

ARCS Site Remote Error Response Procedure

I. Purpose:

The purpose of this procedure is to define the steps taken when an error is detected. The error could be identified at the PNNL Control Center, the BNL Control center, the Science team monitors, or the Operations monitoring personnel. Wherever discovered, the steps toward resolution are the same. The objective is to ensure deliveries of the best possible and complete set of data for use by the customer.

II. Cautions and Hazards:

None.

III. Requirements:

IV. Procedure:

A. Definition:

1. Error reporting procedures are needed to efficiently and effectively correct errors which occur at the TWP/ARCS site. Lack of proper error detection processes creates improper actions to correct problems which could result in loss of data integrity and increase costs for corrective action.

B. Remote RESET Options:

1. If an error is detected, the following remote control options are available. These options are available to the remote monitoring operator at PNNL as well as the backup operator at BNL. The following are remotely manipulated instruments:

<u>Item</u>	<u>Action</u>	<u>Location</u>
• IPC Control	Reboot	(I-Van, D-Van)
• UPS	OFF/ON	(I-Van, D-Van)
• AC	OFF/ON/Normal	(I-Van, D-Van, U-Van)
• Main Power	OFF/ON	(I-Van, D-Van, U-Van, E-Van)
• Heat	OFF only	(I-Van, D-Van)
• Node Unit Device Van, Door, Smoke	Query	T/RH, Voltage and Current in (I-Van, D-Van, E-Van, U-Van)
• Adam and Eve	Off/On	(DMS)

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- WSI OFF/ON (control located in I-Van)
- MWR OFF/ON (control located in I-Van)
- MPL OFF/ON (control located in I-Van)

C. Local operators options (TBA):

1. Error identified:

- a) Monitoring personnel may detect instrument problems in one or more of the following ways:

Monitoring personnel are identified as PNNL or BNL operators, Operations Personnel, Mentors, and Science Team Data Monitors.

- (1) GOES message indicated instrument failure.
- (2) Instrument data erratic, missing, or degrading.
- (3) Local operator message from site of instrument failure.
- (4) Message from an instrument mentor or a Science team member.
- (5) Auto alarm message sent to remote operators via the INMARSAT.

- b) Actions:

Notify Operations management office.

- (1) During normal office hours, # 505-667-1186.
- (2) Off duty hours, 1-800-sky-page, pin # 544-6137.
- (3) If there is no response within the time period designated for that particular error level, then contact these secondary numbers.
 - (a) 1-800-sky-page, pin # 824-2777
 - (b) 1-800-sky-page, pin # 824-2778

D. Notification:

1. **Level 1** requires notification and response time within 1 hour.

- a) Notify one, in order of availability:

- (1) Operations Manager: 505-667-1186.
- (2) RESET team: 800-sky-page 824-2777 or 824-2778.
- (3) TWP Program Manager 888-sky-8888 #544-3897 or 544-3898.

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- (4) Deployment/Integration manager - 800-sky-8888, pin #544-3862.
2. **Level 2** requires notification and response within 3 hours.
 - a) Notification same as **Level 1** above.
3. **Level 3** error requires notification and response within 24 hours.
 - a) Notification same as **Level 1** above.
4. **Level 4** error requires notification and response within 72 hours.
 - a) Notification same as C.1.b.
5. **Level 5** error is a low priority and is addressed during a weekly conference call with the local operators.
 - a) Notification same as C.1.b.
6. **Level 6** error is a very low priority and is corrected during the standard RESET visit. No special consideration is given to Level 6.
 - a) Notification is handled by the Operations manager. Work and visit scheduling takes place in a routine fashion.

E. Responses:

The TWPPPO Operations Office (OPS) determines the exact steps to bring the instrument or system back on-line. The error level dictates the appropriate steps taken. The following tasks are completed for all errors, no matter what error level is assigned.

1. Error notice is logged in operations office log.
2. Error notice is forwarded to OMS for logging.

F. Level 1 Error:

Operations contacts the remote operator (PNNL or BNL) to reset the instrument or equipment that is failing. This is either a power OFF reset or a reboot. Other site incidents may be identified as **Level 1** occurrences but are unrelated to instruments. See level guide for examples.

1. If successful with this step
 - a) Return site to normal operation,
 - b) Notify TWPPPO of success,
 - c) Forward error completion and resolution to OMS for logging,
 - d) Log completion in operations office log book,
 - e) Notify science team of completion,

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2. If unsuccessful with this step, perform the following:
 - a) Contact local operators to resolve problem via phone troubleshooting. (Use troubleshooting guide provided.)
 - b) If error is corrected, go to step 7A
 - c) If error not corrected
 - (1) Disable instrument,
 - (2) Enter in the Site error notification system,
 - (3) Log in operations log,
 - (4) This is a **Level 1** (critical) instrument, go to step 10,
 - (5) Return to normal operation.

G. Level 2 Error:

Operations office contacts the PNNL or BNL operator to reset the instrument or system with a reboot or a power - OFF restart.

1. If successful with this step
 - a) Return site to normal operation,
 - b) Notify TWPPPO of success,
 - c) Forward error completion and resolution to OMS for logging,
 - d) Log completion in operations log book,
 - e) Notify science team of completion.
2. If unsuccessful with this step, perform the following:
 - a) Contact local operators to resolve problem via phone troubleshooting. (Use troubleshooting guide provided.)
 - b) If error corrected, go to step 8 A
 - c) If error not corrected
 - (1) Disable instrument,
 - (2) Enter in the Site error notification system,
 - (3) Log in operations log,
 - (4) This is a **Level 2** (critical) instrument, go to step 10,
 - (5) Return to normal operation.

