
The New Alarm Display Software for the RHIC Control Room

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Abstract

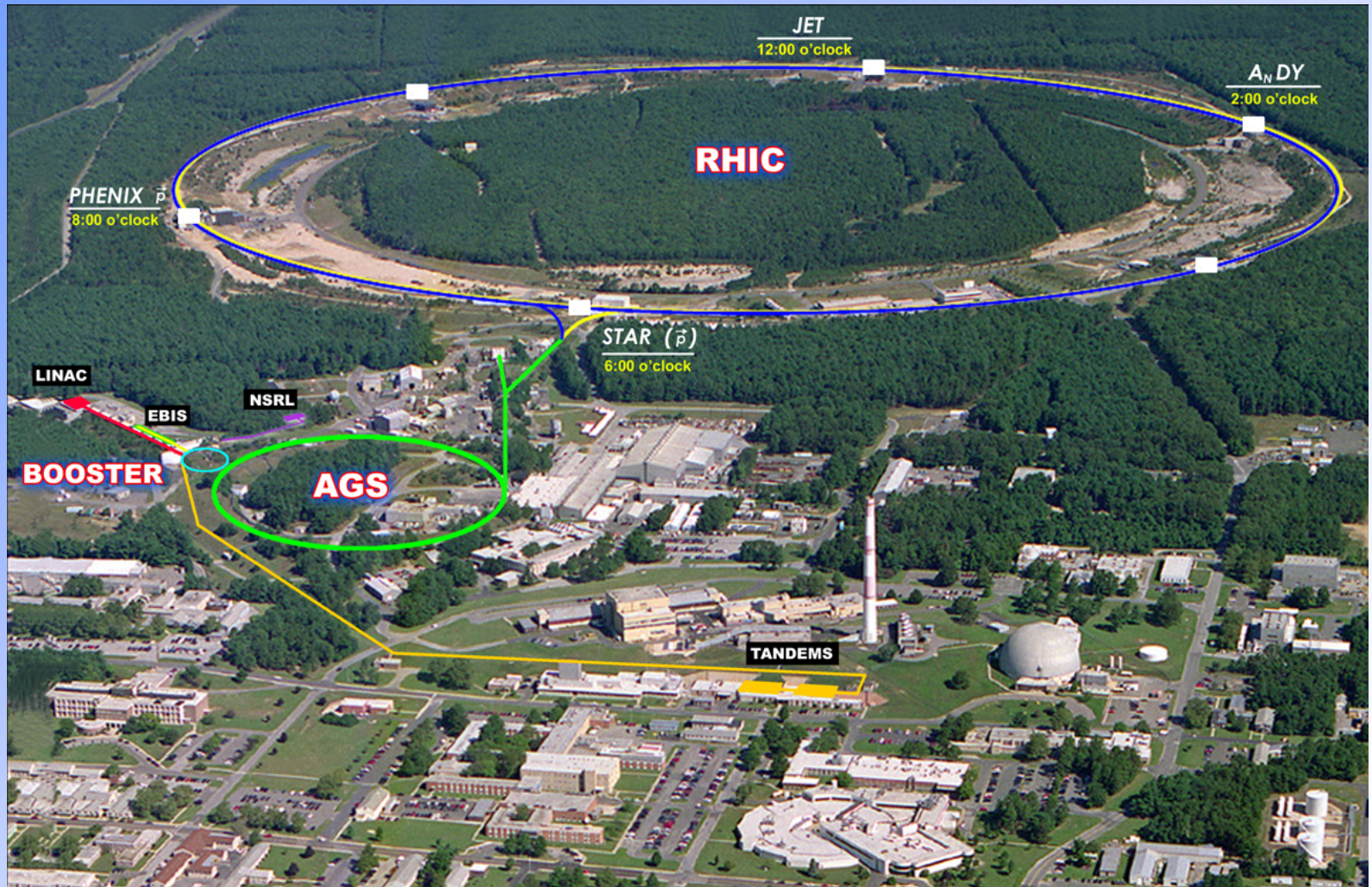
<http://www-conf.slac.stanford.edu/wao2012/sessionAbstracts.asp>

- The Alarm Display for the new RHIC Control Room has undergone a radical reworking. While keeping some of the existing software infrastructure the display adds new database driven features to assist operators to track and manage alarms. A key feature of the application facilitates communication from operator to operator and operator to system specialist of the status e.g. "work in progress" of individual alarms. A new summary display, borrowed from KEK, helps operators pinpoint "distressed" accelerators. This talk will summarize the new features of the alarm display and will review operator experience with the application after two years of use.

What will be covered in this talk:

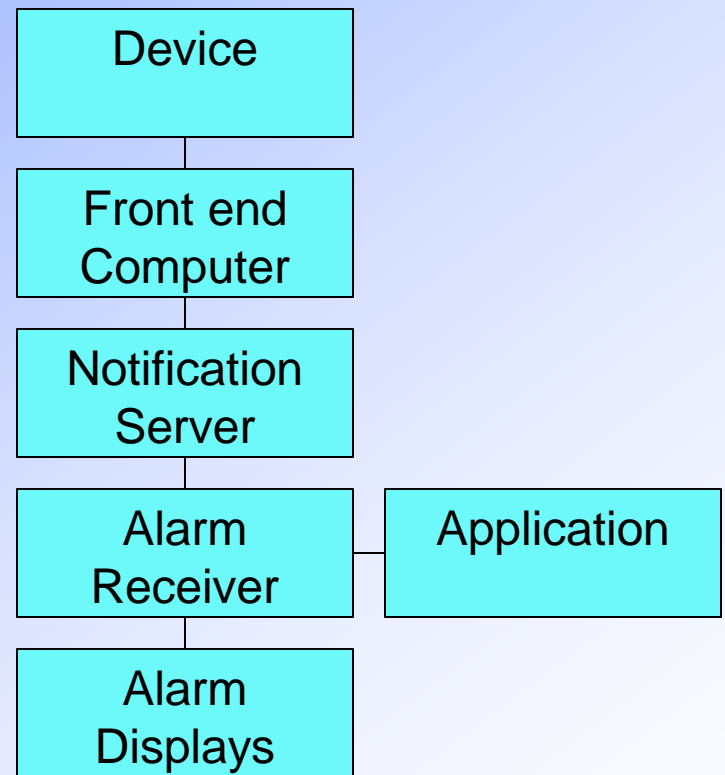
- Focus on the “Communication” Features of the application
 - Operator to Operator
 - Operator to Specialist
 - Specialist to Operator
- Micro review of System Infrastructure
- Summary Display
- Alarm Tracking
- Alarm Annotation
- Response Instructions
- Summary - Operator Experience

