Arnold Schwarzenegger
Governor

CERTS MICROGRID LABORATORY TEST BED

Test Log

APPENDIX N

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CERTS
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Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
6.1.1.1	3/9/07				S		GWP	LB3:40kW,LB6:40kW,59.86Hz Islanded
6.1.1.2	3/9/07	14:23	6.1.1.3	6.1.1.4, 6.1.1.5	S	14:28	GWP	60.01Hz Connected, Meter 1 52kW, Meter 2 16kW, Meter A1 20kW,
6.1.2.1	3/9/07	14:29	6.1.2.2	6.1.2.3	S	14:35	GWP	
6.1.2.4	3/9/07	14:36	6.1.2.5	6.1.2.6	S	14:37	GWP	Event logger didn't capture 1547 Voltage test, SS indicates that it did occur, Caused CB51 to Under voltage Trip: Recommend Increasing Under voltage delay to 30 cycles
6.1.2.7	3/9/07	14:48	6.1.2.8	6.1.2.9, 6.1.2.10	S	14:49	GWP	Waited 5mins.
6.1.3.1	3/9/07	15:07	6.1.3.2,	6.1.3.3	S	15:08	GWP	Triggered at 3.33kW
6.1.3.4	3/9/07		6.1.3.5	6.1.3.6	S		GWP	
6.1.3.7	3/9/07	3:39	6.1.3.8	6.1.3.9	S	15:40	GWP	
6.1.4.1	3/13/07	9:03	6.1.4.2	6.1.4.3, 6.1.4.4	S	9:11	DAK	LB3:40kW, LB4:40kW, Meter 1 Initial 53kW, Final 18kW, No reverse trip occured

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6.1.4.5	**3/13/07**	**9:12**	**6.1.4.6**	**6.1.4.7, 6.1.4.8**	**S**	**9:17**	**DAK**	**SS opened after second reduction of load in LB3 to 30kW, Status was fault with PES alarm and Anti-islanding Microgrid settings. The EMS Event Logger did record a reverse power event. CB14 did open.**
6.1.4.9	**3/13/07**	**9:18**	**6.1.4.10**	**6.1.4.11**	**S**	**9:29**	**DAK**	**LB3:40kW, LB6:0kW, SS reset successfully, and reconnected after the start command was issued. LB6 was at 0kW load instead of 40kW. Two triggers were captured when one was expected. Test was repeated to confirm that absence of 40kW in LB6 had no effect.**
6.1.4.9	**3/13/07**	**9:42 am**	**6.1.4.10**	**6.1.4.11**	**S**	**9:53**	**DAK**	**LB3:40kW, LB6:40kW, SS reset successfully, and reconnected after the start command was issued. LB6 was confirmed at 40kW. A trigger was noted on reset of the SS prior to the Start command being issued. The SS was issued the start command and successfully closed causing the second trigger.**
6.1.5.1	**3/13/07**	**9:56 am**	**6.1.5.2**		**S**	**9:56**	**DAK**	**LB3:40kW, LB6:40kW**

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:

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6.1.5.3	**3/13/07**	**9:57 am**	**6.1.5.4**	**6.1.5.5**	**S**	**10:02 am**	**DAK**	**SS opened with a PES Alarm. Gen A1 shutdown successfully. DG Side Dead Bus and DG PLL not locked events were active. CB 51 opened when Gen A1 shutdown. SS remained open with a dead bus.**
6.1.5.6	**3/13/07**	**10:04 am**	**6.1.5.7**		**S**	**10:15 am**	**DAK**	**SS was reset to remove PES Alarm. Manual Open removed and SS remained Open. Dead Bus Reclose was Enabled, the SS closed and with all events disappeared.**
6.1.6.1	**4/16/07**	**1:25 pm**	**6.1.6.2**	**6.1.6.3**	**S**	**2:00 pm**	**DAK**	**Loads correct, Genset setup correctly, 59.77Hz prior to close of SS, 60.00Hz after.**
6.1.6.4	**4/16/07**	**2:02 pm**	**6.1.6.5**	**6.1.6.6**	**S**	**2:08 pm**	**DAK**	**Event logger didn't capture Power Quality, Relay2 Trip or IEEE 1547 Voltage Trip, SS indicates that a PQ event did occur. Data collection triggered.**
6.1.6.7	**4/16/07**	**2:13 pm**	**6.1.6.8**	**6.1.6.9, 6.1.6.10**	**S**	**2:18 pm**	**DAK**	**IEEE 1547 Voltage Test shut off after CB1 was reclosed, SS waited 5 mins to reconnect, Data collection was triggered on the SS closure**
7.1.1	**4/23/07**	**12:30 pm**	**7.1.2, 7.1.3**	**7.1.4, 7.1.5**	**S**	**2:00 pm**	**DAK**	
7.1.6	**4/25/07**	**8:30 am**	**7.1.7, 7.1.8**	**7.1.9**	**S**	**10:00 am**	**DAK**	**Found blown fuse on PT 17 Phase B secondary. Corrected Meter CT ratios to correct values instead of x10. Corrected Kep server on EMS to fix readout of MG unit and feeder mode droop settings. Fault key armed.**

