

3. Software Demo

- Wonderware - Intouch
- Genesis
- Intellusion

Gilbert Experience with SCADA

4. Design

- Seven Remote Well Sites
  1. Intel 486
  2. 32 megabytes RAM
  3. 120 megabytes hard drive

Gilbert Experience with SCADA

4. Design

- Hardware
  1. Intel 486
  2. 32 megabytes RAM
  3. 120 megabytes hard drive

Gilbert Experience with SCADA

4. Design

- Software Applications
  1. Operating System – 3.11 for Workgroups
  2. Wonderware - Intouch
  3. MS Excel – report generator

Gilbert Experience with SCADA

Gilbert Experience with SCADA

4. Design

- Human/Machine Interface
  1. Programmable Logic Controller
     a) Conditional Logic
        1) Boolean Notation
        2) Ladder Logic

Gilbert Experience with SCADA

Gilbert Experience with SCADA

4. Design

- Communication
  1. 900 mhz dedicated frequency
  2. After hour monitoring
     a) Take home laptop w/ phone modem
     b) Alarm paging

Gilbert Experience with SCADA

Gilbert Experience with SCADA

5. Bid Process

July, 1992

Engineers Estimate	$ 253,000
1. BL Weber Group	$ 233,018
2. Phoenix Controls	$ 239,060
3. C/J Energy Group	$ 330,479

Gilbert Experience with SCADA

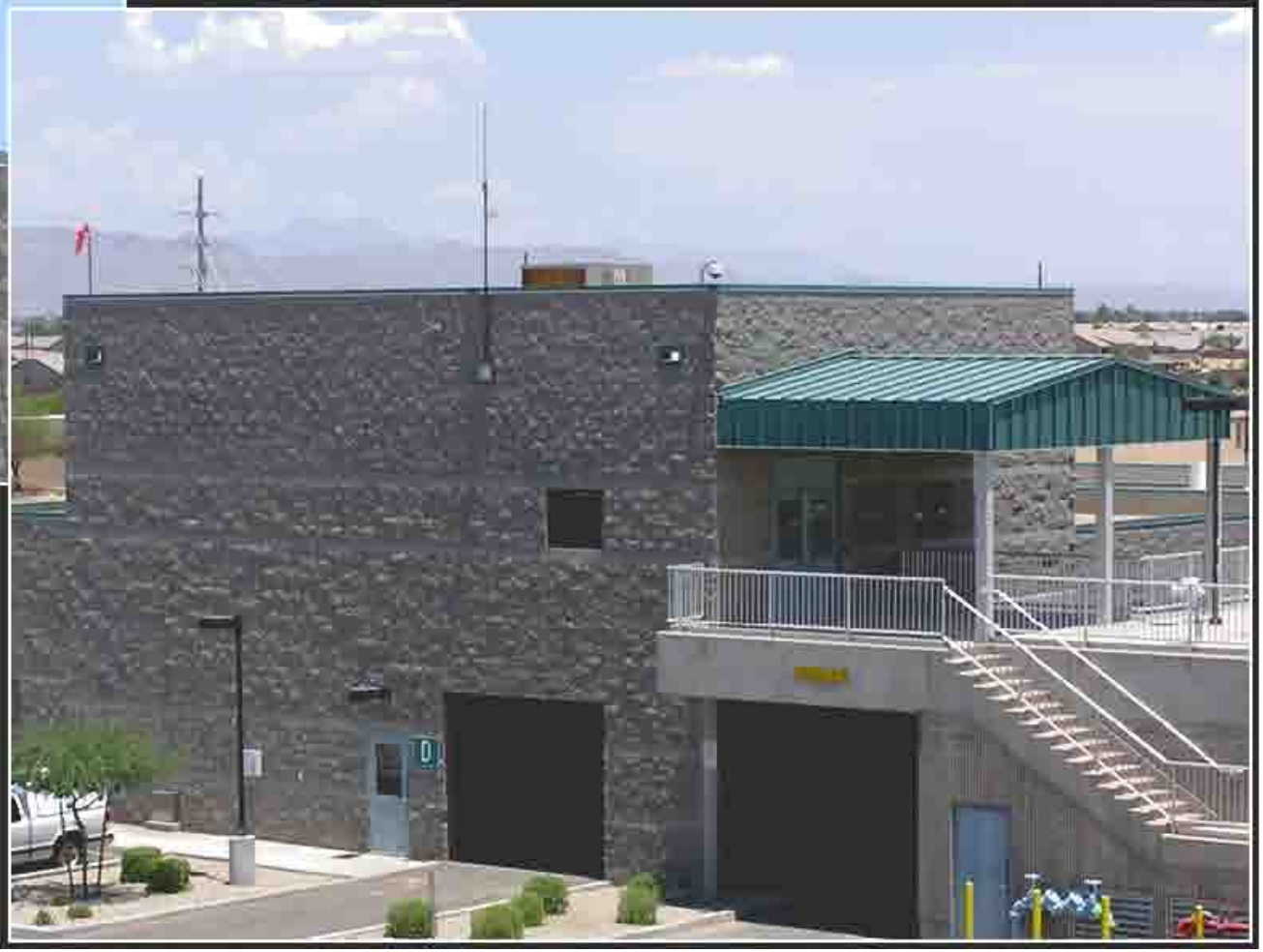
6. Construction

- Remote Sites (7 well sites)
  1. Antennae & mast
  2. Instrumentation Cabinet
  3. Establishing Power
  4. Mount and program PLC's
  5. Establish Radio Communication

Gilbert Experience with SCADA

6. Construction

- Centralized Site
  1. PC workstation
  2. Main Transmitter/receiver cabinet
  3. 50 foot mast and antenna
  4. Establish Radio Communication



Gilbert Experience with SCADA

7. Training

- Software Integration
  1. Wonderware School (5 people)
     a) Graphic Tools
     b) Net DDE
     c) Conditional Logic
  2. PLC ladder logic

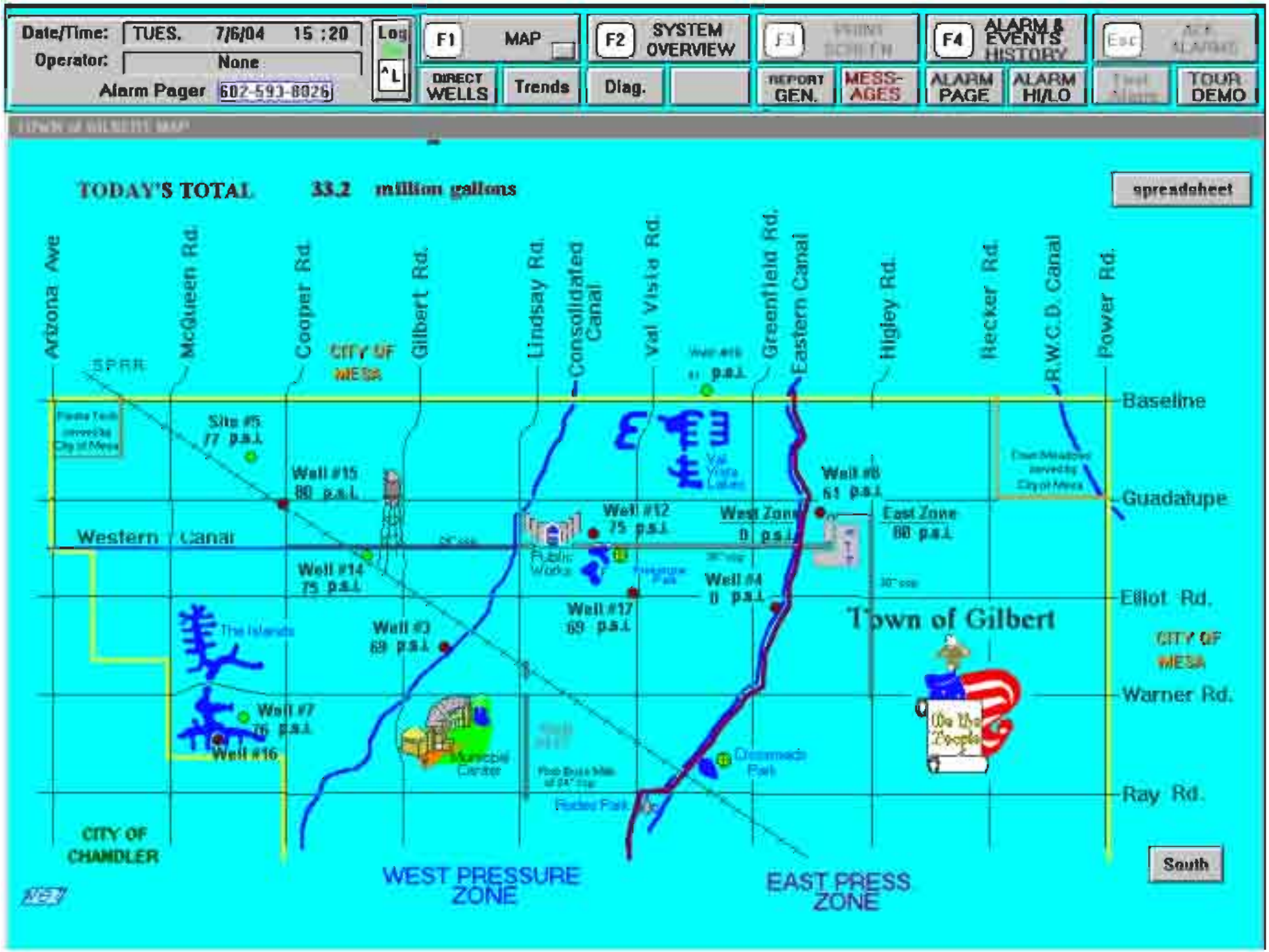
Gilbert Experience with SCADA

7. Training

- Equipment & Instrumentation
  1. PLC's
  2. Radios (900 mHz)
  3. Computer
  4. Transducers

Gilbert Experience with SCADA

8. Real World Application


Date/Time: TUES. 7/6/04 15 :20
Operator: None
Alarm Pager 602-593-8026
Log
^L
F1 MAP
F2 SYSTEM OVERVIEW
F3
F4 ALARM & EVENTS HISTORY
Esc
DIRECT WELLS
Trends
Diag.
REPORT GEN.
MESS-AGES
ALARM PAGE
ALARM HI/LO
TOUR DEMO
TODAY'S TOTAL 33.2 million gallons
spreadsheet
Arizona Ave
McQueen Rd.
Cooper Rd.
Gilbert Rd.
Lindsay Rd.
Consolidated Canal
Val Vista Rd.
Greenfield Rd.
Eastern Canal
Higley Rd.
Recker Rd.
R.W.C.D. Canal
Power Rd.
SPRR
CITY OF MESA
Baseline
Guadalupe
Elliot Rd.
Warner Rd.
Ray Rd.
Site #5 77 p.s.i.
Well #15 80 p.s.i.
Well #14 75 p.s.i.
Well #12 75 p.s.i.
Well #17 69 p.s.i.
Well #4 0 p.s.i.
Well #8 61 p.s.i.
West Zone 0 p.s.i.
East Zone 80 p.s.i.
Western Canal
Public Works
Town of Gilbert
Well #3 69 p.s.i.
Well #7 76 p.s.i.
Well #16
The Islands
Municipal Center
Crossroads Park
CITY OF CHANDLER
WEST PRESSURE ZONE
EAST PRESS ZONE
South

Date/Time: TUES. 7/6/04 15 :22 | Log | F1 MAP | F2 SYSTEM OVERVIEW | F3 POINT SCREEN | F4 ALARM & EVENTS HISTORY | Esc ACK ALARMS