Collider Accelerator Department at Brookhaven National Laboratory

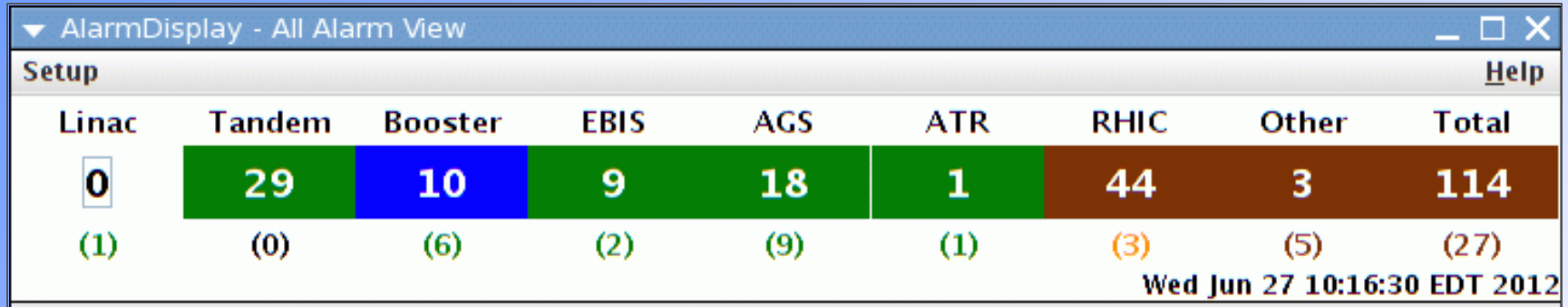


Alarm System Infrastructure

- Code/manager running on fec detects alarm and sends to "Notification server".
- Notif server determines if alarm is real or a diagnostic not relevant to operators
- Notif server sends alarm to the Alarm Receiver which sends it to alarm displays.
- Applications send alarms directly to the Alarm Receiver



Summary Display (a la KEK ca 2003)



The screenshot shows a window titled "AlarmDisplay - All Alarm View" with a "Setup" menu and a "Help" button. The main content is a table with columns for machine types and their alarm counts. The table data is as follows:

Linac	Tandem	Booster	EBIS	AGS	ATR	RHIC	Other	Total
0	29	10	9	18	1	44	3	114
(1)	(0)	(6)	(2)	(9)	(1)	(3)	(5)	(27)

The date and time at the bottom right of the window are "Wed Jun 27 10:16:30 EDT 2012".

- Summary allowed the reduction of Alarm Receivers from two to one
- 7 Machines + one "other"
- Color represents the alarm level of the most severe alarm
- Number in the colored field represents the number of NEW alarms
- Number in parenthesis refers to number of SEEN alarms
- Summary Display is interactive – may spawn an Alarm Display FILTERED by "machine"

Jargon -- Alarm (Severity) Levels

- A Note on Alarm Severity Levels
- Throughout the Alarm System, alarms are tagged with a severity level. This severity level affects the way alarms are displayed and the way they are managed. These severity levels are based on a standard employed at SLAC (ca 1992). The levels range from 1 to 5 with 5 being the most severe. The levels are defined as follows.
 - **Level 1 Warning**, includes power supplies going out of tolerance or tripping off.
 - **Level 2 Interlock**, indicates safe interruption due to the action of an interlock.
 - **Level 3 Potential Equipment Damage**, includes water leaks, vacuum problems, and high temperature alarms.
 - **Level 4 Potential Environmental Impact** (not immediately life threatening), includes tritiated water leaks and high radiation fields.
 - **Level 5 Potential Life Threatening**, includes very high radiation fields.

Jargon -- Alarm (Resolution) States

- **New**
 - Alarm has arrived and has not been investigated by an operator.
- **Seen**
 - Operator has detected the alarm and assumes some responsibility to follow up.
- **Assigned**
 - Operator cannot resolve the alarm independently. Alarm is forwarded to another group.
- **Deferred**
 - Investigation is complete but resolution is not immediately possible (ring access, extensive work required).
- **Orphaned**
 - Alarm is expected to persist. It is not expected that anything will be done about the alarm any time soon.
- **Cleared**
 - Alarm has been resolved and is no longer visible on alarm screen (latched alarms may persist).

Alarm Tracking

- ◆ Alarm Tracking
 - ◆ Follow Alarm Life Cycle
 - ◆ state
 - ◆ Transfer Over Shift Change
 - ◆ owner/user
 - ◆ Previous Alarm History
 - ◆ Timestamp

WAT:\xf.blip_b3\dataBarM
Check BLIP state - BLIP on/too intense? Run Name: run_fy11

Update Alarm State

State:

User:

Annotation

Annotations associated with an alarm state can be entered in this area. The complete annotation from prior states can be viewed in the area below the table by selecting a row. The annotation column in the table displays only the beginning of the annotation.

Alarm History

Timestamp	State	User	Annotation
Wed Feb 23 11:08:48	deferred	seth	Specialist has indicated that the conditi
Wed Feb 23 11:08:00	assigned	seth	It has been determined that someone from
Wed Feb 23 11:06:52	seen	seth	The operator has seen the alarm and will
Wed Feb 23 11:06:16	new	seth	
Wed Feb 23 08:54:29	deferred		
Wed Feb 23 06:32:47	new		
Wed Feb 23 06:32:46	cleared		
Wed Feb 23 06:00:06	new		
Wed Feb 23 06:00:06	cleared		
Wed Feb 23 05:58:26	new		

Specialist has indicated that the condition causing the alarm will be handled during the next maintenance day

Message Area

Alarm Tracking – Data base view

AD 2000

Start: Feb 13 2012 08:00:00 Name: View through current filter. Combines with Name and Description filter.