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7.1.10	**4/25/07**	**10:01 am**	**7.1.11**	**7.1.12, 7.1.13**		**10:20 am**	**DAK**	**Timer set to 99 secs. Once fault was initiated the meter trigger remained on for the duration of the fault timer. When the protection relays opened due to the tests event their meter triggers were missed because the fault timer remained high. Also the SS and CB41 opened during the test. The SS was not expected to open.**
7.1.6R	**4/27/07**	**9:37 am**	**7.1.7R, 7.1.8R**	**7.1.9R**	**S**	**9:53 am**	**DAK**	**Corrected PLC Trigger wiring and code to allow proper protection triggers during faults. LB4: 60kW, SS closed, Load verified, Fault key armed**
7.1.10R	**4/27/07**	**9:53 am**	**7.1.11R**	**7.1.12R, 7.1.13R**	**S**	**10:10 am**	**DAK**	**Timer set to 99 sec. Fault initiated CB41 opened, Also SS and CB51 Opened**
7.1.19	**4/27/07**	**10:30 am**	**7.1.20**	**7.1.21**	**S**	**11:10 am**	**DAK**	**LB4 : 60kW SS closed, Load verified. Removed phases B and C from within fault load bank. Fault key armed.**
7.1.22	**4/27/07**	**11:10 am**	**7.1.23**	**7.1.24, 7.1.25**	**S**	**11:15 am**	**DAK**	**Timer set to 10 sec. Fault initiated, SS opened, CB41 opened, CB 51 opened.**
7.1.26	**4/27/07**	**12:15 pm**	**7.1.27, 7.1.28**	**7.1.29, 7.1.30**	**S**	**12:40 pm**	**DAK**	**Reconnected all 3 phases within fault load bank**
7.2.1	**4/27/07**	**12:40 pm**	**7.2.2,**	**7.2.4,**	**S**	**12:45 pm**	**DAK**	**Moved fault load bank to Zone 3.**

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			7.2.3	7.2.5				Fault key armed.
7.2.6	4/27/07	12:45 pm	7.2.7, 7.2.8	7.2.9	S	12:49 pm	DAK	LB3: 60kW, LB4: 60kW, SS closed, Load verified
7.2.10	4/27/07	12:49 pm	7.2.11	7.2.12, 7.2.13	S	12:57 pm	DAK	Timer set to 99 sec. Fault initiated, SS opened, CB31 did not open, CB51 opened. Relay 2 appears to be causing the SS to open. The SS seems to open when the fault breaker opens, there may be a large transient associated with this which causes the SS to open.
7.2.14	4/27/07	12:58 pm	7.2.15, 7.2.16	7.2.17, 7.2.18	S	1:10 pm	DAK	Disconnected phases A and C from fault load bank.

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
7.2.19	4/27/07	1:25 pm	7.2.20	7.2.21	S	1:33 pm	DAK	LB3: 60kW, LB4: 60kW, SS closed, Load verified
7.2.22	4/27/07	1:33 pm	7.2.23	7.2.24, 7.2.25	S	1:40 pm	DAK	Timer set to 10 sec. Fault initiated, SS opened, CB31 did not open, CB51 opened, CB41 did not open
7.2.26	4/27/07	1:40 pm	7.2.27, 7.2.28	7.2.29, 7.2.30	S	1:55 pm	DAK	Phases A and C reconnected within fault load bank and fault load bank removed from Zone 3

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7.3.1	**4/30/07**	**12:30 pm**	**7.3.2, 7.3.3**	**7.3.4, 7.3.5**	**S**	**12:35 pm**	**DAK**	**Fault load bank moved to zone 5. All three phases connected within fault load bank.**
7.3.6	**4/30/07**	**12:35 pm**	**7.3.7, 7.3.8**	**7.3.9**	**S**	**12:39 pm**	**DAK**	**LB5: 60kW, SS closed, Load verified.**
7.3.10	**4/30/07**	**12:39 pm**	**7.3.11**	**7.3.12, 7.2.13**	**S**	**12:53 pm**	**DAK**	**Timer set to 99 sec. Fault key armed. Fault initiated. SS opened, CB51 opened. CB41 and CB31 remained closed. EMS event log shows Reverse power as reason for SS opening.**
7.3.14	**4/30/07**	**12:53 pm**	**7.3.15, 7.3.16**	**7.3.17, 7.3.18**	**S**	**1:05 pm**	**DAK**	**Phases A and B were removed within the fault load bank.**
7.3.19	**4/30/07**	**1:20 pm**	**7.3.20**	**7.3.21**	**S**	**1:25 pm**	**DAK**	**LB5: 60kW, SS closed, Load verified.**
7.3.22	**4/30/07**	**1:25 pm**	**7.3.23**	**7.3.24, 7.3.25**	**S**	**1:32 pm**	**DAK**	**Timer set to 10 sec. Fault key armed. Fault initiated. SS opened. CB51 opened. CB31 and CB41 remained closed. EMS event logger shows SS opened due to relay 2.**
7.3.26	**4/30/07**	**1:32 pm**	**7.3.27, 7.3.28**	**7.3.29, 7.3.30**	**S**	**1:45 pm**	**DAK**	**Fault load bank was removed from zone 5.**
7.1.1R	**7/06/07**	**9:00 am**	**7.1.2R, 7.1.3R**	**7.1.4R, 7.1.5R**	**S**	**9:07 am**	**DAK**	
7.1.6R	**7/06/07**	**9:07 am**	**7.1.7R, 7.1.8R**	**7.1.9R**	**S**	**9:13 am**	**DAK**	**Fault key armed. Dead Bus close successful. LB4: 60kW.**