Operator: None

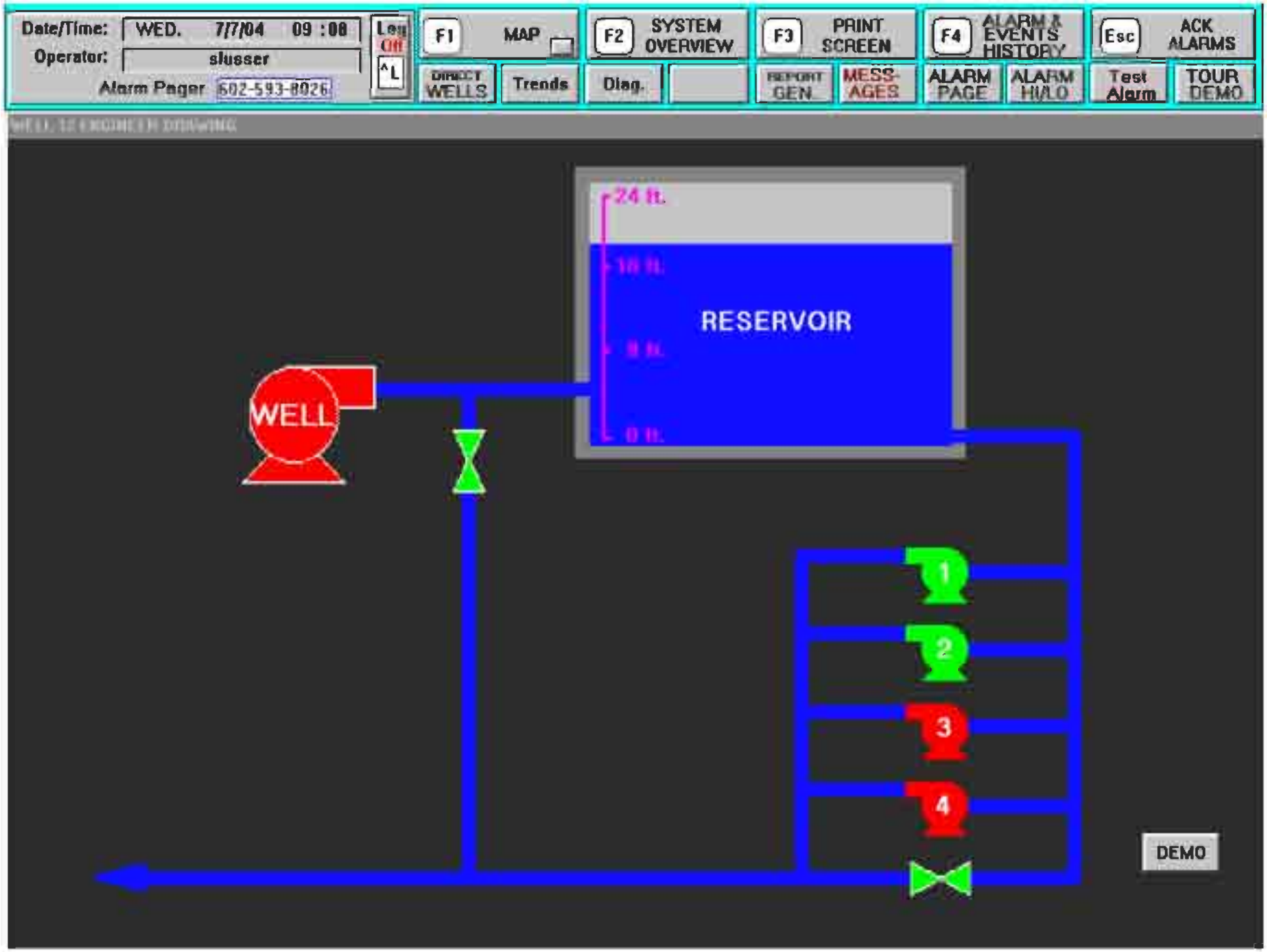
Alarm Pager 602-593-8026

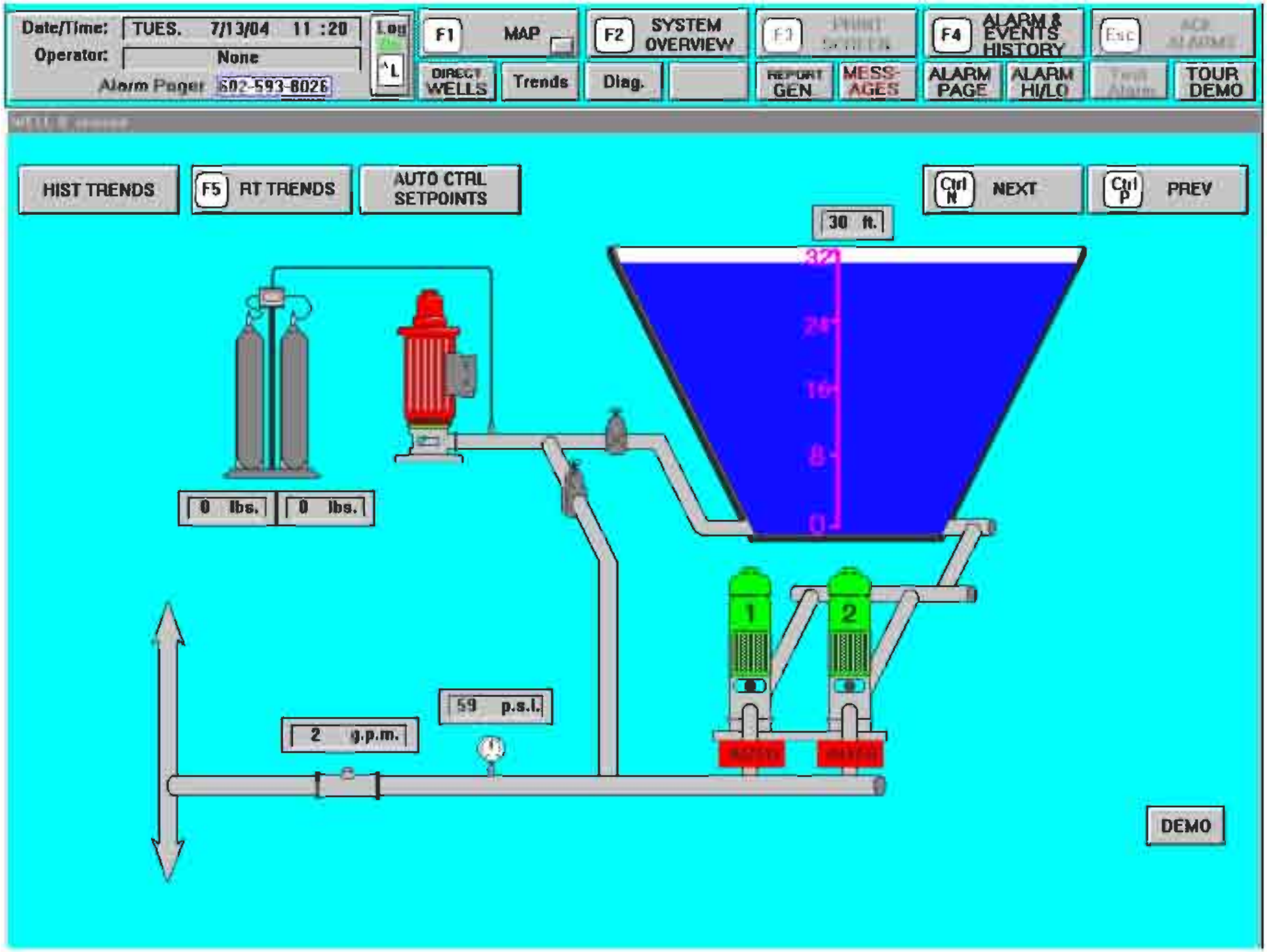
DIRECT WELLS | Trends | Diag. | REPORT GEN | MESS-AGES | ALARM PAGE | ALARM HI/LO | Time Alarm | TOUR DEMO

	WELL STATUS	RESERVOIR LEVEL ft.	RESERVOIR VOL. m.g.	SYSTEM p.s.i.	WELL g.p.m.	BOOSTER g.p.m.	booster status hi lo	hi lo	hi lo		
Well 3	ON auto	28.9	0.89	69	1,686	24	a 72 64	a 70 63	a 70 62		
Well 4	ON auto			z2 79 z1 66	11		SET POINTS				
Site 5	open auto	14.8	0.62	78	650	0	a 76 66	a 80 64	a 78 65		
Well 7	ON auto	12.1	1.52	76	1,435	0	a 78 67	a 80 66	a 81 64	a 75 65	
Well 8	ON auto			62	1,330	2 ZONE 1	a	a	0%		57
Well 12	ON auto	18.9	1.48	75	1,373	0	a	a	a	a	70
Lindsay	CLOSE	Pump Res 21.0 19.2	3.24	64		35	h 100%	a 0%	a		50
Well 14	OFF	no reservoirs		76	13						
Well 15	ON ● hand	on these sites.		81	1,482		(ZONE 1)	71			
Well 16	ON ● hand			77	1,496		(ZONE 2)	73			
Well 17	ON ● hand	direct pumping		69	1,429		(ZONE 3)	56			
Well 18	OFF ○ hand	into system		61	37		(ZONE 4)	##			
Well 19	ON auto	21.1	1.70	62	1,952	0	a **	a	a		55
Well 20	ON auto	15.3	1.30	60	1,238	1,181	a **	a **		4a 70%	60
Site 21	ON auto	13.4	0.90	53	1,513	1,380	1a 88%	a	a		52
W.T.P.		south north 26.8 27.3	13.58	62	V-ZONE 1	9,092	6a 83%	7a 85%	a	a	62
				80	E-ZONE 2	8,700	1a 81%	a	a	4a 88% 5a	80
Well 22											
Well 23											

TOTAL RESERVOIR VOLUME 23.03 m.g. equals 82% of total reservoir capacity NODENAME: VTP7

DAILY SUMS


Date/Time: WED. 7/7/04 09 :08
Operator: slusser
Alarm Pager 602-593-8026
Log Off
^L
F1 MAP
F2 SYSTEM OVERVIEW
F3 PRINT SCREEN
F4 ALARM & EVENTS HISTORY
Esc ACK ALARMS
DIRECT WELLS
Trends
Diag.
REPORT GEN.
MESS-AGES
ALARM PAGE
ALARM HI/LO
Test Alarm
TOUR DEMO
24 ft.
RESERVOIR
WELL
1
2
3
4
DEMO


Date/Time: TUES. 7/13/04 11 :20
Operator: None
Alarm Pager 602-593-8026
Log
L
F1 MAP
F2 SYSTEM OVERVIEW
F4 ALARM & EVENTS HISTORY
Esc
DIRECT WELLS
Trends
Diag.
REPORT GEN
MESS-AGES
ALARM PAGE
ALARM HI/LO
TOUR DEMO
HIST TRENDS
F5 RT TRENDS
AUTO CTRL SETPOINTS
Ctrl N NEXT
Ctrl P PREV
30 ft.
24
16
8
0
0 lbs.
0 lbs.
1
2
59 p.s.i.
2 g.p.m.
DEMO

Date/Time: WED. 7/7/04 09 :09 | Log Off | Operator: slusser | Alarm Pager 602-593-8026

F1 MAP | F2 SYSTEM OVERVIEW | F3 PRINT SCREEN | F4 ALARM & EVENTS HISTORY | Esc ACK ALARMS

DIRECT WELLS | Trends | Diag. | REPORT GEN | MESS-AGES | ALARM PAGE | ALARM HI/LO | Test Alarm | TOUR DEMO

Well 12 Booster Station

	WELL STATUS		RESERVOIR LEVEL ft.					
Well 3	ON	auto	14.7					
Well 4	OFF	hand						
Site 5	closed	auto	13.6					
Well 7	ON	auto	9.2					
Well 8	OFF	auto						
Well 12	ON	auto	15.2					
Lindsay	CLOSE		Pump 17.5	Res 16.0				
Well 14	OFF		no reservoirs					
Well 15	ON	hand	on these sites.		79	1,506		(ZONE 1) 72
Well 16	ON	hand			77	1,495		(ZONE 2) 76
Well 17	ON	hand	direct pumping		71	1,410		
Well 18	OFF	hand	into system		64	28		
Well 19	ON	auto	16.2	1.19	62	1,986	1	
Well 20	ON	auto	15.0	1.27	61	1,222		
Site 21	ON	auto	14.5	1.01	63	1,509	2	
W.T.P.			south 23.6	north 24.2	11.44	70	V-ZONE 1	13
						86	E-ZONE 2	12
Well 22								
Well 23								

Well 12

TOTAL RESERVOIR VOLUME 18.59 m.g. equals 66% of total reservoir capacity NODENAME: VTP7

DAILY SUMS

Date/Time: WED. 7/7/04 09 :10 | Log Off | Operator: slusser | Alarm Pager 602-593-8026

F1 MAP | F2 SYSTEM OVERVIEW | F3 PRINT SCREEN | F4 ALARM & EVENTS HISTORY | Esc ACK ALARMS

DIRECT WELLS | Trends | Diag. | REPORT GEN | MESS-AGES | ALARM PAGE | ALARM HI/LO | Test Alarm | TOUR DEMO