Stop: Feb 13 2012 16:00:00 Description: Search Advance Search

Row	TimeStamp	Name	Level	State	Description	Action	PPM	Machine	Type	Field	System	Location	Annotation	User Name
1522	Feb 13 15:05:44	agsLoss_blm_winsel1alaracRnaM	1	cleared	OK	clear	0	AGS	ado	48	Instrument	911		
1523	Feb 13 15:05:40	agsLoss_blm_winsel1alaracRnaM	4	new	range error PPM=4	set	0	AGS	ado	48	Instrument	911		
1524	Feb 13 15:05:28	TTL_810D2	1	seen	on	set	0	Tandem	device	49	Unknown	Tandem AIC		bsartin
1525	Feb 13 15:05:28	TTL_810D3	1	seen	on	set	0	Tandem	device	49	Unknown	Tandem AIC		bsartin
1526	Feb 13 15:05:28	TTL_810H3	1	seen	on	set	0	Tandem	device	49	Unknown	Tandem AIC		bsartin
1527	Feb 13 15:05:28	TTL_810D2	1	seen	on	set	0	Tandem	device	49	Unknown	Tandem AIC		bsartin
1528	Feb 13 15:05:28	TTL_70H2	1	seen	electrical fit	set	0	Tandem	device	51	Unknown	Tandem AIC	ITB not used for FY12	bsartin
1529	Feb 13 15:05:28	TTL_77D2	1	seen	on	set	0	Tandem	device	49	Unknown	Tandem AIC		bsartin
1530	Feb 13 15:05:28	FacSysmex_2a-bbqymaxMemoryBlock	1	seen	range error	set	0	RHIC	ado	48	Instrument	big_2a	Performed a FIT test and indicated the max memory block was greater than 1/4 of	bsartin
1531	Feb 13 15:05:28	TTL_110H1	1	seen	deferredpre amp fault	ack	0	Tandem	device	53	Unknown	Tandem AIC		bsartin
1532	Feb 13 15:05:28	TTL_810D1	1	seen	on	set	0	Tandem	device	49	Unknown	Tandem AIC		bsartin
1533	Feb 13 15:05:28	TTL_710D2	1	seen	on	set	0	Tandem	device	49	Unknown	Tandem AIC		bsartin
1534	Feb 13 15:05:27	ENG_CRANE_POWER	1	seen	on	set	0	AGS	device	49	Unknown	91B Coop CRANE IS ON!!!!	ONG	bsartin
1535	Feb 13 15:05:27	J18_S032_10_3_T1gotFreshDataM	1	seen	ATR_TemperatureMonitorMan: No LabView Data	set	0	AGS	ado	48	911	C. Theissen is investigating		bsartin
1536	Feb 13 15:05:27	J18_S032_10_4_T1temperatureM	1	seen	ATR_TemperatureMonitorMan: Temperature out of rang	set	0	AGS	ado	48	911	C. Theissen is investigating		bsartin
1537	Feb 13 15:05:27	J18_S032_1_3_T1temperatureM	1	seen	ATR_TemperatureMonitorMan: Temperature out of rang	set	0	AGS	ado	48	911	C. Theissen is investigating		bsartin
1538	Feb 13 15:05:27	J18_S032_1_1_T1gotFreshDataM	1	seen	ATR_TemperatureMonitorMan: No LabView Data	set	0	AGS	ado	48	911	C. Theissen is investigating		bsartin
1539	Feb 13 15:05:27	J18_S032_1_2_T1temperatureM	1	seen	ATR_TemperatureMonitorMan: Temperature out of rang	set	0	AGS	ado	48	911	C. Theissen is investigating		bsartin
1540	Feb 13 15:05:27	J18_S032_1_1_T1temperatureM	1	seen	ATR_TemperatureMonitorMan: Temperature out of rang	set	0	AGS	ado	48	911	C. Theissen is investigating		bsartin
1541	Feb 13 15:05:27	ebis-whenilt_gas-pilotrnm	1	seen	Power supply link down_Missing readback	set	0	EBIS	ado	48			ebis end of day	bsartin
1542	Feb 13 15:05:27	ebis-cp-01-pivpicValveGetFeedbackB1UM	1	seen	EBIS Vacuum Valve Closed	set	0	EBIS	ado	48	Vacuum	930ebis	ebis end of day	bsartin
1543	Feb 13 15:05:27	qfg_930ebis-ps1_10kHestStatusM	1	seen	PSI interlocked, PSI interlock input asserted	set	0	EBIS	ado	48			ebis end of day	bsartin
1544	Feb 13 15:05:27	ENG_CRANE_POWER	1	seen	on	set	0	AGS	device	49	Unknown	91B Coop CRANE IS ON!!!!	ONG	bsartin
1545	Feb 13 15:05:27	J18_S032_10_2_T1gotFreshDataM	1	seen	ATR_TemperatureMonitorMan: No LabView Data	set	0	AGS	ado	48	911	C. Theissen is investigating		bsartin
1546	Feb 13 15:05:27	ebis-mgr-co1-ps1oErrorM	1	seen	Power supply link down_Missing readback	set	0	EBIS	ado	48			ebis end of day	bsartin
1547	Feb 13 15:05:27	J18_S032_10_1_T1gotFreshDataM	1	seen	ATR_TemperatureMonitorMan: No LabView Data	set	0	AGS	ado	48	911	C. Theissen is investigating		bsartin
1548	Feb 13 15:05:27	J18_S032_10_4_T1gotFreshDataM	1	seen	ATR_TemperatureMonitorMan: No LabView Data	set	0	AGS	ado	48	911	C. Theissen is investigating		bsartin
1549	Feb 13 15:05:27	J18_S032_1_4_T1temperatureM	1	seen	ATR_TemperatureMonitorMan: Temperature out of rang	set	0	AGS	ado	48	911	C. Theissen is investigating		bsartin
1550	Feb 13 15:05:27	J18_S032_1_4_T1gotFreshDataM	1	seen	ATR_TemperatureMonitorMan: No LabView Data	set	0	AGS	ado	48	911	C. Theissen is investigating		bsartin
1551	Feb 13 15:05:27	J18_S032_1_3_T1gotFreshDataM	1	seen	ATR_TemperatureMonitorMan: No LabView Data	set	0	AGS	ado	48	911	C. Theissen is investigating		bsartin
1552	Feb 13 15:05:27	ebis-d13-ps1statusM	1	seen	Fault, Out of Regulation	set	0	EBIS	ado	48			ebis 'not running' alarms.	bsartin
1553	Feb 13 15:05:27	J18_S032_1_2_T1gotFreshDataM	1	seen	ATR_TemperatureMonitorMan: No LabView Data	set	0	AGS	ado	48	911	C. Theissen is investigating		bsartin
1554	Feb 13 15:05:26	1111-tap-p121tapStatusM	1	seen	Isolation Valve Closed, Reply OK	set	0	RHIC	ado	48	Vacuum			bsartin
1555	Feb 13 15:05:26	BWD_LM_SYS_STATUS	1	seen	gasFaultib	set	0	Booster	device	50	Unknown	930 UEB	Still under investigation	bsartin
1556	Feb 13 15:05:26	BWD_LM_SYS_STATUS	1	seen	gasFaultac	set	0	Booster	device	49	Unknown	930 UEB	Still under investigation	bsartin
1557	Feb 13 15:05:26	J18_S032_10_2_T1temperatureM	1	seen	ATR_TemperatureMonitorMan: Temperature out of rang	set	0	AGS	ado	48	911	C. Theissen is investigating		bsartin

- Fields
 - Time stamp
 - Alarm
 - Level
 - State
 - Description
 - Action
 - Machine
 - Device Type
 - System
 - Location
 - Annotation
 - User Name

Annotation

CAD AD2000 - Thu Aug 2 08:44:43 2012

Setup Filter Mask Logs Transfer Diagnostics Help

6 Critical Alarms Unfiltered View Last Received @ Thu Aug 2 01:21:45 2012

Lvl	Count	Name	Description	ppm	State	Time
4	1	prs.917-8.913-J-H-18_House:dicomM	A Fan House Condensate Level o		seen	Jun 22 15:43
4	1	prs.973-6.914_Gas_and_Cmprs_Shed:di	Booster Radiation Monitor Syst		seen	Jul 13 16:11
4	1	NM.062:deviceReadErrorM	TRNH U/S LINAC PLUG		seen	Aug 01 10:38
4	1	NM.061:deviceReadErrorM	946-BSTER & LINAC-BS1		seen	Aug 01 10:38
4	1	NM.060:deviceReadErrorM	914 PLUG DOOR		seen	Aug 01 10:38
4	1	prs.992-4.911:dicomM	Aux Systems-Control Panel Low		seen	Aug 02 01:21