H. Instrument Error Level 3 - 6:

1. Run checks with the local operators via phone, using the local operator troubleshooting procedures.

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2. If local operator procedures are able to repair the problem
 - a) Bring site back to normal operations,
 - b) Bring PNNL or BNL site operator back to normal operation,
 - c) Perform logging procedures,
 - d) Perform notification procedures.
3. If instrument did not come on-line
 - a) Disable the instrument, (power OFF),
 - b) Check OMS for instrument spares,
 - c) Commit the spare for deployment on the next RESET visit,
 - d) Put on repair schedule for RESET visit,
 - e) Perform the logging procedures,
 - f) Perform the notification procedures.
- I. Check inventory for availability of spare instruments. It may be necessary to make a visual check at the storage facility as well.
 1. Spare to repair instrument is available.
 2. Schedule trip to site for repair visit.
 3. Pick up spares at SNL or have spare pre-shipped to site.
 4. RESET travel to site (Recuperate).
 5. Repair and/or replace the instrument on arrival as the first step.
 - a) Perform the site installation calibration and/or comparison checks on the instrument replaced or repaired.
 - b) Perform the normal RESET visit functions at this time and record.
 - c) Enter all information of instrument problem and solutions into the Site Log Book for future references and documentation.
 6. Check data quality of instrument via ADaM readings and by checking the GOES message results via SAT phone with operations.
 7. Perform the routine RESET visit procedures.
 8. Inventory site spares and equipment.
 9. Log all information into preliminary Site Travel Report.
 10. Return site to normal operations.

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a) **Primary operations and Data collection must successfully run at the site for at least a 5-day, uninterrupted period before the RESET team is able to close-out the visit and return to CONUS.**

11. RESET return to CONUS.
12. Return failed instrument to mentor for repair or replacement.
13. Complete trip report and submit to operations for logging.
14. Operations performs notification procedures.
15. Operations performs OMS logging procedures.

J. Spare Not Available at SNL, (according to OMS):

1. Request the SNL representative to physically check at the spares storage facility to verify if a spare is available.
2. Contact mentor to obtain spare instrument or spare parts for the instrument.
3. Make tentative RESET visit schedule, depending on the arrival of spares.
4. Determine if instrument can be repaired on-site or if there is a need to borrow an instrument from another ARCS. It may be necessary to borrow an instrument from the ARCS system presently in integration, from SGP or from NSA.
5. Go to step I.

V. References:

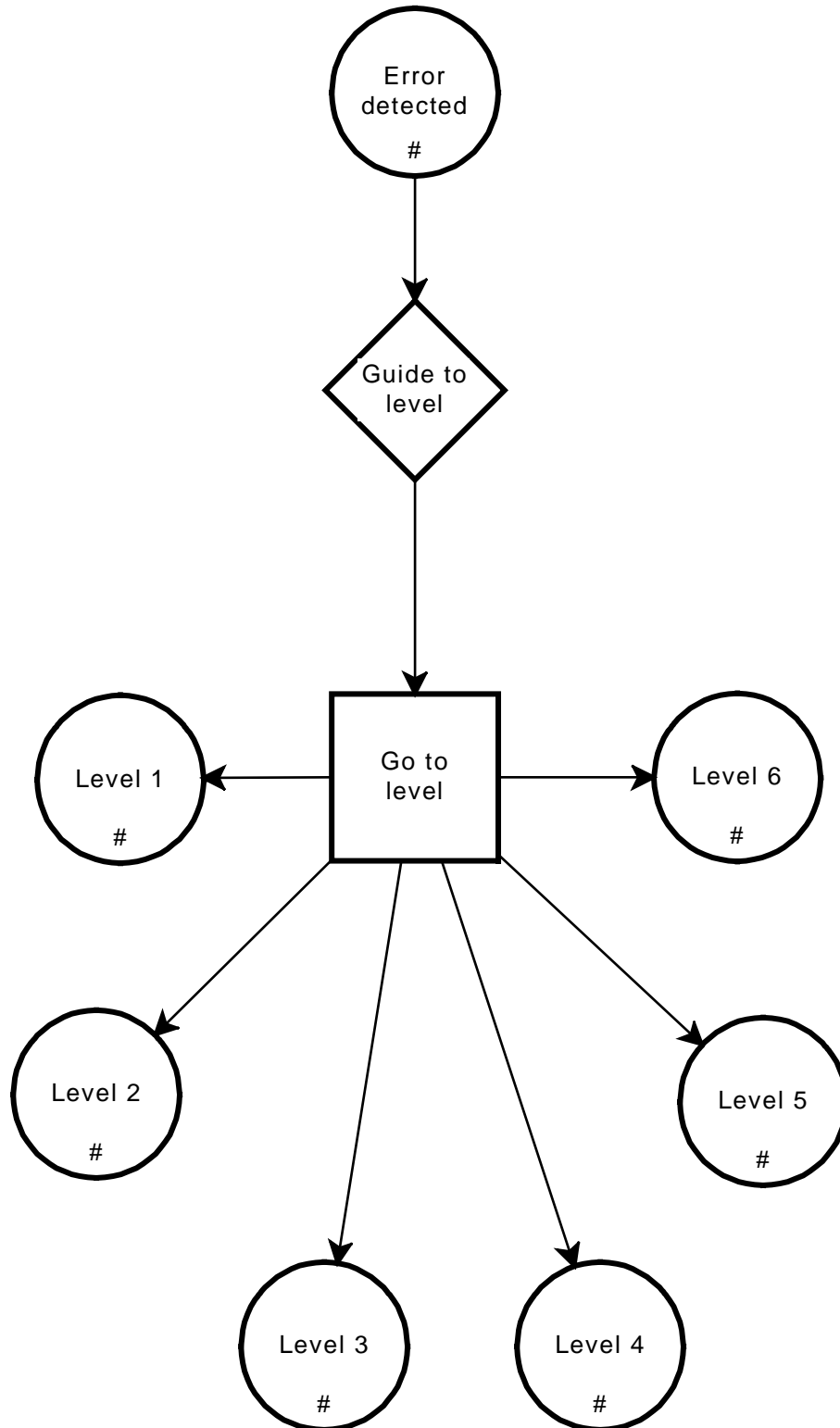
None.