	WELL STATUS	RESERVOIR LEVEL ft.	RESERVOIR VOL. m.g.	SYSTEM p.s.i.	WELL g.p.m.	BOOSTER g.p.m.	booster status hi lo hi lo hi lo
Well 3	ON auto	14.7	0.46	71	1,776	780	a 72 64 2a 71 60 a 70 62
Well 4	OFF hand			z2 80 z1 74	8		SET POINTS
Site 5	closed auto	13.6	0.57	76		0	a 76 63 a 76 64 a 78 62
Well 7	ON auto	9.2	1.15	76	1,458	1,434	
Well 8	OFF auto			67	13	1,152 ZONE 1	
Well 12	ON auto	15.2	1.09	79	1,419	2,222	
Lindsay	CLOSE	Pump 17.5 Res 16.0	2.70	64		232	
Well 14	OFF hand	no reservoirs		78	11		
Well 15	ON ● hand	on these sites.		79	1,493		
Well 16	ON ● hand			77	1,496		
Well 17	ON ● hand	direct pumping		71	1,410		
Well 18	OFF ○ hand	into system		65	28		
Well 19	ON auto	16.2	1.19	62	1,987	1,300	a [illegible] a a [illegible]
Well 20	ON auto	15.0	1.27	62	1,217	1,070	a [illegible] a [illegible] 4a 70% 62
Site 21	ON auto	14.4	1.01	62	1,508		
W.T.P.		south 23.6 north 24.2	11.43	70 86	V-ZONE 1 E-ZONE 2		
Well 22							
Well 23							

TOTAL RESERVOIR VOLUME 18.59 m.g. equals 66% of tota

Well 8

Well 8 Booster Station

Date/Time: TUES. 7/13/04 11 :19 | Log | F1 MAP | F2 SYSTEM OVERVIEW | F3 | F4 ALARM & EVENTS HISTORY | Esc

Operator: None | ^L | DIRECT WELLS | Trends | Diag. | REPORT GEN | MESS-AGES | ALARM PAGE | ALARM HI/LO | TOUR DEMO

Alarm Pager 602-593-8026

WTP Boosters (West Zone - Z1) | WTP Boosters (East Zone - Z2)

Well 20	ON	auto	15.6	1.32	74	1,177	3,213	a	ex	2a 89%		4a 85%		74
Site 21	OFF	auto	9.5	0.54	50	0	23	1a 70%		a	a			50
W.T.P.			south 23.7 north 24.1	11.47	56	W-ZONE 1	4,904	6a 79%		a ex	a	a		56
					74	E-ZONE 2	6,866	1a 88%		a	a	4a 93%	a	74
Well 22														
Well 23														

TOTAL RESERVOIR VOLUME 18.28 m.g. equals 65% of total reservoir capacity NODENAME: WTP7

DAILY SUMS

Date/Time: TUES. 7/6/04 15 :22 | Log | F1 MAP | F2 SYSTEM OVERVIEW | F3 POINT SCREEN | F4 ALARM & EVENTS HISTORY | Esc ACK ALARMS

Operator: None

Alarm Pager 602-593-8026

DIRECT WELLS | Trends | Diag. | REPORT GEN | MESS-AGES | ALARM PAGE | ALARM HI/LO | Time Alarm | TOUR DEMO

	WELL STATUS	RESERVOIR LEVEL ft.	RESERVOIR VOL. m.g.	SYSTEM p.s.i.	WELL g.p.m.	BOOSTER g.p.m.	booster status hi lo	hi lo	hi lo		
Well 3	ON auto	28.9	0.89	69	1,686	24	a 72 64	a 70 63	a 70 62		
Well 4	ON auto			z2 79 z1 66	11		SET POINTS				
Site 5	open auto	14.8	0.62	78	650	0	a 76 66	a 80 64	a 78 65		
Well 7	ON auto	12.1	1.52	76	1,435	0	a 78 67	a 80 66	a 81 64	a 75 65	
Well 8	ON auto			62	1,330	2 ZONE 1	a	a	0%		57
Well 12	ON auto	18.9	1.48	75	1,373	0	a	a	a	a	70
Lindsay	CLOSE	Pump Res 21.0 19.2	3.24	64		35	h 100%	a 0%	a		50
Well 14	OFF	no reservoirs		76	13						
Well 15	ON ● hand	on these sites.		81	1,482		(ZONE 1)	71			
Well 16	ON ● hand			77	1,496		(ZONE 2)	73			
Well 17	ON ● hand	direct pumping		69	1,429		(ZONE 3)	56			
Well 18	OFF ○ hand	into system		61	37		(ZONE 4)	##			
Well 19	ON auto	21.1	1.70	62	1,952	0	a **	a	a		55
Well 20	ON auto	15.3	1.30	60	1,238	1,181	a **	a **		4a 70%	60
Site 21	ON auto	13.4	0.90	53	1,513	1,380	1a 88%	a	a		52
W.T.P.		south north 26.8 27.3	13.58	62	V-ZONE 1	9,092	6a 83%	7a 85%	a	a	62
				80	E-ZONE 2	8,700	1a 81%	a	a	4a 88% 5a	80
Well 22											
Well 23											

TOTAL RESERVOIR VOLUME 23.03 m.g. equals 82% of total reservoir capacity NODENAME: VTP7

DAILY SUMS

Date/Time: TUES. 7/13/04 11 :25
Operator: None
Alarm Pager 602-593-8026

Log | AL

F1 MAP | DIRECT WELLS | Trends
F2 SYSTEM OVERVIEW | Diag.
F3 | REPORT GEN | MESS-AGES
F4 ALARM & EVENTS HISTORY | ALARM PAGE | ALARM HI/LO
Esc | TOUR DEMO

	WELL STATUS
Well 3	ON aut
Well 4	OFF har
Site 5	closed au
Well 7	ON au
Well 8	ON au
Well 12	ON au
Lindsay	CLOSE
Well 14	ON
Well 15	ON ● han
Well 16	ON ● han
Well 17	ON ● han
Well 18	ON ● han
Well 19	ON aut
Well 20	ON aut
Site 21	OFF aut
W.T.P.	
Well 22	
Well 23	

WEST ZONE BOOSTER PUMPS

BOOSTER 6	BOOSTER 7	BOOSTER 8	BOOSTER 9	WTP FILL VALVE
ON / OFF	ON / OFF	ON / OFF	ON / OFF	OPEN / CLOSE
MANUAL	MANUAL	MANUAL	MANUAL	open 00:00 close 00:00 Schedule OFF
60 %	71 %	start 00:00 stop 00:00 Schedule OFF	start 00:00 stop 00:00 Schedule OFF	
Pump Position Current: 1 New: 0	Pump Position Current: 2 New: 0	Pump Position Current: 3 New: 0	Pump Position Current: 4 New: 0	
Off Setpoint (Sched. Only)		Off Setpoint (Sched. Only)	Off Setpoint (Sched. Only)	

Be aware: When setting start/stop times, computer & PLC in field have different clocks.

OPERATIONAL SETPOINTS

	Position 1	Position 2	Position 3	Position 4
On Setpoint:	60 psi	50 %	50 %	50 %
On Delay:	70 sec	60 sec	100 sec	200 sec
Off Setpoint:	75 psi	70 %	72 %	75 %
Off Delay:	180 sec	250 sec	180 sec	120 sec

Pump Station
MANUAL
AUTO

Change Pump Positions

TUNE

Cl2 #1	Cl2 #2
OFF	OFF
Fail	Fail

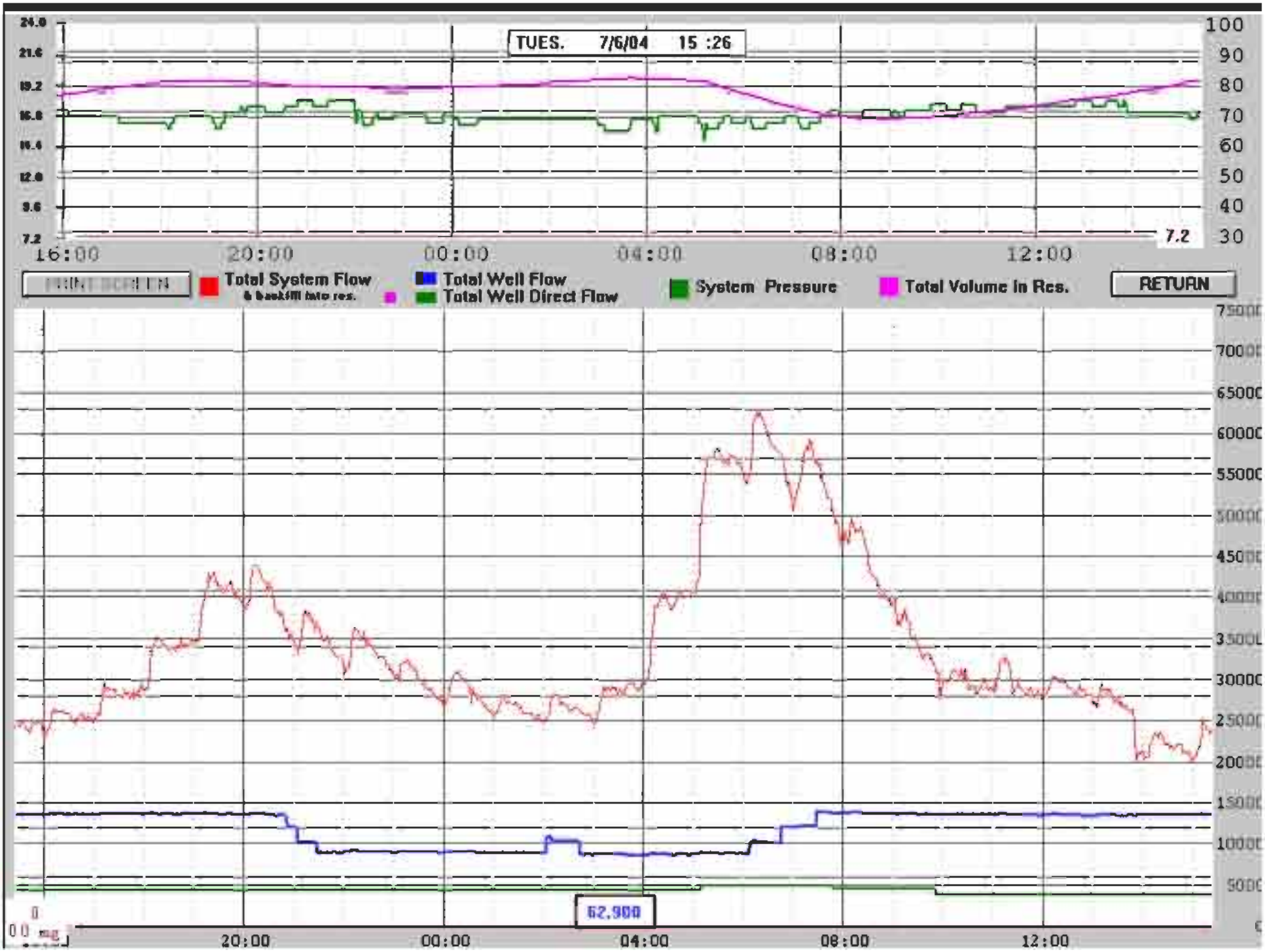
56 psi

5,856 GPM

TOTAL RESERVOIR VOLUME 18.34 m.g. equals 65% of total reservoir capacity

NODENAME: VTPZ

DAILY SUMS


TUES. 7/6/04 15 :26
24.0
21.6
19.2
16.8
14.4
12.0
9.6
7.2
100
90
80
70
60
50
40
30
7.2
16:00
20:00
00:00
04:00
08:00
12:00
PRINT SCREEN
Total System Flow
& backfill into res.
Total Well Flow
Total Well Direct Flow
System Pressure
Total Volume in Res.
RETURN
75000
70000
65000
60000
55000
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
62,900
20:00
00:00
04:00
08:00
12:00