765 Standard Alarms Unfiltered View Last Received @ Thu Aug 2 08:43:44 2012

Lvl	Count	Name	Description	ppm	State	Time
1	1	qdprocess.10a-qd2:yellowAuxQuenchMs	Yellow Aux 5 Quenched [Signal		new	Jul 27 09:13
1	1	qdprocess.12a-qd2:yellowAuxQuenchMs	Yellow Aux 5 Quenched [Signal		new	Jul 27 09:13
1	1	AGS_GAUSS_EVENTS	missing events	1	new	Jul 27 10:17
1	2	BSTR_GAUSS_SOURCE	Not Primary	*	new	Jul 27 10:17
2	1	permit.958-vme.A:input3StatusM	NSRL rarc20:Permit Link FAIL		new	Jul 28 00:01
1	9	tmpCh tmpStatusM	Isolation Valve Closed, Reply		new	Jul 28 09:57
1	13	varianIpMan voltageM	range error		new	Jul 28 10:37
1	10	varianIpMan hvM	?		new	Jul 28 10:37
1	12	gp303IgChMan gpAvgPressureM	range error		new	Jul 28 10:37
3	1	prs.936-2.H-10_House:dicomM	UPS Trouble-H-10 House		new	Jul 28 10:39
1	1	ai5-qfjmp-ps.hv:statusM	Fault, Filter		new	Jul 28 13:26
1	5	AMUX	range error		new	Jul 28 13:26
1	4	AMUX	off		new	Jul 28 13:26
1	1	1008AGFMOD.RHIC-SUB-8A:grndFaultM	Ground fault		assigned	Jul 28 21:16
1	1	wfg.bi9-th3.1-4-ps:ioErrorM	I/O differenc		new	Jul 29 12:43
1	1	PS:psCtrlM.yi7-sxfl-ps	Off, No Fan		new	Jul 30 10:17
1	64	qfg ioErrorM	Power suppl		new	Jul 30 15:13
1	4	sam statusM	HB Failure		new	Jul 30 16:20
1	1	r-inst-N2.pressure:inBitsAlarmM	NSRL N2 Pre		new	Jul 30 22:26
1	20	apcups upsOnBatteryM	UPS FAULT		new	Jul 31 13:57
1	14	apcups upsLowBatteryM	UPS FAULT		new	Jul 31 14:02
1	1	CF:cfe-11b-ps2	response fa		new	Jul 31 14:06
1	1	qdprocess.8b-qd2:yellowAuxQuenchMsg	Yellow Aux		new	Jul 31 14:39
1	1	qdprocess.8b-qd1:blueAuxQuenchMsg	Blue Aux 5		new	Jul 31 14:39
1	3	apcups upsNotAnsweringM	UPS FAULT		new	Aug 01 07:42
2	1	permit.Master:input1StatusM	Loss Monitor		new	Aug 01 09:17
1	25	madcCh watchAlarmM	range error		new	Aug 01 09:51

1333 Deferred/Orphaned Alarms (0 Critical) Unfiltered View Last Received @ Sun Jul 8 10:25:54 2012

Lvl	Count	Name	Description	ppm	State	Time
2	1	permit.911-agsbil.D:input2StatusM	AGS Sector Valves:Permit Link		deferred	Jul 02 10:10
1	23	vacPlcAgsVMan plcValveGetFeedba	AGS Vacuum Valve Closed		deferred	Jul 02 13:50
2	1	permit.at-ps2.B:input1StatusM	U Line Vacuum:Permit Link FAIL		deferred	Jul 02 14:13
1	36	dtenPSI stateM	Not Off		deferred	Jul 02 15:17
1	73	qfg stateM	No data		deferred	Jul 02 15:17
3	19	gaugeCh pressureM	Insulating Vac Alarm		deferred	Jul 08 10:25

Alarm Receiver Connection established (Aug 1 17:34:04)
Selected alarms being deselected so that new alarms will be visible (autoscrolling) (Aug 1 17:40:40)

Annotation – text entry

CAD AD2000 - Thu Aug 2 08:59:34 2012

Setup Filter Mask Logs Transfer Diagnostics Help

6 Critical Alarms Unfiltered View Last Received @ Thu Aug 2 01:21:45 2012

Lvl	Count	Name	Description	ppm	State	Time
4	1	prs.917-8.913-J-H-18_House:dicomM	A Fan House Condensate Level o		seen	Jun 22 15:43
4	1	prs.973-6.914_Gas_and_Cmprs_Shed:di	Booster Radiation Monitor Syst		seen	Jul 13 16:11
4	1	NM.062:deviceReadErrorM	TRNH U/S LINAC PLUG		seen	Aug 01 10:38
4	1	NM.061:deviceReadErrorM	946-BSTER & LINAC-BS1		seen	Aug 01 10:38
4	1	NM.060:deviceReadErrorM	914 PLUG DOOR		seen	Aug 01 10:38
4	1	prs.992-4.911:dicomM	Aux Systems-Control Panel Low		seen	Aug 02 01:21

765 Standard Alarms

1008AGFMD.RHIC-SUB-8A:grndFaultM
[L]Ground fault indicator Run Name: shutdown_fy12

Update Alarm State

State: assigned

Notify: Select

Owner: czimmer

Submit Update

Annotation

Alarm History

Timestamp	State	Owner	Annotation
Sun Jul 29 06:06:02	assigned	mcr (rtuccio)	: -assigned to pkfeng
Sat Jul 28 23:40:07	seen	mcr (wjackson)	P.K.Feng Has been notified.
Sat Jul 28 21:16:59	new		

Close

1333 Deferred/Orphaned A

Lvl	Count	Name	Description	State	Time
2	1	permit.91			
1	23	vacPlcAgs			
2	1	permit.at			
1	36	dtenPSI s			
1	73	qfg statem			
3	19	gaugeCh pressureM	No data Insulating Vac Alarm	deferred	Jul 02 15:17 deferred Jul 08 10:25

Selected alarms are being deselected so that new alarms will be visible (autoscrolling) (Aug 2 08:45:07)
Selected alarms are being deselected so that new alarms will be visible (autoscrolling) (Aug 2 08:53:46)

Annotation - Assignment

CAD AD2000 - Thu Aug 2 09:02:59 2012

Setup Filter Mask Logs Transfer Diagnostics Help

6 Critical Alarms Unfiltered View Last Received @ Thu Aug 2 01:21:45 2012

lvl	Count	Name	Description	ppm	State	Time
4	1	prs.917-8.913-J-H-18_House:dicomM	A Fan House Condensate Level o		seen	Jun 22 15:43
4	1	prs.973-6.914_Gas_and_Cmprs_Shed:di	Booster Radiation Monitor Syst		seen	Jul 13 16:11
4	1	NM.062:deviceReadErrorM	TRNH U/S LINAC PLUG		seen	Aug 01 10:38
4	1	NM.061:deviceReadErrorM	946-BSTER & LINAC-BS1		seen	Aug 01 10:38
4	1	NM.060:deviceReadErrorM	914 PLUG DOOR		seen	Aug 01 10:38
4	1	prs.992-4.911:dicomM	Aux Systems-Control Panel Low		seen	Aug 02 01:21

765 Standard Alarms Unfiltered View Last Received @ Thu Aug 2 09:02:59 2012

4	sam statusM	HB Failure	new	Jul 30 16:20
1	r-inst-N2.pressure:inBitsAlarmM	NSRL N2 Pressure Low	new	Jul 30 22:26

1008AGFMOD.RHIC-SUB-8A:grndFaultM
[L]Ground fault indicator

Run Name: shutdown_fy12

Update Alarm State

State: (circled in red)

Notify: (circled in red)

Owner: (circled in red)

Annotation

Alarm History

Timestamp	State	Owner	Annotation
Sun Jul 29 06:06:02	assigned	mcr(rtuccio)	: -assigned to pkfeng
Sat Jul 28 23:40:07	seen	mcr(wjackson)	P.K.Feng Has been notified.
Sat Jul 28 21:16:59	new		