VI. Attachments:

1. ERRLEVL Flowchart.
2. ERRLEVL2 Flowchart.
3. ERRLEVL3 Flowchart.
4. ERRLEVL4-6 Flowchart.
5. ERRLOGB Flowchart.
6. ERRFLO1 Flowchart.
7. ERRFLO2 Flowchart.
8. ERRFLOA Flowchart.
9. Critical Instrument List.

Attachment 1

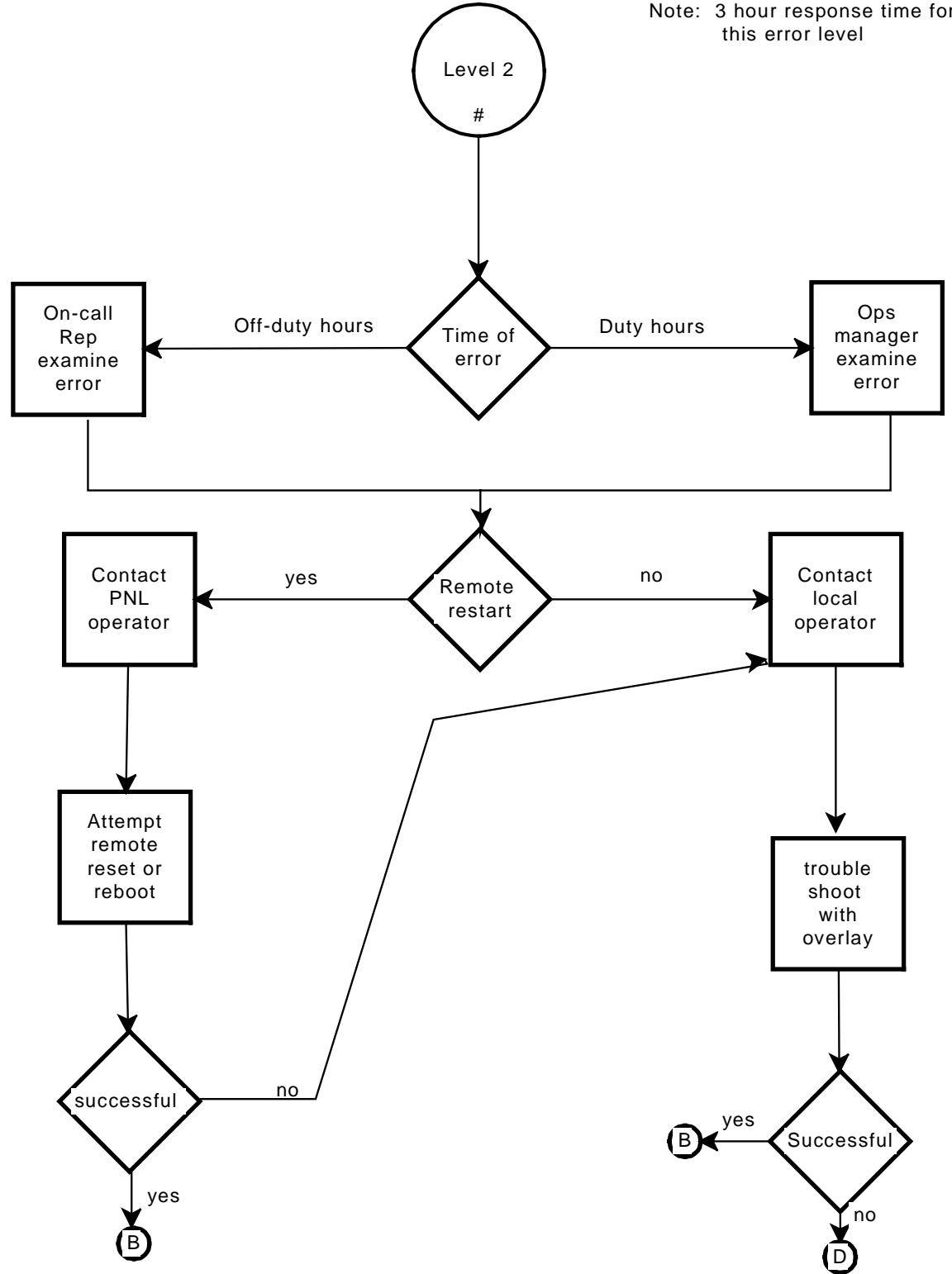
ERRLEVEL



Attachment

ERRLEVEL2

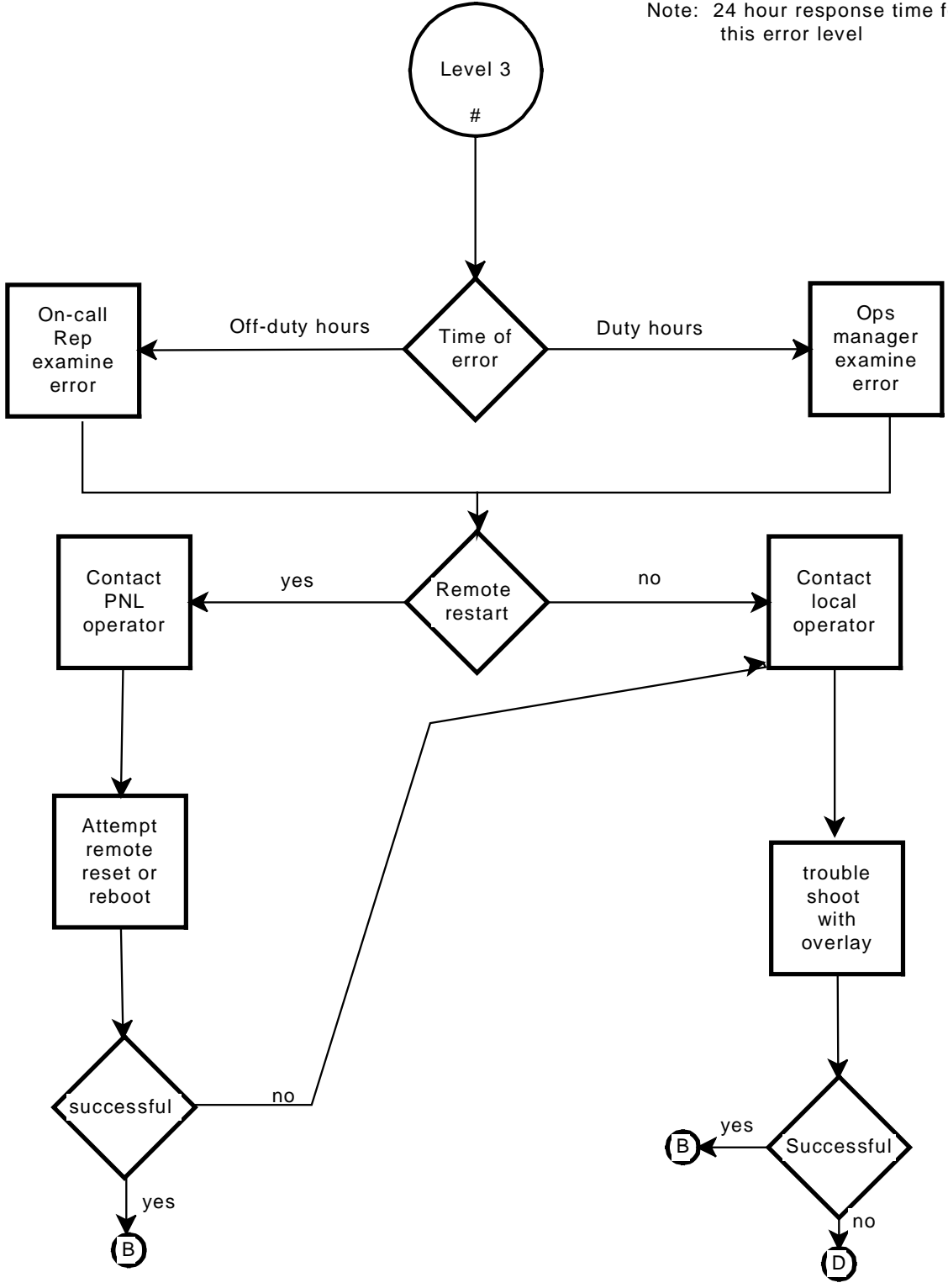
Note: 3 hour response time for this error level