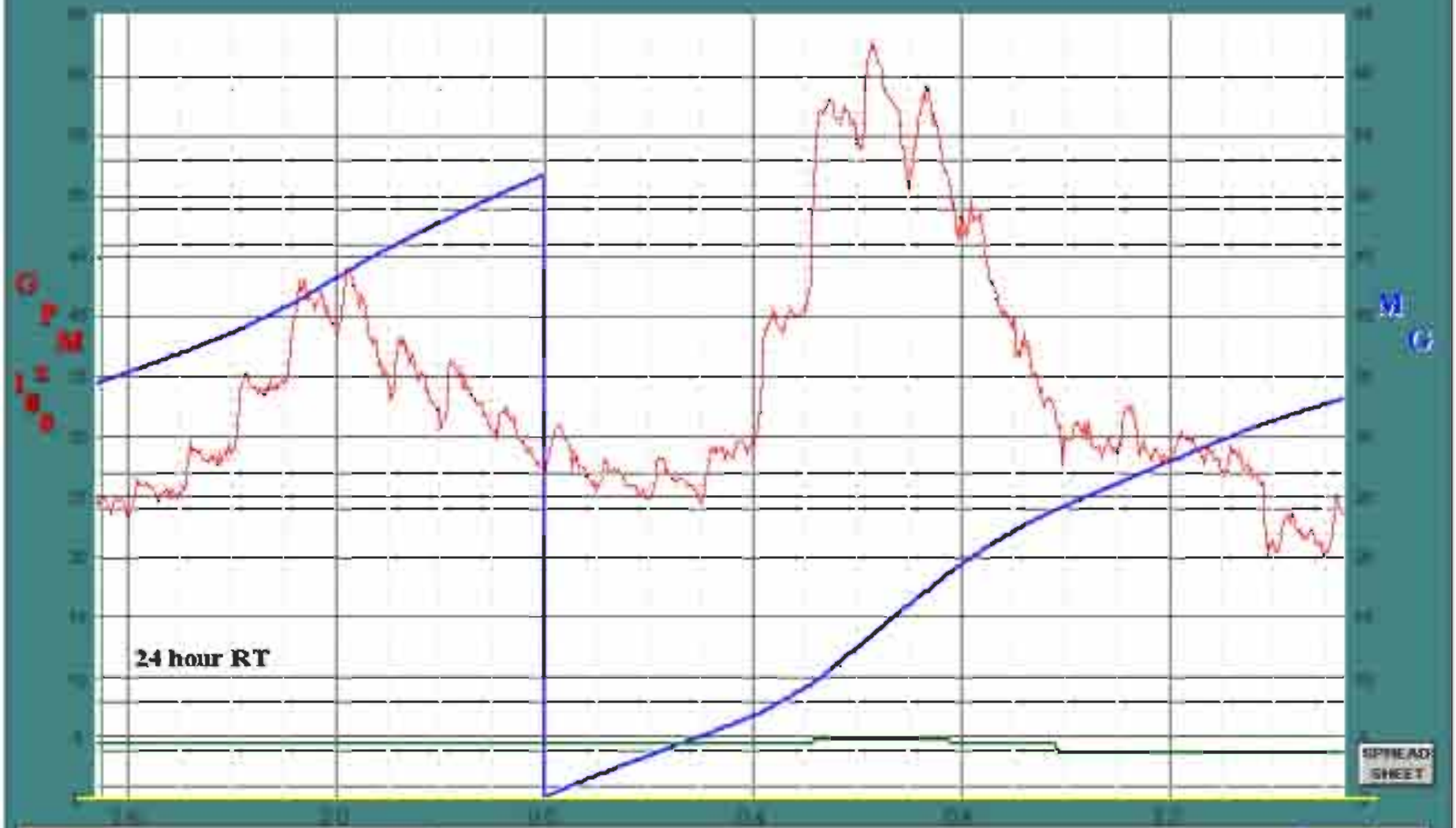
Date/Time: TUES. 7/6/04 15 :24

Operator: None

Alarm Pager 602-593-8026

F1 MAP | F2 SYSTEM OVERVIEW | F3 POINT SCREEN | F4 ALARM & EVENTS HISTORY | Esc ACK ALARMS

DIRECT WELLS | Trends | Diag. | REPORT GEN | MESS-AGES | ALARM PAGE | ALARM HI/LO | Time Alarm | TOUR DEMO



0 g.p.m.

0 g.p.m. prev. day peak

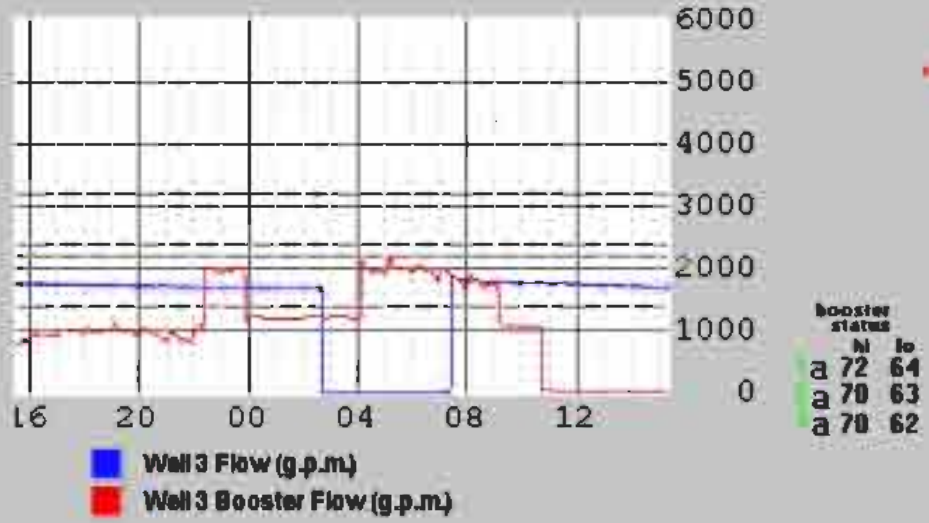
Daily Sum	33.249	Sun.	Mon.	Tue.	Wed.	Thur.	Fri.	Sat.
Last Week		50.004	51.198	49.263	50.832	48.793	51.546	48.593
Present Week		47.867	51.555					

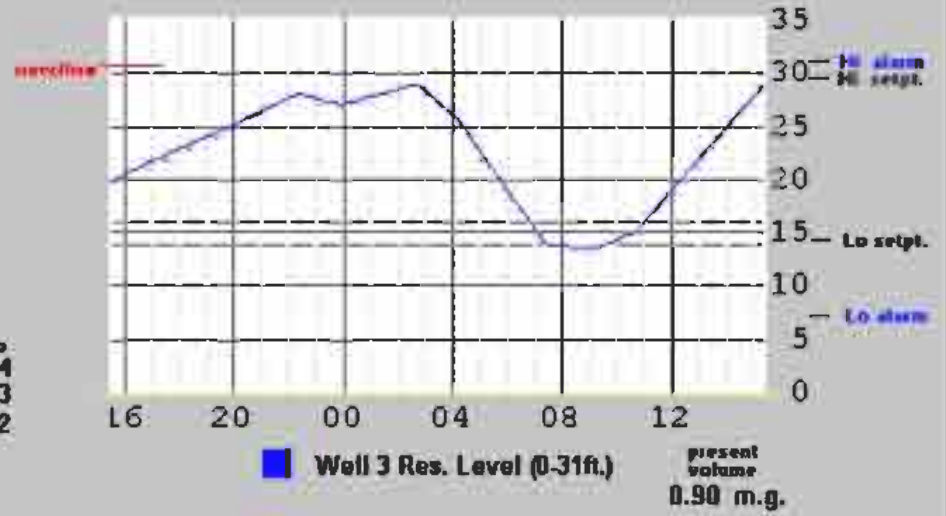
0.808 m.g

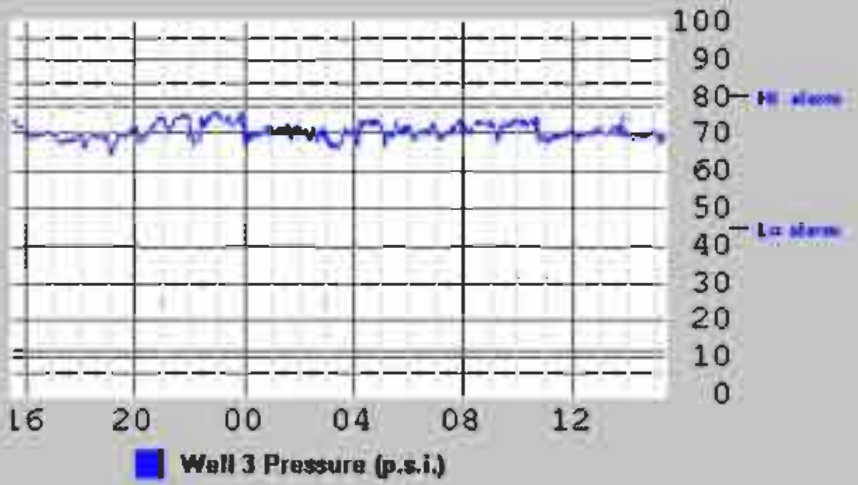
Date/Time: TUES. 7/6/04 15 :27
Operator: None
Alarm Pager 602-593-8026

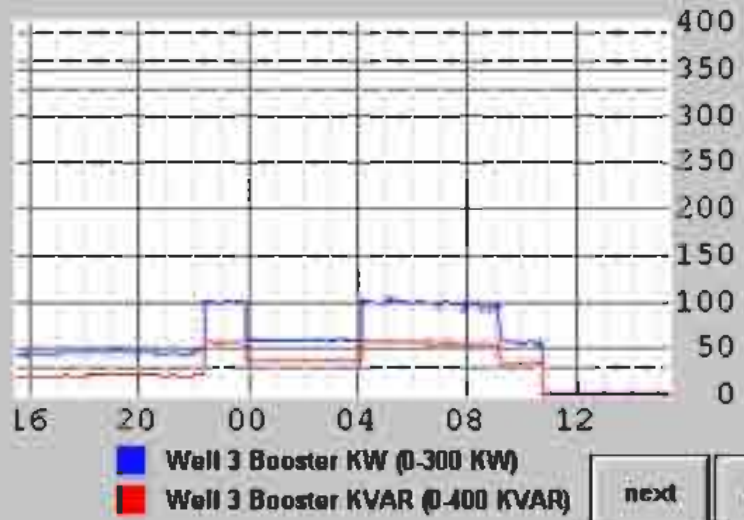
F1 MAP | F2 SYSTEM OVERVIEW | F3 POINT SCREEN | F4 ALARM & EVENTS HISTORY | Esc ACK ALARMS

DIRECT WELLS | Trends | Diag. | REPORT GEN | MESS-AGES | ALARM PAGE | ALARM HI/LO | Time Alarm | TOUR DEMO









next | prev.

return

Note: Trends show 24 hours of data.

Date/Time: TUES. 7/13/04 11 :17
Operator: None
Alarm Pager 602-593-8026

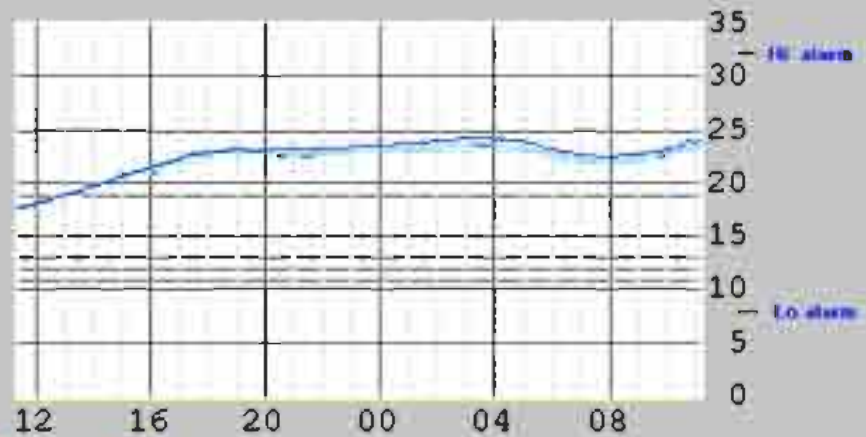
Log | ^L

F1 MAP | DIRECT WELLS | Trends | F2 SYSTEM OVERVIEW | Diag. | F3 PRINT SCREEN | REPORT GEN | MESS-AGES | F4 ALARM & EVENTS HISTORY | ALARM PAGE | ALARM HI/LO | Esc ACK ALARMS | Test Alarm | TOUR DEMO

WTP West Zone Booster Flow
Reservoir Backfill (g.p.m.)