: -assigned to pkfeng

Select User To Assign Alarm

- Edwards, Robert
- Eich, Robert
- Eisele, William
- Etkin, Asher
- Evers, Louis
- Famiglietti, Joseph
- Farooq, Sheikh
- Fedotov, Alexei
- FengPei, Kuan (highlighted)
- Fernando, Arthur
- Fischer, Wolfram
- Fite, Jesse
- Fitzsimmons, Jonathan
- Flanagan, Thomas
- Folz, Charles
- Frak, Bartosz
- Franco, Nicholas
- Fu, Wenge
- Funaro, Joseph
- Galarraga, Jorge
- Gardner, Christopher
- Gassner, David
- Genco, James

Filter:

Selected alarms are being deselected so that new alarms will be visible (autoscrolling) (Aug 2 08:53:46)
 Selected alarms are being deselected so that new alarms will be visible (autoscrolling) (Aug 2 09:00:54)

Assignment - Reviewing

CAD AD2000 - Thu Aug 2 09:09:49 2012

Setup Filter Mask Logs Transfer Diagnostics Help

6 Critical Alarms Unfiltered View Last Received @ Thu Aug 2 01:21:45 2012

Lvl	Count	Name	Description	ppm	State	Time
4	1	prs.917-8.913-J-H-18_House:dicomM	A Fan House Condensate Level o		seen	Jun 22 15:43
4	1	prs.973-6.914_Gas_and_Cmprs_Shed:di	Booster Radiation Monitor Syst		seen	Jul 13 16:11
4	1	NM.062:deviceReadErrorM	TRNH U/S LINAC PLUG		seen	Aug 01 10:38
4	1	NM.061:deviceReadErrorM	946-BSTER & LINAC-BS1		seen	Aug 01 10:38
4	1	NM.060:deviceReadErrorM	914 PLUG DOOR		seen	Aug 01 10:38
4	1	prs.992-4.911:dicomM	Aux Systems-Control Panel Low		seen	Aug 02 01:21

764 Standard Alarms Unfiltered View Last Received @ Thu Aug 2 09:08:19 2012

Lvl	Count	Name	Description	ppm	State	Time
1	12	gp303IgChMan gpAvgPressureM	range error		new	Jul 28 10:37
3	1	prs.936-2.H-10_House:dicomM	UPS Trouble-H-10_House		new	Jul 28 10:39
1	1	ai5-qfjmp-ps.hv:statusM	Fault, Filter		new	Jul 28 13:26
1	5	AMUX	range error		new	Jul 28 13:26
1	4	AMUX	off		new	Jul 28 13:26
1	1	1008AGFMOD.RHIC-SUB-8A:grndFaultM	Ground fault		assigned	Jul 28 21:16
1	1	wfg.bi9-th3.1-4-ps:ioErrorM	I/O diff		new	Jul 29 12:43
1	1	PS:psCtrlM.yi7-sxf1-ps	Off, No Faults		new	Jul 30 10:17
1	64	qfg ioErrorM	Power supply link down		new	Jul 30 15:13
1	4	sam statusM	HB Failure		new	Jul 30 16:20
1	1	r-inst-N2.pressure:inBitsAlarmM	NSRL N2 Pressure Low		new	Jul 30 22:26
1	20	apcups upsOnBatteryM	UPS FAULT		new	Jul 31 13:57
1	14	apcups upsLowBatteryM	UPS FAULT		new	Jul 31 14:02
1	1	CF:cfe-11b-ps2	response failure -> acnfec199.		new	Jul 31 14:06
1	1	qdprocess.8b-qd2:yellowAuxQuenchMsg	Yellow Aux 5 Quenched [Signal		new	Jul 31 14:39
1	1	qdprocess.8b-qd1:blueAuxQuenchMsg	Blue Aux 5 Quenched [Signal B8		new	Jul 31 14:39
1	3	apcups upsNotAnsweringM	UPS FAULT		new	Aug 01 07:42
2	1	permit.Master:input1StatusM	Loss Monitor 1:Permit Link FAI		new	Aug 01 09:17
1	25	madcCh watchAlarmM	range error		new	Aug 01 09:51
1	1	y8-dh0-ps.dmmDAC:diffM	range error		new	Aug 01 10:23
1	1	HB:cfe-929-rf-atr	No HeartBeat		new	Aug 01 11:55
1	1	HB:cfe-11b-ps2	No HeartBeat		new	Aug 01 11:55
1	1	HB:RhicIpmManager	No HeartBeat		new	Aug 01 11:55
1	1	HB:GpmMan.VoltageMonitor	No HeartBeat		new	Aug 01 11:55
1	1	CST-HITL1-VME	not reporting		new	Aug 01 14:23
1	1	B-8B_R8B05_RACK_TEMP.T:temperatureM	SrvBldMan: Temperature out of		new	Aug 01 15:03
1	2	BSTR_GAUSS_EVENTS	missing events	*	new	Aug 01 15:13
1	1	CST-930UEB-BLOSS	not reporting		new	Aug 01 15:25

1333 Deferred/Orphaned Alarms (0 Critical) Unfiltered View Last Received @ Sun Jul 8 10:25:54 2012

Lvl	Count	Name	Description	ppm	State	Time
1	23	vacPlcAgsVMan plcValveGetFeedbackBi	AGS Vacuum Valve Closed		deferred	Jul 02 13:50
2	1	permit.at-ps2.B:input1StatusM	U Line Vacuum:Permit Link FAIL		deferred	Jul 02 14:13
1	36	dtenPSI stateM	Not Off		deferred	Jul 02 15:17
1	73	qfg stateM	No data		deferred	Jul 02 15:17
3	19	gaugeCh pressureM	Insulating Vac Alarm		deferred	Jul 08 10:25

Selected alarms are being deselected so that new alarms will be visible (autoscrolling)(Aug 2 08:53:46)
 Selected alarms are being deselected so that new alarms will be visible (autoscrolling)(Aug 2 09:00:54)

Assignment - Shift Change

CAD AD2000 - Thu Aug 2 08:53:38 2012

Setup Filter Mask **Logs** Transfer Diagnostics Hel

6 Critical Alarms **Operator Change** Unfiltered View Last Received @ Thu Aug 2 01:21:45 20

Lvl	Count	Name	Description	ppm	State	Time
4	1	prs.917-8.913-J-H-18_House:dicomM	A Fan House Condensate Level o		seen	Jun 22 15:43
4	1	prs.973-6.914_Gas_and_Cmprs_Shed:di	Booster Radiation Monitor Syst		seen	Jul 13 16:11
4	1	NM.062:deviceReadErrorM	TRNH U/S LINAC PLUG		seen	Aug 01 10:38
4	1	NM.061:deviceReadErrorM	946-BSTER & LINAC-BS1		seen	Aug 01 10:38
4	1	NM.060:deviceReadErrorM	914 PLUG DOOR		seen	Aug 01 10:38
4	1	prs.992-4.911:dicomM	Aux Systems-Control Panel Low		seen	Aug 02 01:21