Attachment 3

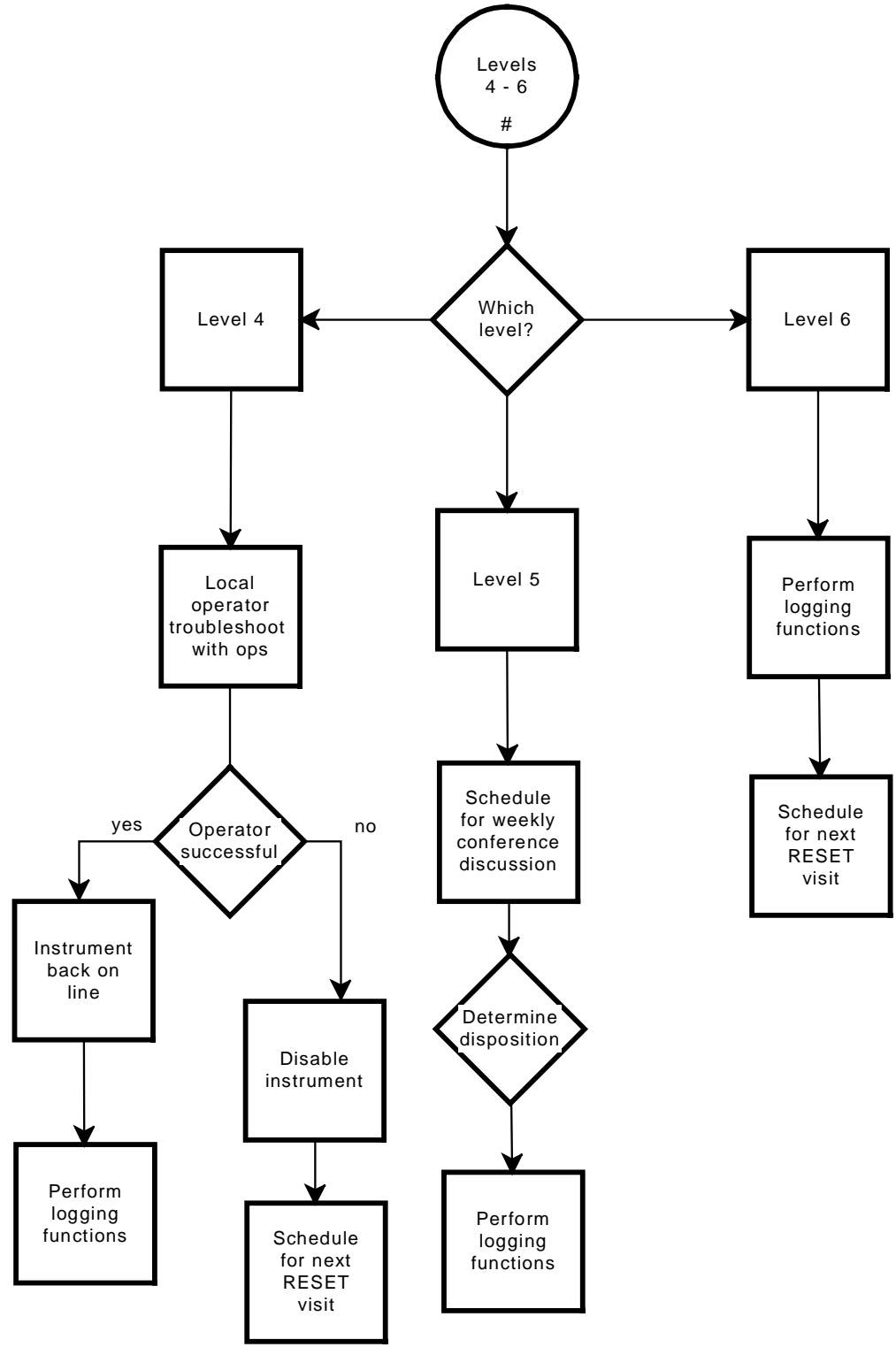
ERRLEVEL3

Note: 24 hour response time for this error level



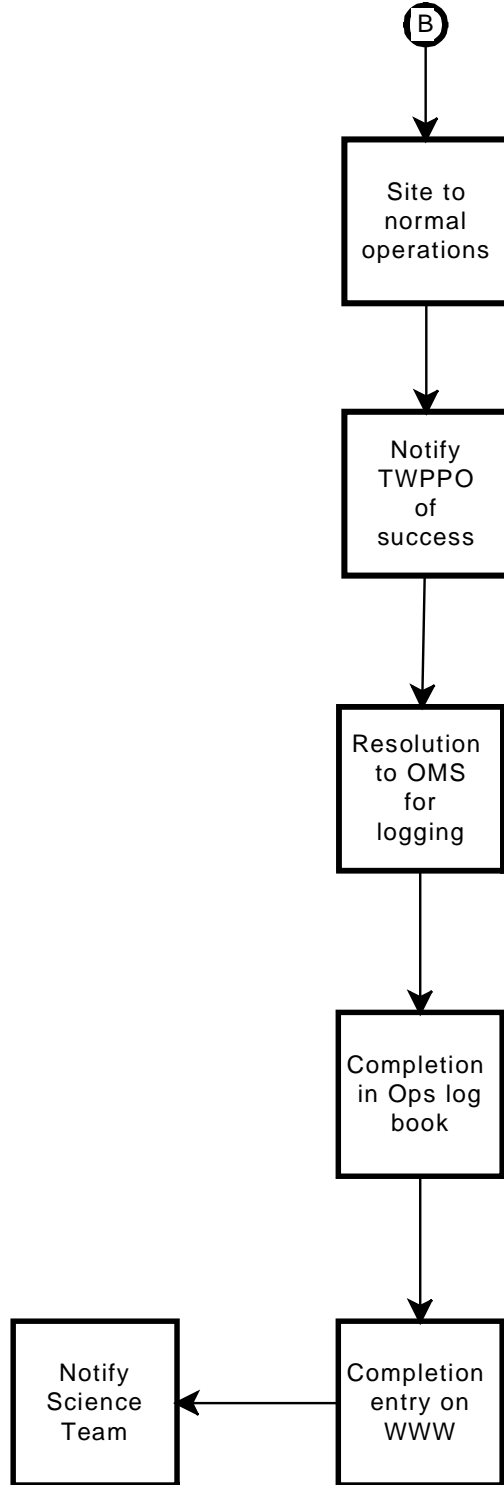
Attachment 4

ERRLEVL4 - 6



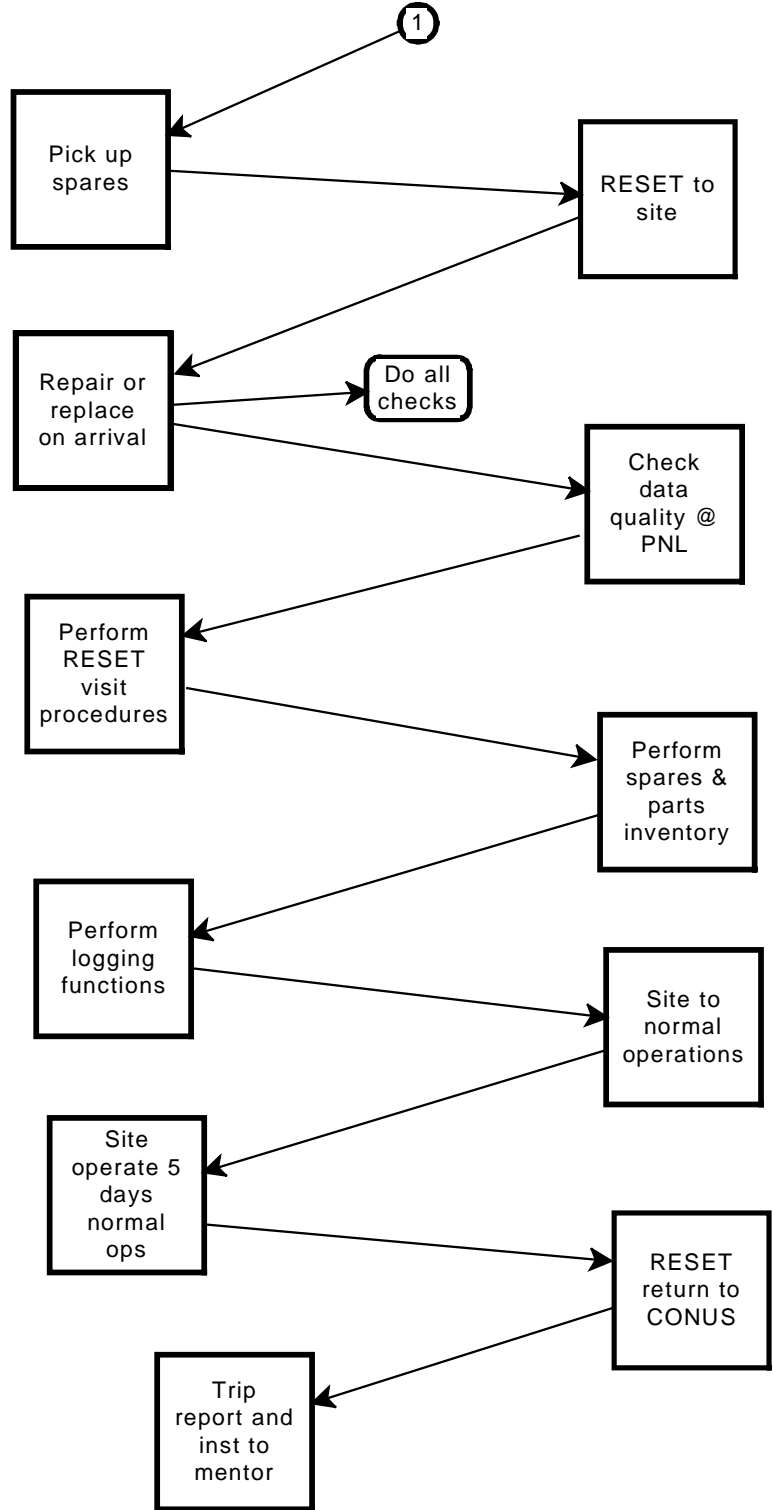
Attachment 5

ERRLOGB



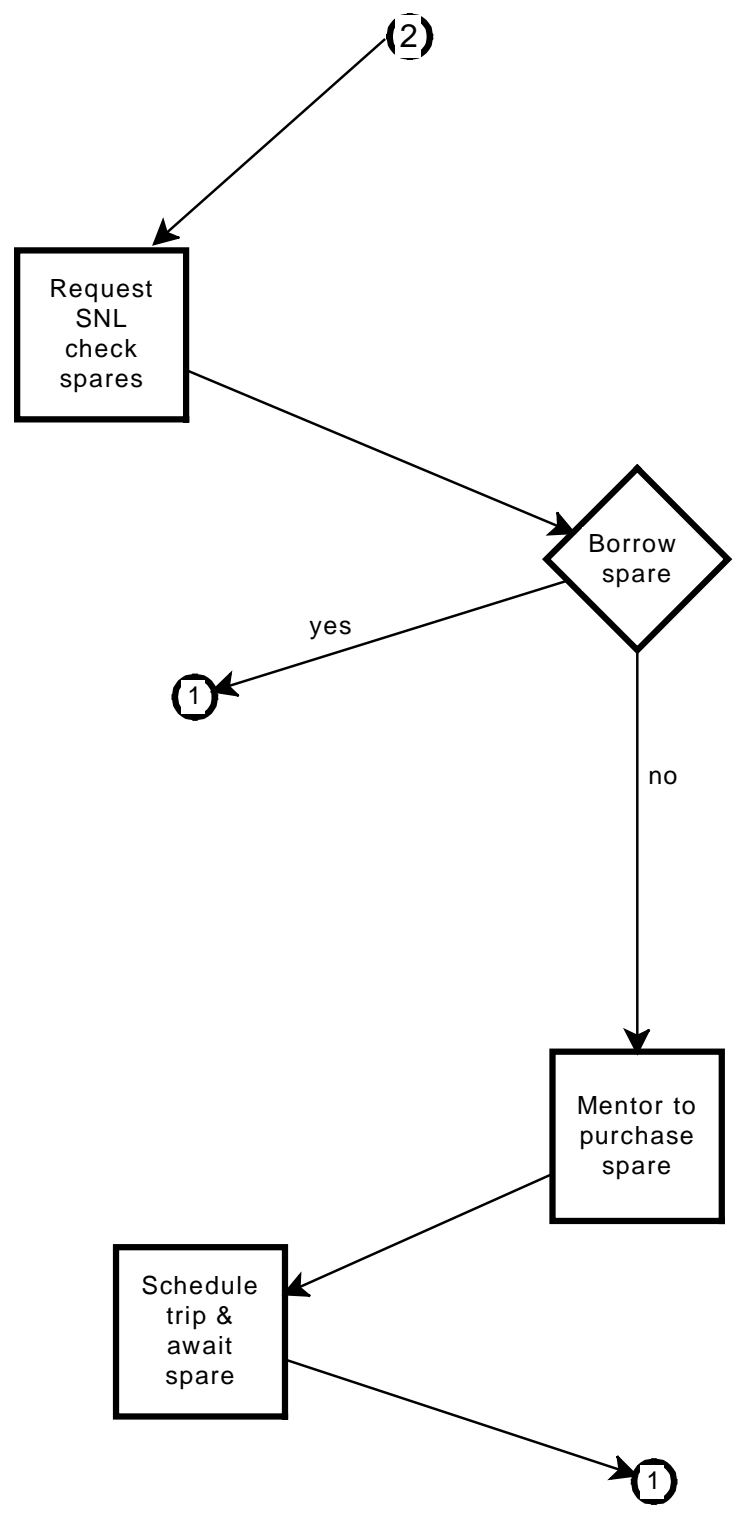
Attachment 6

ERRFLO1