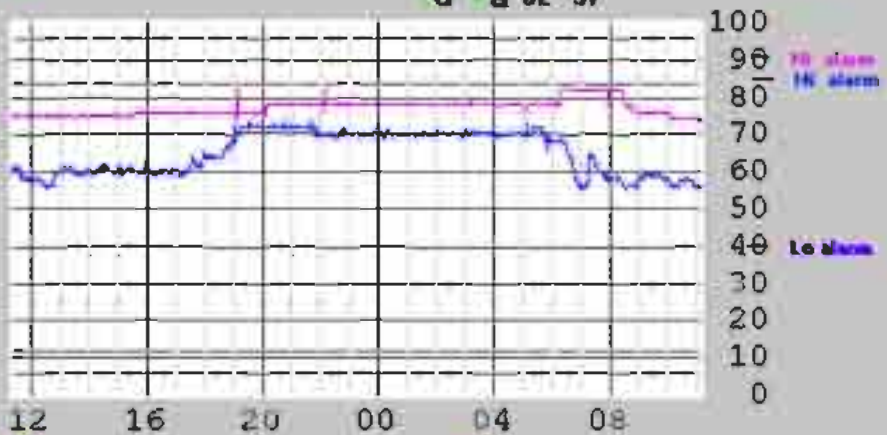
Well #9 booster status to west zone
hi lo
a a 62 57

WTP W2 booster status
6a a
a a
56



WTP North Res. Level (0-31ft.)
WTP South Res. Level (0-31ft.)

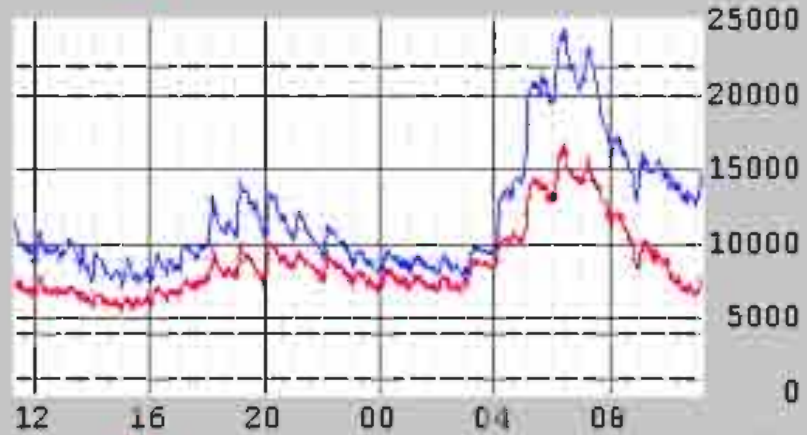
present volume
11.60 m.g.



WTP Zone 1 Pressure (p.s.i.)
WTP Zone 2 Pressure (p.s.i.)
Pump 7 VFD %
Pump 5 VFD %

Note: Trends show 24 hours of data.

WTP EZ booster status
a a a
1a 4a
74



WTP East Zone Booster Flow (g.p.m.)
WTP East Zone Booster
East Zone Flow (g.p.m.)
(WTP Z2+W19+W20)

EZ RUN RT
W2 RUN RT

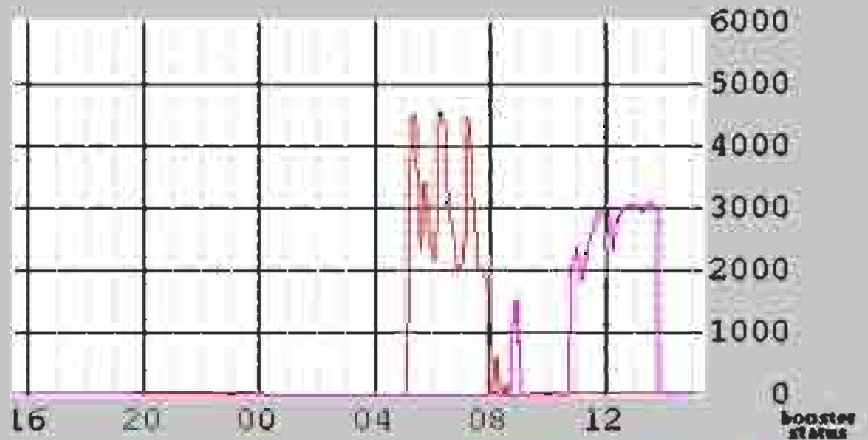
next | prev.
return

Date/Time: TUES. 7/6/04 15 :28
Operator: None
Alarm Pager 602-593-8026

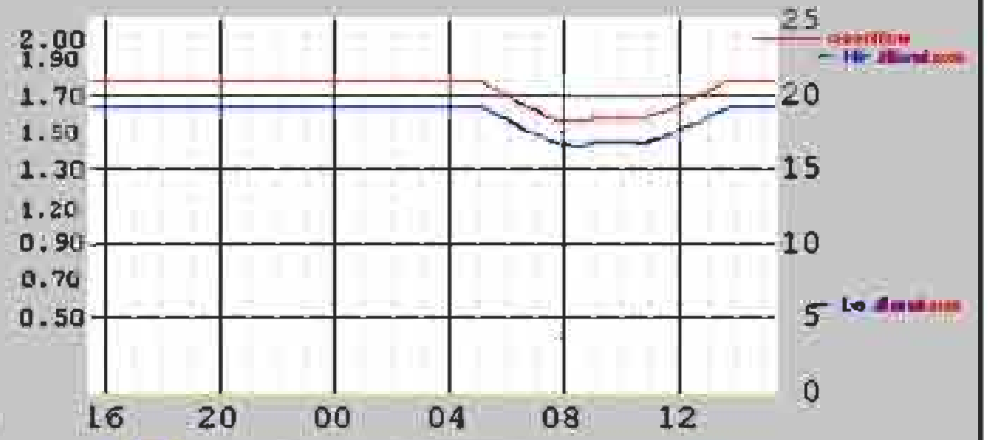
Log ^L

F1 MAP | F2 SYSTEM OVERVIEW | F3 POINT SCREEN | F4 ALARM & EVENTS HISTORY | Esc ACK ALARMS

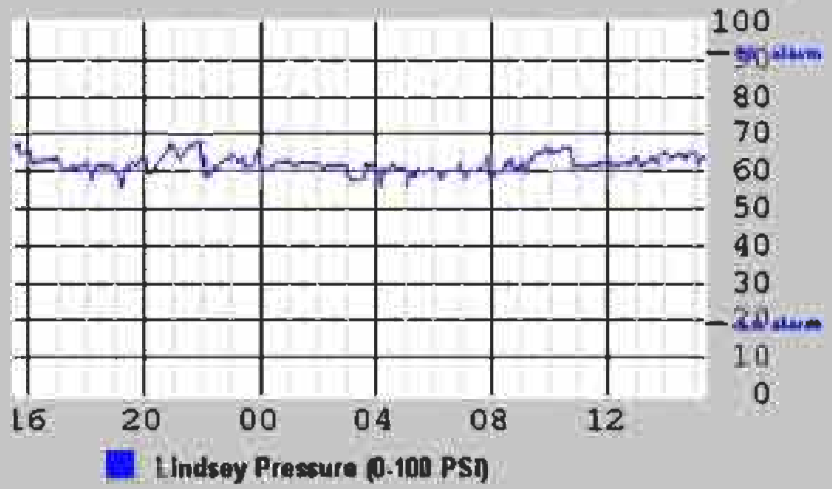
DIRECT WELLS | Trends | Diag. | REPORT GEN. | MESS-AGES | ALARM PAGE | ALARM HI/LO | Test Alarm | TOUR DEMO

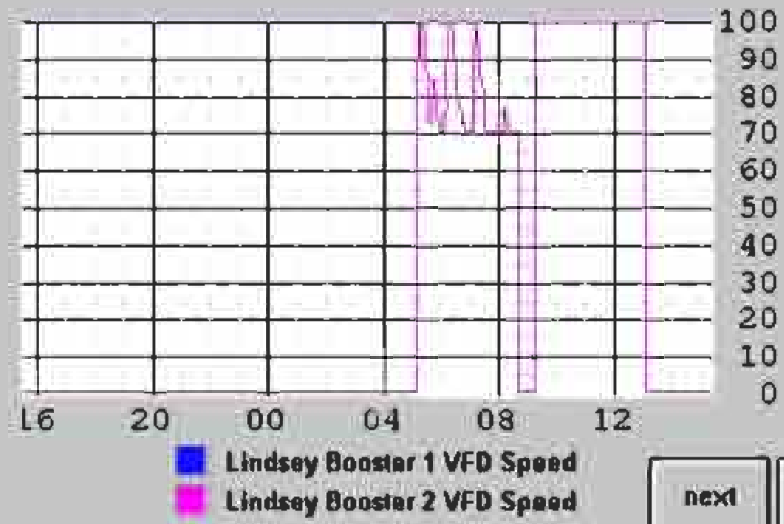


booster status
h
a
a
58



3.24 m.g. present volume

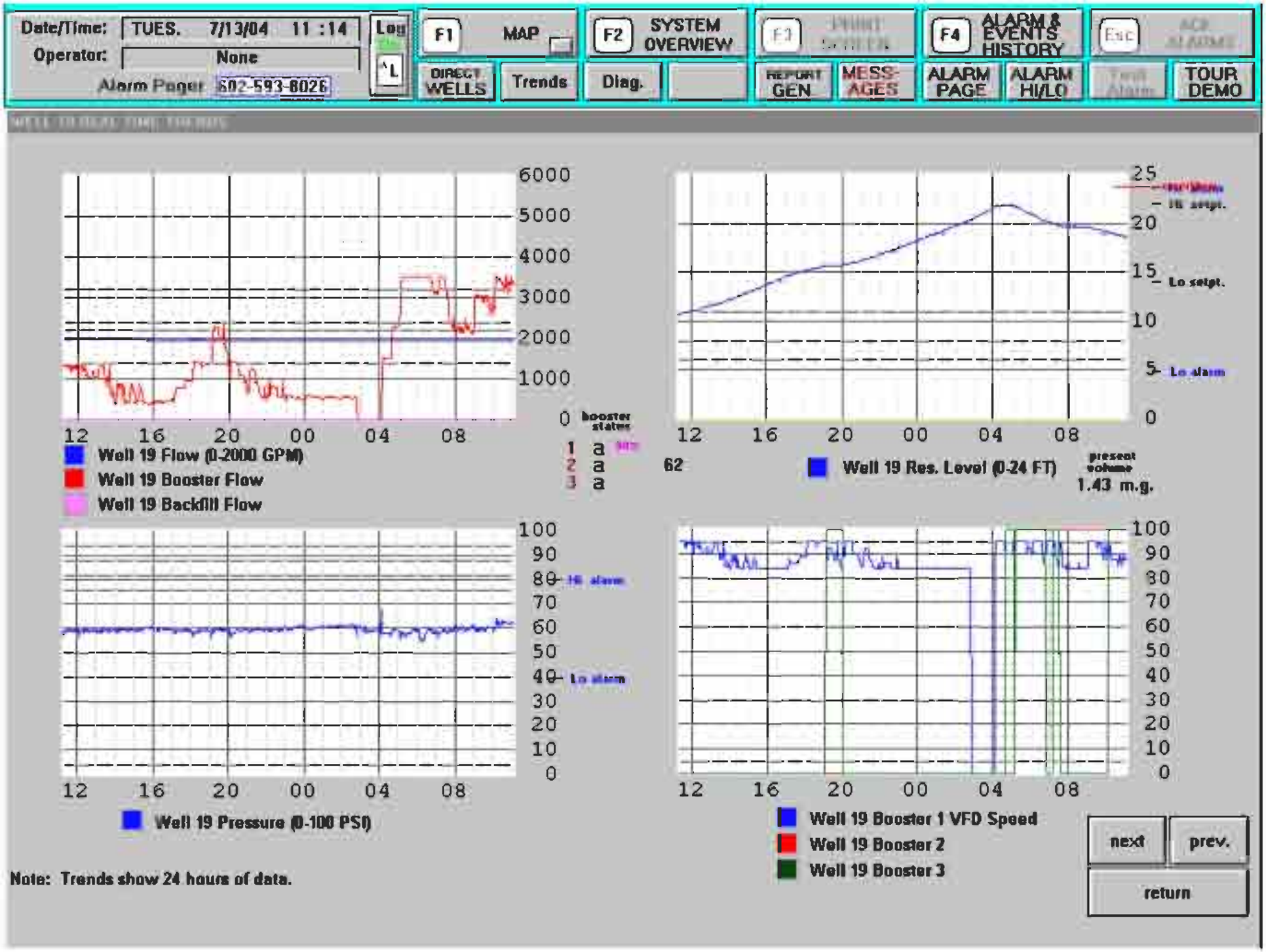




next | prev.

return

Note: Trends show 24 hours of data.