764 Standard Alarms Unfiltered View Last Received @ Thu Aug 2 08:52:56 20

Lvl	Count	Name	Description	ppm	State	Time
1	2	BSTR_GAUSS_SOURCE	Not Primary	*	new	Jul 27 10:17
2	1	permit.958-vme.A:input3StatusM	NSRL rarc20:Permit Link FAIL		new	Jul 28 00:01
1	9	tmpCh tmpStatusM	Isolation Valve Closed, Reply		new	Jul 28 09:57
1	13	varianIpMan voltageM	range error		new	Jul 28 10:37
1	10	varianIpMan hvM	?		new	Jul 28 10:37
1	12	gp303IgChMan gpAvgPressureM	range error		new	Jul 28 10:37
3	1	prs.936-2.H-10_House:dicomM	UPS Trouble-H-10 House		new	Jul 28 10:39
1	1	ai5-qfjmp-ps.hv:statusM	Fault, Filter		new	Jul 28 13:26
1	5	AMUX	range error		new	Jul 28 13:26
1	4	AMUX	off		new	Jul 28 13:26
1	1	1008AGFMOD.RHIC-SUB-8A:grndFaultM	Ground fault indicator		assigned	Jul 28 21:16
1	1	wfg.bi9-th3.1-4-ps:ioErrorM	I/O difference		new	Jul 29 12:43
1	1	PS:psCtrlM.yi7-sxf1-ps	Off, No Faults		new	Jul 30 10:17
1	64	qfg ioErrorM	Power supply link down		new	Jul 30 15:13
1	4	sam statusM	HB Failure		new	Jul 30 16:20
1	1	r-inst-N2.pressure:inBitsAlarmM	NSRL N2 Pressure Low		new	Jul 30 22:26
1	20	apcups upsOnBatteryM	UPS FAULT		new	Jul 31 13:57
1	14	apcups upsLowBatteryM	UPS FAULT		new	Jul 31 14:02
1	1	CF:cfe-11b-ps2	response failure -> acnfec199.		new	Jul 31 14:06
1	1	qdprocess.8b-qd2:yellowAuxQuenchMsg	Yellow Aux 5 Quenched [Signal		new	Jul 31 14:39
1	1	qdprocess.8b-qd1:blueAuxQuenchMsg	Blue Aux 5 Quenched [Signal B8		new	Jul 31 14:39
1	3	apcups upsNotAnsweringM	UPS FAULT		new	Aug 01 07:42
2	1	permit.Master:input1StatusM	Loss Monitor 1:Permit Link FAI		new	Aug 01 09:17
1	25	madcCh watchAlarmM	range error		new	Aug 01 09:51
1	1	y8-dh0-ps.dmmDAC:diffM	range error		new	Aug 01 10:23
1	1	HB:cfe-929-rf-atr	No HeartBeat		new	Aug 01 11:55
1	1	HB:cfe-11b-ps2	No HeartBeat		new	Aug 01 11:55

1333 Deferred/Orphaned Alarms (0 Critical) Unfiltered View Last Received @ Sun Jul 8 10:25:54 20

Lvl	Count	Name	Description	ppm	State	Time
2	1	permit.911-agsbil.D:input2StatusM	AGS Sector Valves:Permit Link		deferred	Jul 02 10:10
1	23	vacPlcAgsVMan plcValveGetFeedba	AGS Vacuum Valve Closed		deferred	Jul 02 13:50
2	1	permit.at-ps2.B:input1StatusM	U Line Vacuum:Permit Link FAIL		deferred	Jul 02 14:13
1	36	dtcnPSI stateM	Not Off		deferred	Jul 02 15:17
1	73	qfg stateM	No data		deferred	Jul 02 15:17
3	19	gaugeCh pressureM	Insulating Vac Alarm		deferred	Jul 08 10:25

Selected alarms are being deselected so that new alarms will be visible (autoscrolling) (Aug 1 17:40:40)
 Selected alarms are being deselected so that new alarms will be visible (autoscrolling) (Aug 2 08:45:07)

Annotation – alarm transfer window

CAD AD2000 - Thu Aug 2 08:55:33 2012

Setup Filter Mask Logs Transfer Diagnostics Help

6 Critical Alarms Unfiltered View Last Received @ Thu Aug 2 01:21:45 2012

Lvl	Count	Name	Description	ppm	State	Time
4	1	prs.917-8.913-J-H-18_House:dicomM	A Fan House Condensate Level o		seen	Jun 22 15:43
4	1	prs.973-6.914_Gas_and_Ompres_Shed:di	Rooster Radiation Monitor Syst		seen	Jul 13 16:11

Alarm Transfer Window

View: jmar Assign: blackler Group Alarms 1329 Alarms Transfer All

Lvl	Count	Name	Description	ppm	State	Time
1	178	wfgRamp ioErrorM	Power supply link carrier		deferred	Jun 27 18:08
2	2	permit input5Stat	PASS Division B:Permit Link FA		deferred	Jun 28 07:33
2	2	permit input2Stat	PASS Division B:Permit Link FA		deferred	Jun 28 07:33
2	1	permit.12a-ps1.B:j	PASS Beam Stop B:Permit Link F		deferred	Jun 28 07:33
2	1	permit.12a-ps1.B:j	PASS Beam Stop A:Permit Link F		deferred	Jun 28 07:33
2	2	permit input1Stat	PASS Division A:Permit Link FA		deferred	Jun 28 07:37
2	2	permit input4Stat	PASS Division A:Permit Link FA		deferred	Jun 28 07:41
2	3	permit input6Stat	PASS Division B:Permit Link FA		deferred	Jun 28 08:33
2	3	permit input5Stat	PASS Division A:Permit Link FA		deferred	Jun 28 08:33
1	4	wfgRamp ioErrorM	Power supply link carrier,Fram		deferred	Jun 28 11:33
1	7	wfgRamp ioErrorM	Power supply link carrier,CRC		deferred	Jun 28 11:33
2	1	permit.10a-ps3.B:input2StatusM	Yellow Abort Kicker:Permit Lin		deferred	Jun 29 08:07
2	1	permit.10a-ps3.B:input1StatusM	Blue Abort Kicker:Permit Link		deferred	Jun 29 08:07
1	242	psCtrlM statusM	No PS / Illegal State		deferred	Jun 29 15:14
1	1	wfg.aj10-dump-ps:ioErrorM	I/O difference,Power supply li		deferred	Jun 30 22:16
1	2	wfgControl linkErrorM	Event link carrier phase,Event		deferred	Jun 30 22:33
1	1	wfg.pttWest-ps.star:ioErrorM	Frame error,I/O difference		deferred	Jun 30 23:06
2	1	permit.7w-ps2.A:input1StatusM	Loss Monitor 1:Permit Link FAI		deferred	Jul 01 17:23
1	2	wfgRamp ioErrorM	CRC error,I/O difference		deferred	Jul 02 00:50
2	1	permit.911-agbsbi1.D:input2StatusM	AGS Sector Valves:Permit Link		deferred	Jul 02 10:10
1	23	vacPlcAgsVMan plcValveGetFeedbackBi	AGS Vacuum Valve Closed		deferred	Jul 02 13:50
2	1	permit.at-ps2.B:input1StatusM	U Line Vacuum:Permit Link FAIL		deferred	Jul 02 14:13
1	36	dtcPSI stateM	Not Off		deferred	Jul 02 15:17
1	73	qfg stateM	No data		deferred	Jul 02 15:17
1	3	19 gaugeCh pressureM	Insulating Vac Alarm		deferred	Jul 08 10:25

Close

Selected alarms are being deselected so that new alarms will be visible (autoscrolling) (Aug 2 08:45:07)
 Selected alarms are being deselected so that new alarms will be visible (autoscrolling) (Aug 2 08:53:46)