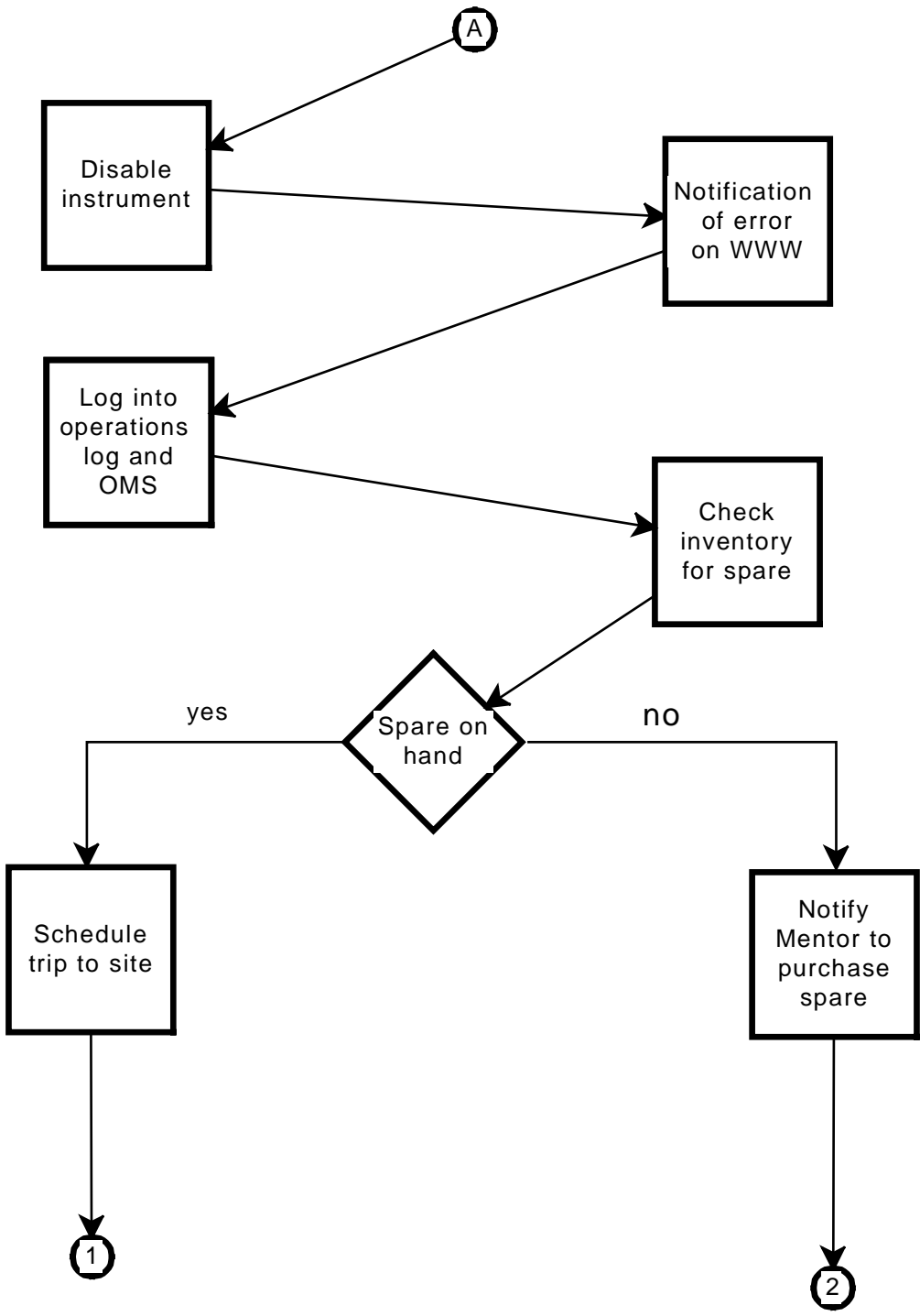
Attachment 7

ERRflo2



Attachment 8

ERRFLOA



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Attachment 9
ARCS-1 SITE CRITICAL INSTRUMENT LIST

I. Purpose:

The purpose of this procedure is to list the instruments that are critical to the operation of the ARCS site. In order to provide the best possible data to the customer, these instruments must be maintained at the highest possible level. This list is to be used in determining the error level to be assigned by the Operations office. It is to be used by the Monitoring personnel to help determine the manner in which to notify operations of an error.