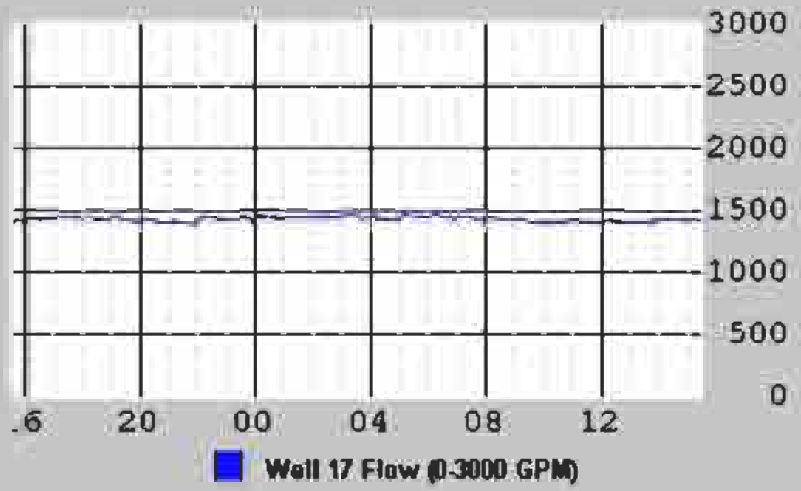

Date/Time: TUES. 7/13/04 11 :14
Operator: None
Alarm Pager 602-593-8026
Log
F1 MAP
F2 SYSTEM OVERVIEW
F3
F4 ALARM & EVENTS HISTORY
Esc
DIRECT WELLS
Trends
Diag.
REPORT GEN
MESS-AGES
ALARM PAGE
ALARM HI/LO
TOUR DEMO
6000
5000
4000
3000
2000
1000
0
12 16 20 00 04 08
booster states
1 a
2 a
3 a
Well 19 Flow (0-2000 GPM)
Well 19 Booster Flow
Well 19 Backfill Flow
25
20
15
10
5
0
Lo setpt.
Lo alarm
62
Well 19 Res. Level (0-24 FT)
present volume
1.43 m.g.
100
90
80
70
60
50
40
30
20
10
0
Hi alarm
Lo alarm
Well 19 Pressure (0-100 PSI)
Well 19 Booster 1 VFD Speed
Well 19 Booster 2
Well 19 Booster 3
next
prev.
return
Note: Trends show 24 hours of data.

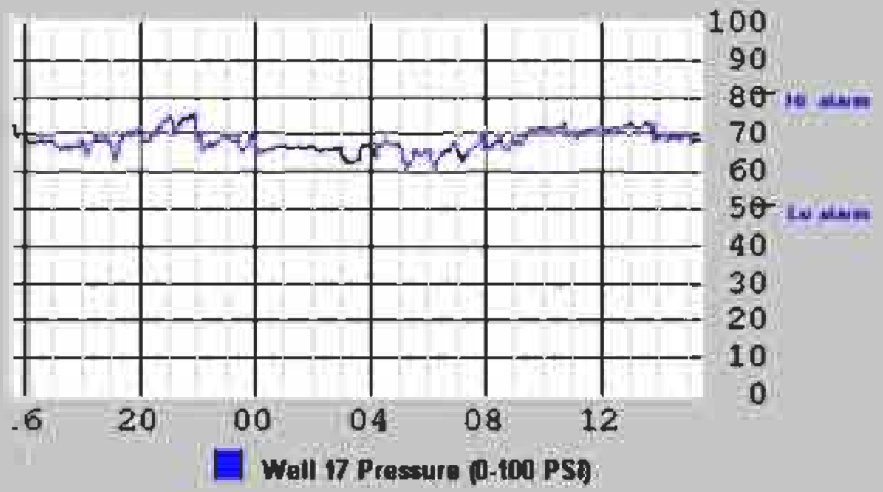
Date/Time: TUES. 7/6/04 15 :30
Operator: None
Alarm Pager 502-593-8026

Log ^L

F1 MAP | F2 SYSTEM OVERVIEW | F3 POINT SCREEN | F4 ALARM & EVENTS HISTORY | Esc ACK ALARMS

DIRECT WELLS | Trends | Diag. | REPORT GEN. | MESS-AGES | ALARM PAGE | ALARM HI/LO | Next Alarm | TOUR DEMO

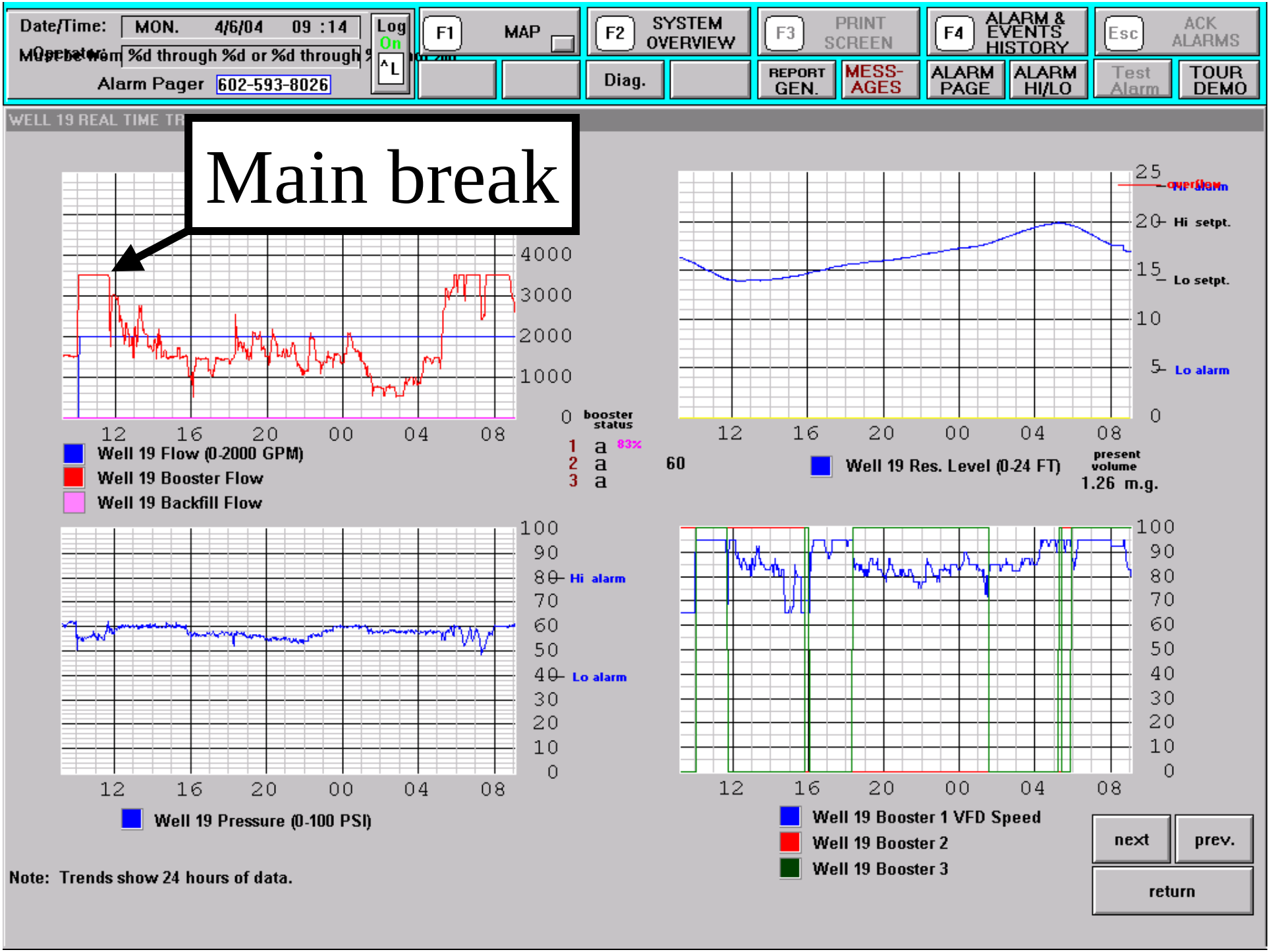




Note: Trends show 24 hours of data.

next | prev.

return


Date/Time: MON. 4/6/04 09 :14
Log On
F1 MAP
F2 SYSTEM OVERVIEW
F3 PRINT SCREEN
F4 ALARM & EVENTS HISTORY
Esc ACK ALARMS
%d through %d or %d through %
Alarm Pager 602-593-8026
Diag.
REPORT GEN.
MESS-AGES
ALARM PAGE
ALARM HI/LO
Test Alarm
TOUR DEMO
WELL 19 REAL TIME TR
Main break
4000
3000
2000
1000
0
booster status
1 a 83%
2 a
3 a
60
12 16 20 00 04 08
Well 19 Flow (0-2000 GPM)
Well 19 Booster Flow
Well 19 Backfill Flow
25
20 Hi setpt.
15 Lo setpt.
10
5 Lo alarm
0
Well 19 Res. Level (0-24 FT)
present volume
1.26 m.g.
100
90
80 Hi alarm
70
60
50
40 Lo alarm
30
20
10
0
Well 19 Pressure (0-100 PSI)
Well 19 Booster 1 VFD Speed
Well 19 Booster 2
Well 19 Booster 3
next
prev.
return
Note: Trends show 24 hours of data.

Date/Time: TUES. 7/13/04 11 :24
Operator: None
Alarm Pager: 602-593-8026

Log

F1 MAP | F2 SYSTEM OVERVIEW | F3 | F4 ALARM & EVENTS HISTORY | Esc

DIRECT WELLS | Trends | Diag. | REPORT GEN | MESS-AGES | ALARM PAGE | ALARM HI/LO | TOUR DEMO

TAGNAME		ALARM SET POINTS HIGH	LOW	RANGE
W3_RES_LEVEL		30.5	7.0	0-31 FT
W4_RES_LEVEL		20.0	4.0	0-24 FT
S5_RES_LEVEL	23.0	22.5	6.0	0-24 FT
W7_RES_LEVEL		16.0	6.0	0-16 FT
W12_RES_LEVEL		23.5	7.0	0-24 FT
LR_RES_LEVEL		22.5	6.0	0-24 FT
LR_PUMP_STN_LEVEL		22.5	6.0	0-24 FT
W19_RES_LEVEL		23.6	5.0	0-24 FT
W20_RES_LEVEL		21.0	2.0	0-24 FT
WTP RES SOUTH		32.0	8.0	0-31FT
WTP RES NORTH		31.0	2.0	0-31 FT

TAGNAME	ALARM SET POINTS HIGH	LOW	RANGE
W3_PRESSURE	80.0	45.0	0-150 PSI
W4_WZ_PRESSURE	90.0	35.0	0-125 PSI
W4_EZ_PRESSURE	90.0	35.0	0-125 PSI
S5_PRESSURE	85.0	55.0	0-150 PSI
W7_PRESSURE	85.0	50.0	0-150 PSI
W8_PRESSURE	92.0	42.0	0-100 PSI
LR_PRESSURE	92.0	20.0	0-150 PSI
W12_PRESSURE	85.0	50.0	0-100 PSI
W14_PRESSURE	85.0	40.0	0-200 PSI
W15_PRESSURE	90.0	60.0	0-150 PSI
W16_PRESSURE	90.0	50.0	0-150 PSI
W17_PRESSURE	80.0	50.0	0-125 PSI
W18_PRESSURE	80.0	40.0	0-100 PSI
W19_PRESSURE	80.0	40.0	0-300 PSI
W20_PRESSURE	95.0	15.0	0-200 PSI
W21_PRESSURE	95.0	15.0	0-125 PSI
WTP_WZ_PRESSURE	85.0	40.0	0-300 PSI
WTP_EZ_PRESSURE	90.0	40.0	0-300 PSI

Date/Time: TUES. 7/13/04 11 :21
Operator: None
Alarm Pager 502-593-8026

Log

F1 MAP | F2 SYSTEM OVERVIEW | F3 | F4 ALARM & EVENTS HISTORY | Esc

DIRECT WELLS | Trends | Diag. | REPORT GEN | MESS-AGES | ALARM PAGE | ALARM HI/LO | TOUR DEMO

BE AWARE LIST

1. When W.T.P. is backfilling from the system the logic in the SCADA system drops the set points to lower values (50 and 40). This assures that when backfill occurs, the boosters at Well #8 aren't emptying the the reservoirs at the same time.