Annotation – show ownership

CAD AD2000 - Thu Aug 2 09:06:24 2012

Setup Filter Mask Logs Transfer Diagnostics Help

6 Critical Alarms **Unfiltered View** Last Received @ Thu Aug 2 01:21:45 2012

Level	Count	Name	Description	ppm	State	Time
4	1	913-J-H-18_House:dicomM	A Fan House Condensate Level o		seen	Jun 22 15:43
4	1	914_Gas_and_Cmprs_Shed:di	Booster Radiation Monitor Syst		seen	Jul 13 16:11
4	1	viceReadErrorM	TRNH U/S LINAC PLUG		seen	Aug 01 10:38
4	1	viceReadErrorM	946-BSTER & LINAC-BS1		seen	Aug 01 10:38
4	1	viceReadErrorM	914 PLUG DOOR		seen	Aug 01 10:38
4	1	911:dicomM	Aux Systems-Control Panel Low		seen	Aug 02 01:21

766 Standby Alarms **Unfiltered View** Last Received @ Thu Aug 2 09:06:16 2012

Level	Count	Name	Description	ppm	State	Time
1	4	sam statusM	HB Failure		new	Jul 30 16:20
1	1	r-inst-N2.pressure:inBitsAlarmM	NSRL N2 Pressure Low		new	Jul 30 22:26
1	20	apcups upsOnBatteryM	UPS FAULT		new	Jul 31 13:57
1	14	apcups upsLowBatteryM	UPS FAULT		new	Jul 31 14:02
1	1	CF:cfe-11b-ps2	response failure -> acnfec199.		new	Jul 31 14:06
1	1	qdprocess.8b-qd2:yellowAuxQuenchMsg	Yellow Aux 5 Quenched [Signal		new	Jul 31 14:39
1	1	qdprocess.8b-qd1:blueAuxQuenchMsg	Blue Aux 5 Quenched [Signal B8		new	Jul 31 14:39
1	3	apcups upsNotAnsweringM	UPS FAULT		new	Aug 01 07:42
2	1	permit.Master:input1StatusM	Loss Monitor 1:Permit Link FAI		new	Aug 01 09:17
1	25	madcCh watchAlarmM	range error		new	Aug 01 09:51
1	1	y8-dh0-ps.dmmDAC:diffM	range error		new	Aug 01 10:23
1	1	HB:cfe-929-rf-atr	No HeartBeat		new	Aug 01 11:55
1	1	HB:cfe-11b-ps2	No HeartBeat		new	Aug 01 11:55
1	1	HB:RhicIpmManager	No HeartBeat		new	Aug 01 11:55
1	1	HB:GpmMan.VoltageMonitor	No HeartBeat		new	Aug 01 11:55
1	1	CST-HITL1-VME	not reporting		new	Aug 01 14:23
1	1	B-8B_R8B05_RACK_TEMP.T:temperatureM	SrvBldMan: Temperature out of		new	Aug 01 15:03
1	2	BSTR_GAUSS_EVENTS	missing events	*	new	Aug 01 15:13
1	1	CST-930UEB-BLOSS	not reporting		new	Aug 01 15:25
1	1	CST-930HEBT-PLRMTR	not reporting		new	Aug 01 15:29
1	2	wireOneMaster fileUsedErrorM			new	Aug 01 18:34
1	1	CAD_Weather_Alert	SPECIAL WARNING		new	Aug 02 06:57
1	9	gaugeCh pressureM	Insulating Vac Warning		new	Aug 02 08:04
1	1	aj5-qfjnp-ps.hv:statusM	Fault, LV PS, Filter		new	Aug 02 08:23
1	1	serverman.psSnapshotServer:lastChec	last checkin Thu Aug 2 08:54:		new	Aug 02 08:57
1	1	CI:APC UPS qd 1010a	UPS Abnormality		new	Aug 02 09:02
3	126	gaugeCh pressureM	Insulating Vac Alarm		new	Aug 02 09:03
1	7	HITL_QUADS	range error		new	Aug 02 09:06

1333 Deferred/Orphaned Alarms (0 Critical) **Unfiltered View** Last Received @ Sun Jul 8 10:25:54 2012

Level	Count	Name	Description	ppm	State	Time
2	1	permit.911-agsbil.D:input2StatusM	AGS Sector Valves:Permit Link		deferred	Jul 02 10:10
1	23	vacPlcAgsVMan plcValveGetFeedbackBi	AGS Vacuum Valve Closed		deferred	Jul 02 13:50
2	1	permit.at-ps2.B:input1StatusM	U Line Vacuum:Permit Link FAIL		deferred	Jul 02 14:13
1	36	dtenPSI stateM	Not Off		deferred	Jul 02 15:17
1	73	qfg stateM	No data		deferred	Jul 02 15:17
3	19	gaugeCh pressureM	Insulating Vac Alarm		deferred	Jul 08 10:25

Selected alarms are being deselected so that new alarms will be visible (autoscrolling) (Aug 2 08:53:46)
 Selected alarms are being deselected so that new alarms will be visible (autoscrolling) (Aug 2 09:00:54)

Annotation – ownership screen

The screenshot shows the CAD AD2000 software interface. At the top, the title bar reads "CAD AD2000 - Thu Aug 2 09:07:39 2012". Below the title bar is a menu bar with "Setup", "Filter", "Mask", "Logs", "Transfer", "Diagnostics", and "Help". A red circle highlights the text "Owner: czimmer" in the "Filter" menu. Below the menu bar, there are three sections of alarms:

- 6 Critical Alarms**: Filtered View, Last Received @ Thu Aug 2 01:21:45 2012. A table with columns: lvl, Count, Name, Description, ppm, State, Time.
- 1 Standard Alarms**: Filtered View, Last Received @ Wed Jun 6 22:41:50 2012. A table with columns: lvl, Count, Name, Description, State, Time.
- 0 Deferred/Orphaned Alarms (0 Critical)**: Filtered View.

At the bottom of the window, there is a status bar with the following text: "Selected alarms are being deselected so that new alarms will be visible (autoscrolling) (Aug 2 08:53:46)" and "Selected alarms are being deselected so that new alarms will be visible (autoscrolling) (Aug 2 09:00:54)".

lvl	Count	Name	Description	ppm	State	Time
4	1	prs.917-8.913-J-H-18_House:dicomM	A Fan House Condensate Level o		seen	Jun 22 15:43
4	1	prs.973-6.914_Gas_and_Cmprs_Shed:di	Booster Radiation Monitor Syst		seen	Jul 13 16:11
4	1	NM.062:deviceReadErrorM	TRNH U/S LINAC PLUG		seen	Aug 01 10:38
4	1	NM.061:deviceReadErrorM	946-BSTER & LINAC-BS1		seen	Aug 01 10:38
4	1	NM.060:deviceReadErrorM	914 PLUG DOOR		seen	Aug 01 10:38
4	1	prs.992-4.911:dicomM	Aux Systems-Control Panel Low		seen	Aug 02 01:21

lvl	Count	Name	Description	State	Time
1	1	TTL.10DH1	dev not answr	seen	Jun 06 22:41