Note: The following list is given in the order of importance of the instrument; the first listed instrument being the most critical of the ARCS instrumentation.

II. Cautions and Hazards:

None.

III. Requirements:

None.

IV. Procedure:

A. Instruments:

1. SKYRAD PSP Unshaded
2. SKYRAD PIR Unshaded
3. Whose Sky Imager (WSI)
4. Micropulse Lidar (MPL) (or Ceilometer if MPL is not operating)
5. Balloon-Borne Sondes
6. Microwave Radiometer (MWR)
7. SKYRAD Infrared Thermometer (IRT)
8. Normal Incidence Pyronometer (NIP)
9. SKYRAD PSP Shaded
10. SKYRAD PIR Shaded
11. Multifunctional Rotating Shadowband Radiometer (MFRSR)

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12. ISS Wind Profiler
13. Optical Rain Gauge (ORG)
14. Ceilometer (CEI) (If MPL is operating)
15. GNDRAD Infrared Thermometer (IRT)
16. GNDRAD PSP
17. GNDRAD PIR
18. Radiometer (NET)
19. Surface Temperature
20. Surface Humidity
21. Surface Wind
22. UVB
23. Surface Pressure

B. System Criticality:

1. ADaM
2. Air Conditioning
3. SKYRAD Datalogger (DAQ)
4. SMET Datalogger (DAQ)
5. GNDRAD Datalogger (DAQ)
6. MFRSR Datalogger (DAQ)
7. MACS/COMS
8. Inter-communications
9. Solar Power
10. Generator Set
11. Grid Power
12. Van Penetration
13. Battery Chargers
14. Batteries
15. Generator fuel/oil

C. ERROR LEVEL GUIDE:

<i>Instrument</i>	<i>Error Indication</i>	<i>Criticality level</i>
Whole Sky Imager (WSI)	No image	Level 2
	Mag tape error	Level 2
	won't boot OS/2	Level 5
	Occultor arm broken	Level 2
Micropulse Lidar (MPL)	Will not lase	Level 2
	No display on computer	Level 3
	Air compressors inoperative	Level 2
	Exterior lens leaking	Level 3
	Sun shades do not drop to cover	Level 2
Micro Wave Radar MWR	Mirrors not rotating	Level 2
	No data output	Level 2
ADaM (DMS)	No raw data tapes	Level 2
	Will not process data	Level 2
	No tape headers	Level 3
MACS/COMS	No GOES messages	Level 3
	No INMARSART 2 message	Level 3
	No transmit or receive indication	Level 3
	Cannot control node units	Level 2
	No instrument indications	
User Interface	Will not present data	Level 5
Data Van A/C	Not cooling	Level 2
	Heater will not turn ON	Level 3
	Thermostat Inoperative	Level 3
GENSET	Will not auto - start	Level 3
	No output voltage	Level 3
	Voltage output too high	Level 3
Datalogger SKYRAD	No Instrument data	Level 2
	No air pressure	Level 4

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	erratic or noisy data	Level 3
Datalogger GNDRAD	Same as SKYRAD	
Datalogger SMET	Same as SKYRAD	
Datalogger Cal		
Infrared Thermometer (IRT)	Data out is bad	Level 2
	Water inside lens (sky)	Level 2
	Erratic data	Level 3
Net Radiometer (NET)	No data out	Level 4
Normal Incidence Pyroheliometer (NIP)	No data out	Level 4
Precision Infrared Radiometer (PIR)	No data out	Level 3
	Water in dome	Level 3
	Cracked dome	Level 3
Optical Rain Gauge (ORG)		
Precision Spectral Radiometer (PSP)	Same as PIR	Same as PIR
MFRSR	Arm not rotating	Level 3
	No data out	Level 3
	Noisy data	Level 4
SMET tower	Tower loose	Level 4
	Tower down	Level 3
	Anemometers misaligned	Level 3
Solar Tracker (TRK)	Not rotating with sun	Level 3
	Shading arm bent	Level 4
	Instrument shades misaligned	Level 4
	Shading arm won't raise	Level 3
Ultraviolet Biometer		
Wind monitors (WND)	Wind speed propeller not	Level 3

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Ceilometer (CEI)	turning Anemometer misaligned	Level 3
Instrument Van A/C	Not cooling Heater will not turn ON Thermostat Inoperative	Level 2 Level 3 Level 3
Expansion Van A/C	Not cooling Heater will not turn ON Thermostat Inoperative	Level 2 Level 3 Level 3
Instrument solar panels	No voltage output	Level 3
Data van solar panels		
Instrument van Lightning suppression		
Data van lightning suppression		
Instrument cabling		
Shore Power measurements		
Node Data units		
Uninterruptable power supplies in data and instrument van		
Security Breach	Fence cut Van broken into Instruments damaged	Level 3 Level 2 Level 2
Personnel Injury	Severe lacerations Broken leg/arm	Level 1 Level 1

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	Bodily injury	Level 1
Site Logistics	Lawnmower broken	Level 5
	Cleaning material shortage	Level 4
	Miscellaneous material shortage	Level 5

ARCS 1 SYSTEM **TOTALLY ON FIRE** ***LEVEL 1***