2. When Site 5 will not fill or stops filling, look at the site pressure. If the pressure is 65 p.s.i. or went that low during backfill (look at real time trend), then any backfilling will stop. Sometimes to get it to start the backfill process again, a stop backfill needs to be initated. You do this by setting the reservoir level high setpoint, lower than the reservoir level at that moment. After you wait for the polling cycle, about 3 minutes, then return reservoir setpoint back. Now backfill should occur.

3. Sometimes at Site 5 it seems the wrong booster is running. This might be an indication that the PLC needs to be reset at the site.

Clear

BE AWARE LIST!

Date/Time: MON. 7/12/04 12 :24
Operator: slusser
Alarm Pager 602-593-8026

Log Off | ^L

F1 MAP | F2 SYSTEM OVERVIEW | F3 PRINT SCREEN | F4 ALARM & EVENTS HISTORY | Esc

DIRECT WELLS | Trends | Diag. | REPORT GEN | MESS-AGES | ALARM PAGE | ALARM HI/LO | Test Alarm | TOUR DEMO

Alarm Group	Code
Well3	3
Well4	4
Site5	5
Well7	7
Well8	8
Well12	12
Well14	14
Well15	15
Well17	17
Well18	18
W.T.P.	50
Test Alarm -WELLS	99
Test Alarm-WTP	999
Chlorine Leak-WTP	333

	NAME	RADIO #	HOME PH.	PAGER	Cell Phone
	Operator	W 381	503-6376	593-8026	215-8543
Field Supervisor - Wells	Kurt Medavid	W 383	987-9537	593-4793	861-9402
operator	John Kubala	NA	563-0164	208-4388	
operator	Otis Kinney	NA	895-1712	519-8054	
operator	Tim walter	NA	373-9102	608-9149	
operator	Vernon Miller	NA	659-4069	401-9754	
operator	Robert Adrews	NA	753-5526	208-5982	
operator	Rick Kilborn	NA	888-0712	208-3052	
Asst. Tech.	John Chavez	W 384	520-689-9068	498-5301	620-1052
Asst. Tech.	Joe Smith	W 382	649-5592	213-2420	620-1051
Field Supervisor - Wells	Pat Slusser	W 307	633-2352	218-3572	620-1055
well tech.	Mike Hiller	W 374	899-1615	261-9224	well tech. on-call
well tech.	Bill Baumgartner	W 370	391-3292	208-5442	620-1053
well tech.	Jose Moreno	W 378	899-0772	219-5572	well tech. day-one
well tech.	Ken Ohler	NA	633-6928	213-5964	620-1054
Sr. Maint	Al Posada	W 377	982-7221	498-0784	
Mech.	Rick Ruter	NA	633-0422	208-3798	
Mech.	Bob Johnson	NA	753-5526	208-5982	
Field Supervisor - Distr.	Arnold Bringas	W 386	503-1975	498-7161	620-1060
Supervisor	Gene Schmidt	W 308	497-6134	498-0837	216-0317
Supervisor	Bill Taylor	W 380	812-1607	498-7500	620-1050
H2O Quality	Antonio Trejo	NA	732-9566	219-8538	

Emergency Ph. #'s

SRP Power failure (24 hrs.) 236-5296

SRP On/Off 236-5889

CL2 Leak
Alarm WTP
Page
Production

Date/Time: TUES. 7/13/04 11 :21
Operator: None
Alarm Pager 602-593-8026

Log

F1 MAP | F2 SYSTEM OVERVIEW | F3 | F4 ALARM & EVENTS HISTORY | Esc

DIRECT WELLS | Trends | Diag. | REPORT GEN | MESS-AGES | ALARM PAGE | ALARM HI/LO | TOUR DEMO

900 Mhz. RADIO COMMUNICATION

Timag Secondary Address	Site	Heartbeat	Status PLC
01	Well 3		SUCCESSFUL
02	Well 4		SUCCESSFUL
03	Site 5		SUCCESSFUL
04	Well 7		SUCCESSFUL
05	Well 8		SUCCESSFUL
06	Well 12		SUCCESSFUL
07	Well 14		SUCCESSFUL
08	WTP		SUCCESSFUL
09	Well 15		SUCCESSFUL
10	Well 17		SUCCESSFUL
11	Well 18		SUCCESSFUL
12	Well 19		
13	Well 20 bstrs.		SUCCESSFUL
14	Well 20 well		SUCCESSFUL
15	Well 21 bstrs.		
16	Well 16		
17	Well 21 well		
18	Lindsay Res		

reset heartbeat

HOST is not waiting for Call

BE AWARE LIST!

Date/Time: MON. 7/12/04 12 :23
Operator: slusser
Alarm Pager 602-593-8026

Log Off | AL

F1 MAP | F2 SYSTEM OVERVIEW | F3 PRINT SCREEN | F4 ALARM & EVENTS HISTORY | Esc ACK ALARMS

DIRECT WELLS | Trends | Diag. | REPORT GEN | MESS-AGES | ALARM PAGE | ALARM HI/LO | Test Alarm | TOUR DEMO

Report Name	Auto Report Generation	Scheduled For: Day of WK/Mo	HH	MM	Make Report Now For:		
Current Status Report	On		14	46		Right Now	Cancel Report
Water Prod. Daily Report	Off		01	00	Yesterday		Cancel Report
Water Prod. Weekly Report	Off	Mon	01	30	Last Week	This Week	Cancel Report
Water Prod. Monthly Report	On	1	02	00	Last Month	This Month	Cancel Report
Water Prod. Yearly Report	Off	Jan 1	02	30	Last Year	This Year	Cancel Report
Power Usage Daily Report	Off		03	00	Yesterday		Cancel Report
Power Usage Weekly Report	Off	Mon	03	30	Last Week	This Week	Cancel Report
Power Usage Monthly Report	Off	1	04	00	Last Month	This Month	Cancel Report
Power Usage Yearly Report	Off	Jan 1	04	30	Last Year	This Year	Cancel Report
Daily & Weekly RT Trend Printout	On		00	00			Cancel Report

Excel Status	Report Status
Excel is OK	

Date/Time: SAT. 7/6/04 16:22:00
Operator: miller
On 602-593-8026

F2 TEXT OVERVIEW | F3 PLANT OVERVIEW | F4 CHEMICAL SYSTEMS | Ctrl H ALARM/EVENT HISTORY | Esc ACK ALARMS

POWER | Status Current | TREND MENU | Prev. Maint. | PLC Diag. | PC Network | REPORT | ALARM HI/LO | Pager Test | DEMO MODE

	INLET	LOW LIFT	FILTER APPLIED		EFFLUENT
Flow (m.g.d.)	33.9	38.3	—		34.2
Turbidity (ntu)	5.9	0.0	0.59 West	1.25 East	0.05
pH	8.4	7.7	7.9 West	7.6 East	7.8
Water Temp.	27.8	—	—		—
Nitrates	1.4	—	—		1.3
Conductivity	1663	Fluoride Analyzer			0.73
Cl2 Residual	—	0.0	0.0		2.27

PLC Sec.
CHEM 10
ADMIN 32
RES 14
OZN 39
RES.

HIGH LEVEL NW sump

1.3 EZ

PRE - SEDIMENTATION BASIN 1 - 2

Basin #1 Rake #1 STOP #2 STOP
Sludge Wet Well Lvl 6.0 ft.
Pump #1 STOP Pump #2 STOP

Basin #2 Rake #1 STOP #2 STOP
Sludge Wet Well Lvl 6.6 ft.
Pump #1 STOP Pump #2 STOP

Rapid Mix STOP 0 %

LOW LIFT PUMP STATION

PUMPS	1 LAG3	2 LAG4	3 LAG5	4 LEAD	5 LAG 1	6 LAG2
STATUS	STOP	STOP	STOP	RUN	RUN	RUN
	0 %	0 %	0 %	91 %	94 %	93 %

FLOCCULATION BASINS (West)

MIXERS#1	Flash	#1	#2	#3
STATUS	RUN	RUN	RUN	RUN
SPEED	75 %	45 %	45 %	45 %
MIXERS#2	Rapid	#1	#2	#3
STATUS	RUN	RUN	RUN	RUN
SPEED	75 %	45 %	45 %	45 %

FLOCCULATION BASINS (East)

MIXERS#5	Flash	#1	#2	#3
STATUS	RUN	RUN	RUN	RUN
SPEED	82 %	50 %	50 %	51 %
MIXERS#6	Rapid	#1	#2	#3
STATUS	RUN	RUN	RUN	RUN
SPEED	82 %	50 %	50 %	50 %

Ozone

Generator	#1	#2	Dos. SP
STATUS	Remote On	Shutdown	1.5
Lbs/Day	366	0 ppm	Residual
Flow Return	396	gpm	#1 0.11 mg/L
Gas Con.	9.0	0.00 %wt	#2 0.05 mg/L
Contactor			#3 0.02 mg/L
Gas Flow	#1 33.9scfm		
	#2 0.1scfm	Channel Lvl. 21.1 Ft.	

Sludge Drying Beds

CHLORINE

SCALE #1 2015 lbs
SCALE #2 3990 lbs

THICKENER TANK

Moyno Pumps # 1 2 3
INLET FLOW 0.00 MGD
OUT. FLOW 0.19 MGD

WASHWATER TANK

Pumps #	LEVEL	FLOW
1 2 3	9.6 ft.	3.4 MGD

FILTERS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
RUN TIME	3.4	22.9	19.2	0.0	0.0	17.6	7.1	11.1	24.9	1.4	12.8	8.4	5.2	27.5	5.9	21.6
FLOW	3.3	1.4	1.4	0.0	0.0	2.0	3.2	2.7	0.9	5.2	2.2	3.0	3.7	0.9	3.2	0.9
TURBIDITY	0.08	0.08	0.06	0.05	0.05	0.06	0.05	0.05	0.05	0.04	0.05	0.04	0.03	0.06	0.05	0.06

Filter Headloss
West 1.8 ft. East 3.2 ft.

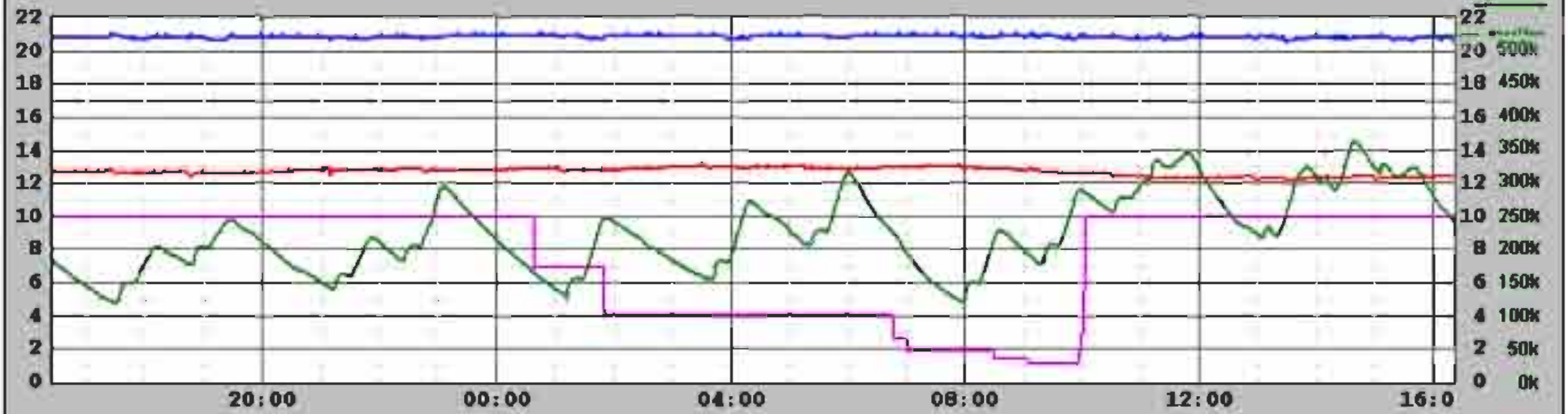
Total Flow 34.2

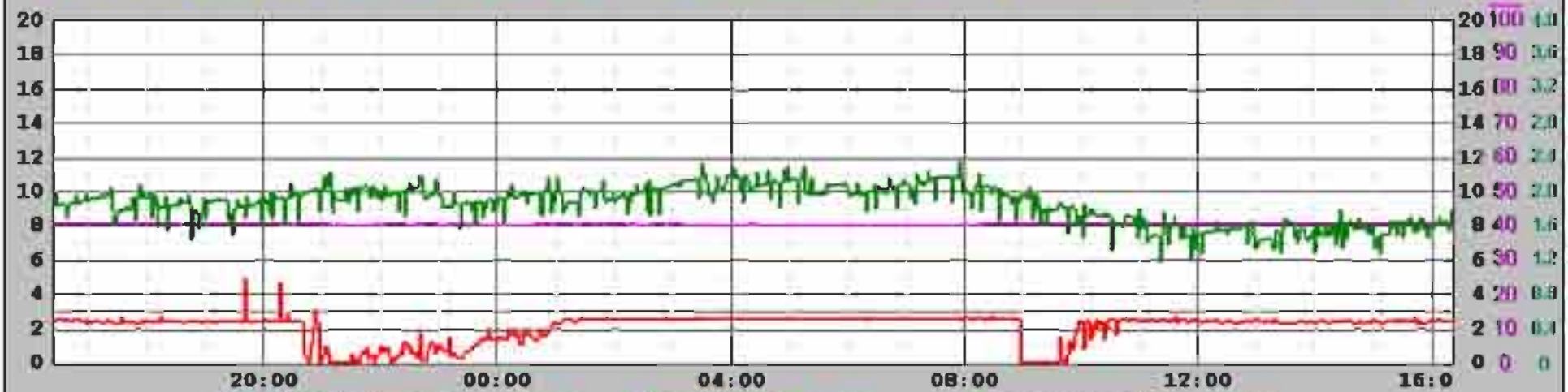
Date/Time: SAT. 7/6/04 16:23:43
Operator: miller
On 602-593-8026