Communications to Operators – response instructions

CAD AD2000 - Thu Aug 2 08:44:43 2012

Setup Filter Mask Logs Transfer Diagnostics Help

6 Critical Alarms Unfiltered View Last Received @ Thu Aug 2 01:21:45 2012

Lvl	Count	Name	Description	ppm	State	Time
4	1	prs.917-8.913-J-H-18_House:dicomM	A Fan House Condensate Level o		seen	Jun 22 15:43
4	1	prs.973-6.914_Gas_and_Cmprs_Shed:di	Booster Radiation Monitor Syst		seen	Jul 13 16:11
4	1	NM.062:deviceReadErrorM	TRNH U/S LINAC PLUG		seen	Aug 01 10:38
4	1	NM.061:deviceReadErrorM	946-BSTER & LINAC-BS1		seen	Aug 01 10:38
4	1	NM.060:deviceReadErrorM	914 PLUG DOOR		seen	Aug 01 10:38
4	1	prs.992-4.911:dicomM	Aux Systems-Control Panel Low		seen	Aug 02 01:21

765 Standard Alarms Unfiltered View Last Received @ Thu Aug 2 08:43:44 2012

Lvl	Count	Name	Description	ppm	State	Time
1	1	qdprocess.10a-qd2:yellowAuxQuenchMs	Yellow Aux 5 Quenched [Signal		new	Jul 27 09:13
1	1	qdprocess.12a-qd2:yellowAuxQuenchMs	Yellow Aux 5 Quenched [Signal		new	Jul 27 09:13
1	1	AGS_GAUSS_EVENTS	missing events	1	new	Jul 27 10:17
1	2	BSTR_GAUSS_SOURCE	Not Primary	*	new	Jul 27 10:17
2	1	permit.958-vme.A:input3StatusM	NSRL rarc20:Permit Link FAIL		new	Jul 28 00:01
1	9	tmpCh tmpStatusM	Isolation Valve Closed, Reply		new	Jul 28 09:57
1	13	varianIpMan voltageM	range error		new	Jul 28 10:37
1	10	varianIpMan hvM	?		new	Jul 28 10:37
1	12	gp303IgChMan gpAvgPressureM	range error		new	Jul 28 10:37
3	1	prs.936-2.H-10_House:dicomM	UPS Trouble-H-10 House		new	Jul 28 10:39
1	1	ai5-qfjmp-ps.hv:statusM	Fault, Filter		new	Jul 28 13:26
1	5	AMUX	range error		new	Jul 28 13:26
1	4	AMUX	off		new	Jul 28 13:26
1	1	1008AGFMOD.RHIC-SUB-8A:grndFaultM	Ground fault		assigned	Jul 28 21:16
1	1	wfg.bi9-th3.1-4-ps:ioErrorM	I/O differ		new	Jul 29 12:43
1	1	PS:psCtrlM.yi7-sxfl-ps	Off, no Fau		new	Jul 30 10:17
1	64	qfg ioErrorM	Power suppl		new	Jul 30 15:13
1	4	sam statusM	HB Failure		new	Jul 30 16:20
1	1	r-inst-N2.pressure:inBitsAlarmM	NSRL N2 Pre		new	Jul 30 22:26
1	20	apcups upsOnBatteryM	UPS FAULT		new	Jul 31 13:57
1	14	apcups upsLowBatteryM	UPS FAULT		new	Jul 31 14:02
1	1	CF:cfe-11b-ps2	response fa		new	Jul 31 14:06
1	1	qdprocess.8b-qd2:yellowAuxQuenchMsg	Yellow Aux		new	Jul 31 14:39
1	1	qdprocess.8b-qd1:blueAuxQuenchMsg	Blue Aux 5		new	Jul 31 14:39
1	3	apcups upsNotAnsweringM	UPS FAULT		new	Aug 01 07:42
2	1	permit.Master:input1StatusM	Loss Monitor		new	Aug 01 09:17
1	25	madcCh watchAlarmM	range error		new	Aug 01 09:51

1333 Deferred/Orphaned Alarms (0 Critical) Unfiltered View Last Received @ Sun Jul 8 10:25:54 2012

Lvl	Count	Name	Description	ppm	State	Time
2	1	permit.911-agsbi1.D:input2StatusM	AGS Sector Valves:Permit Link		deferred	Jul 02 10:10
1	23	vacPlcAgsVMAN plcValveGetFeedbackBi	AGS Vacuum Valve Closed		deferred	Jul 02 13:50
2	1	permit.at-ps2.B:input1StatusM	U Line Vacuum:Permit Link FAIL		deferred	Jul 02 14:13
1	36	dtenPSI stateM	Not Off		deferred	Jul 02 15:17
1	73	qfg stateM	No data		deferred	Jul 02 15:17
3	19	gaugeCh pressureM	Insulating Vac Alarm		deferred	Jul 08 10:25

Alarm Receiver Connection established (Aug 1 17:34:04)
Selected alarms are being deselected so that new alarms will be visible (autoscrolling) (Aug 1 17:40:40)

Example -- alarm response instructions displayed on a webpage

grndFaultCh Alarm Response Instructions

This is a note for operations on what action should be taken when alarms from grndFaultCh devices come up on the alarm display.

Ground fault indicator from building monitoring system

- **Alarm** =:grndFaultM -- description "Ground fault indicator"
- **Response** =
 - Follow OPM 2.39 "Response to Ground Fault Alarm at C-AD"
 - For "Notification" (CATV Message) when MCR is not staffed contact Ingrassia x4272, or Sampson x7178, or Shrey x7451, or Naylor x7986, or VanKuik x4245
 - Monitor ground faults on the web at <http://130.199.40.205/groundfaults.html>
 - **Notification** = Per OPM 2.39 **Contact the Head of the Power Distribution Group -- PK Feng x5648 -- Pager 5312**
- **Unlatching** = Ground fault alarms will remain on the alarm display even after the ground fault is cleared. To remove the alarm, right-click on the alarm and choose Unlatch from the pop-up options.

- **Alarm** =:grndFaultM --description "Communications fault"
- **Response** = A sensor or other system failure has caused the alarm."Support One" shall contact P.K. Feng (Power Engineering) or Charles Theisen (Controls Group)-- the system experts.

Notification = CONTACT CAS AND REPORT THE LOCATION OF THE SYSTEM FAILURE -- CAS will contact the experts.

<p>noDataTimeoutErrorM</p>	<p>1 indicates that no data has been received in the timeout period</p> <p><i>Building Monitoring Channel Alarms:</i></p> <p><i>Contacts:</i> <i>System:</i> <i>HW: Charles Theisen: x4706 [Home: ?]</i> <i>SW: James Jamilkowski: x8598</i></p> <p><i>If this occurs then no updates from LabView are occurring</i> <i>- Contact Charles Theisen</i></p> <p><i>SnapServer can also be a cause of this problem.</i> <i>SnapServers can be found in StartUp as follows:</i> <i>--- StartUp > diagnostics > Servers > System Servers > Snap Server</i> <i>One or more of the SnapServers should be running</i> <i>- Contact James Jamilkowski</i></p>
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Summary - Operator Experience

- Annotation Feature is “fabulous”
- “Ownership” avoided
 - operators misunderstood short term intention of ownership.
- Labor involved
 - Some operators used the features more than others
- Not all alarms required annotation
 - Operators developed a good understanding of short term alarms which need not be annotated
- One year of experience -- more acceptance needed