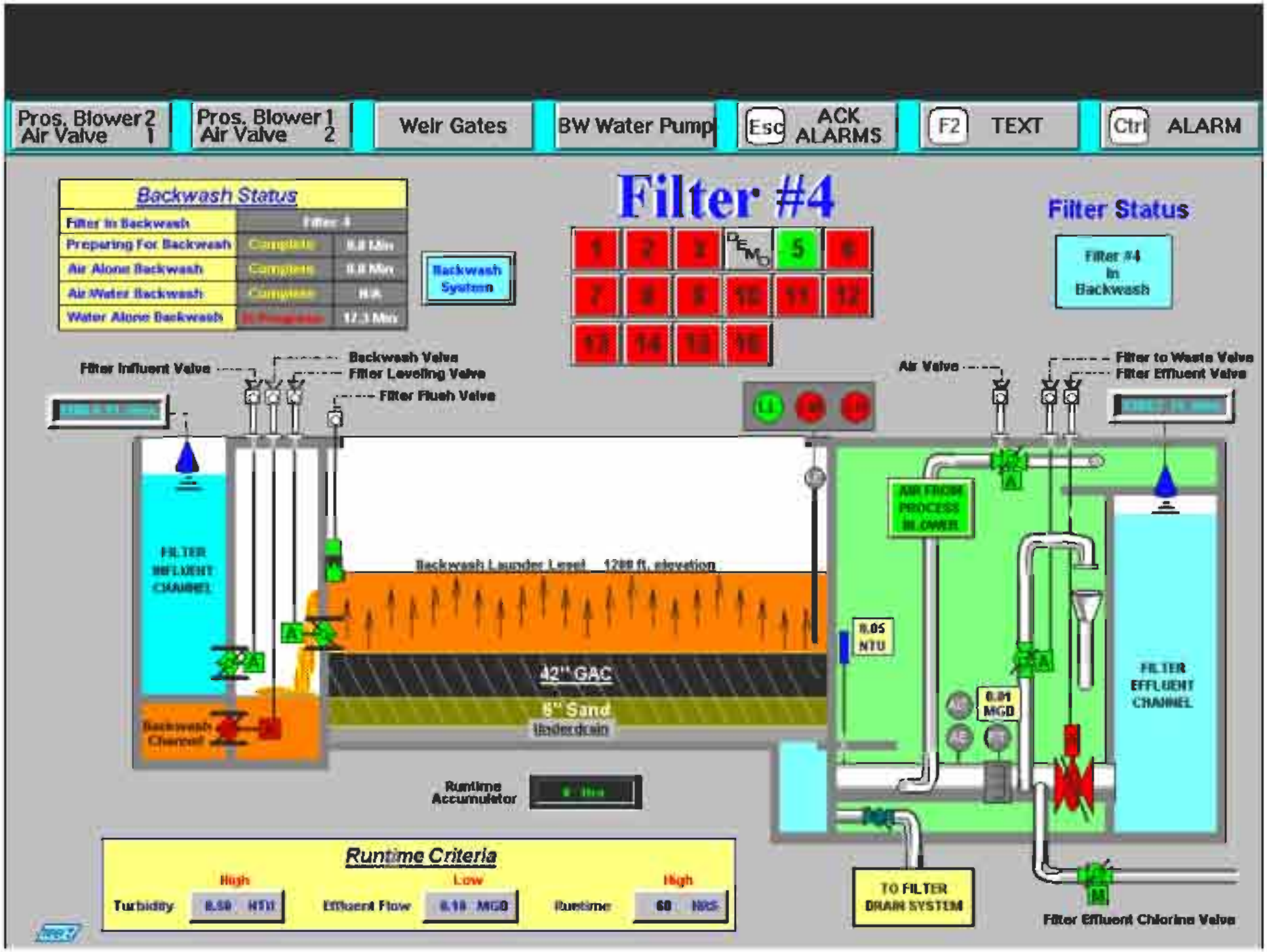
F2 TEXT OVERVIEW | F3 PLANT OVERVIEW | F4 CHEMICAL SYSTEMS | Ctrl H ALARM/EVENT HISTORY | Esc ACK ALARMS

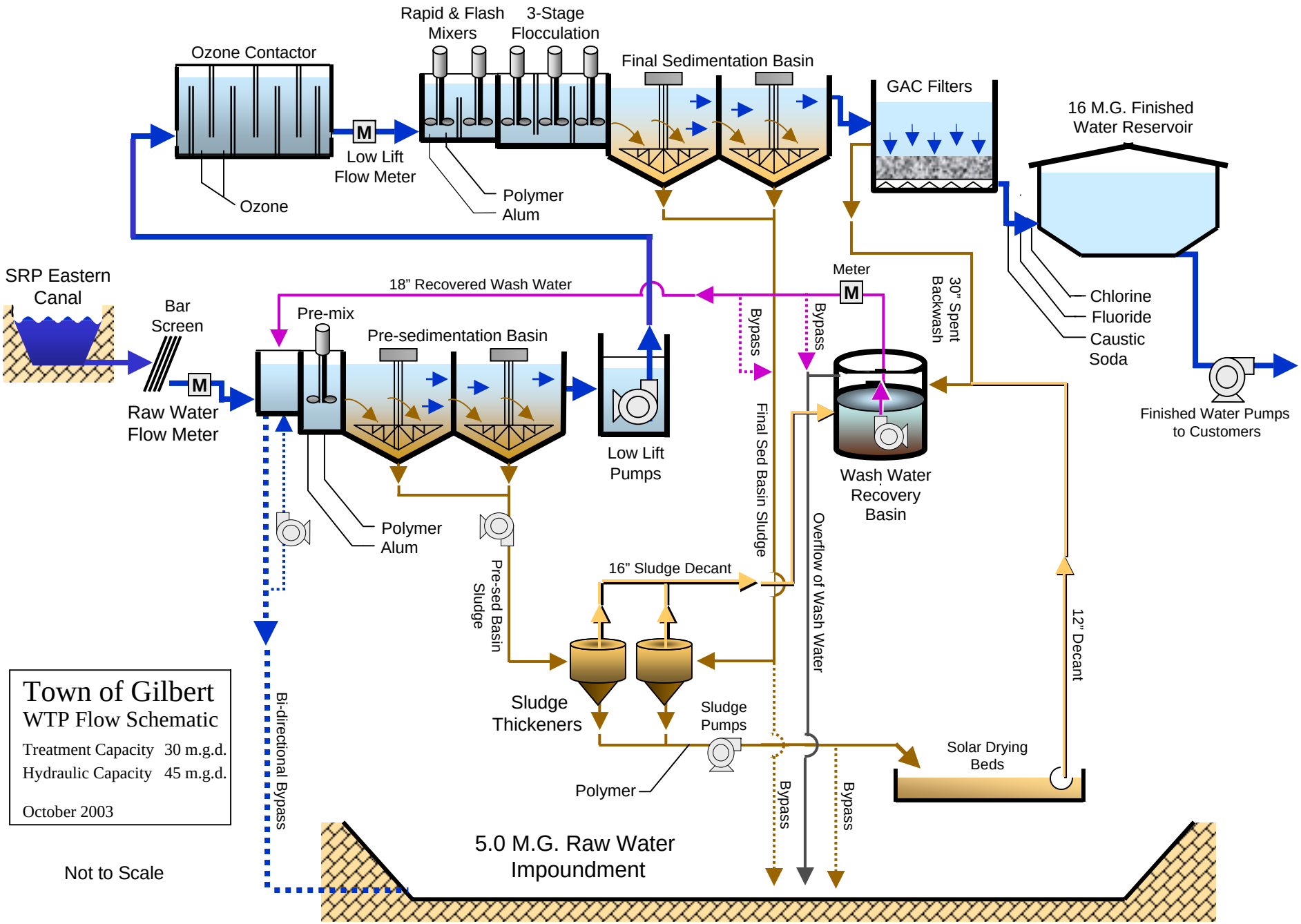
POWER | Status Current | TREND MENU | Prev. Maint. | PLC Diag. | PC Network | REPORT | ALARM HI/LO | Pager Test | DEMO MODE

REAL TIME PROCESS LEVEL TRENDS WEST






Pros. Blower 2 Air Valve 1
Pros. Blower 1 Air Valve 2
Weir Gates
BW Water Pump
Esc ACK ALARMS
F2 TEXT
Ctrl ALARM
Backwash Status
Filter in Backwash
Preparing For Backwash
Air Alone Backwash
Air Water Backwash
Water Alone Backwash
Backwash System
Filter #4
Filter Status
Filter #4 in Backwash
Filter Influent Valve
Backwash Valve
Filter Leveling Valve
Filter Flush Valve
Air Valve
Filter to Waste Valve
Filter Effluent Valve
FILTER INFLUENT CHANNEL
Backwash Launder Level 1200 ft. elevation
42" GAC
6" Sand
Underdrain
Backwash Channel
AIR FROM PROCESS BLOWER
0.05 NTU
0.01 MGD
FILTER EFFLUENT CHANNEL
Runtime Accumulator
Runtime Criteria
High
Low
High
Turbidity
Effluent Flow
Runtime
TO FILTER DRAIN SYSTEM
Filter Effluent Chlorine Valve


Ozone Contactor
Ozone
M
Low Lift
Flow Meter
Rapid & Flash
Mixers
3-Stage
Flocculation
Polymer
Alum
Final Sedimentation Basin
GAC Filters
16 M.G. Finished
Water Reservoir
Chlorine
Fluoride
Caustic
Soda
Finished Water Pumps
to Customers
SRP Eastern
Canal
Bar
Screen
M
Raw Water
Flow Meter
18" Recovered Wash Water
Pre-mix
Pre-sedimentation Basin
Low Lift
Pumps
Meter
M
Bypass
Bypass
30" Spent
Backwash
Wash Water
Recovery
Basin
Final Sed Basin Sludge
Overflow of Wash Water
Polymer
Alum
Pre-sed Basin
Sludge
16" Sludge Decant
12" Decant
Sludge
Thickeners
Sludge
Pumps
Polymer
Solar Drying
Beds
Bypass
Bypass
Bi-directional Bypass
5.0 M.G. Raw Water
Impoundment
Town of Gilbert
WTP Flow Schematic
Treatment Capacity 30 m.g.d.
Hydraulic Capacity 45 m.g.d.
October 2003
Not to Scale

Since 9-11
SCADA
Security Barrier

Gilbert Experience with SCADA

9. Twelve Year Report Card

Twelve Year SCADA Report Card

Capability	A-
Sustainability	C
Flexibility	B
Reliability	B+
Controllability	A
Report Ability	A
Sensibility	B

Advances in Technology

- SQL Servers
- Maintenance Program
- Programmable Trans/Receivers
- Fiber Optics

Questions???