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7.1.10R	**7/06/07**	**9:13 am**	**7.1.11R**	**7.1.12R, 7.1.13R**	**S**	**9:26 am**	**DAK**	**Timer set to 99 secs. Fault initiated. CB41 opened. The SS opened from relay 2 and was not expected to open. CB 51 also opened after the SS opened.**

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
								The ground over-current and neutral over-current have all been delayed 2 cycles from original settings. Note the negative sequence trip for relay 2 had previously and continues to be delayed 8 cycles due to problems from the inrush when dead bus energizing the microgrid.
7.1.1R	**7/11/07**	**9:20 am**	**7.1.2R, 7.1.3R**	**7.1.4R, 7.1.5R**	**S**	**9:24 am**	**DAK**	
7.1.6R	**7/11/07**	**9:24 am**	**7.1.7R, 7.1.8R**	**7.1.9R**	**S**	**9:27 am**	**DAK**	**Fault key armed. Dead Bus close successful. LB4: 60kW.**
7.1.10R	**711/07**	**9:27 am**	**7.1.11R**	**7.1.12R, 7.1.13R**	**S**	**9:35 am**	**DAK**	**Timer set to 99 secs. Fault initiated. CB41 opened. The SS opened from Reverse Power. CB 51 also opened after the SS opened. The test procedure was modified to add a small load in LB6 to prevent**

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								reverse power trips. Changed SS reverse power setting to zero.
7.1.1R	**7/11/07**	**10:38: am**	**7.1.2R, 7.1.3R**	**7.1.4R, 7.1.5R**	**S**	**10:40 am**	**DAK**	
7.1.6R	**7/11/07**	**10:40 am**	**7.1.7R, 7.1.8R**	**7.1.9R**	**S**	**10:42am**	**DAK**	**Fault key armed. Dead Bus close successful. LB4: 60kW. LB6:10kW.**
7.1.10R	**711/07**	**10:42 am**	**7.1.11R**	**7.1.12R, 7.1.13R**	**S**	**10:50 am**	**DAK**	**Timer set to 99 secs. Fault initiated. CB41 opened. The SS and CB 51 remained closed as expected.**
7.1.19R	**711/07**	**11:47: am**	**7.1.20R**	**7.1.21R**	**S**	**11:51 am**	**DAK**	**LB4:60kW LB6:10kW SS closed, Load verified. Removed phases B and C from within fault load bank. Fault key armed.**
7.1.22R	**7/11/07**	**11:51 am**	**7.1.23R**	**7.1.24R, 7.1.25R**	**S**	**12:00 pm**	**DAK**	**Timer set to 10 sec. Fault initiated, SS opened from a relay 2 trip, CB 51 opened after SS. CB41 remained closed.**
7.1.26R	**7/11/07**	**12:00 pm**	**7.1.27R, 7.1.28R**	**7.1.29R, 7.1.30R**	**S**	**12:15 pm**	**DAK**	**Reconnected all 3 phases within fault load bank**
7.2.1R	**7/11/07**	**12:15 pm**	**7.2.2R, 7.2.3R**	**7.2.4R, 7.2.5R**	**S**	**12:20 pm**	**DAK**	**Moved fault load bank to Zone 3. Fault key armed.**
7.2.6R	**7/11/07**	**12:20 pm**	**7.2.7R, 7.2.8R**	**7.2.9R**	**S**	**12:24 pm**	**DAK**	**LB3: 60kW, LB4: 60kW, LB6:10kW SS closed, Load verified**
7.2.10R	**7/11/07**	**12:24 pm**	**7.2.11R**	**7.2.12R,**	**S**	**12:34 pm**	**DAK**	**Timer set to 99 sec. Fault initiated, No protection**

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				7.2.13R				operated. The overload is likely to small to trip the protection. The trip point for breaker 3 is 225A and we were just below that at 216A.
7.2.1R	7/11/07	1:10 pm	7.2.2R, 7.2.3R	7.2.4R, 7.2.5R	S	1:12 pm	DAK	Moved fault load bank to Zone 3. Fault key armed.
7.2.6R	7/11/07	1:12 pm	7.2.7R, 7.2.8R	7.2.9R	S	1:15 pm	DAK	LB3: 75kW, LB4: 75kW, LB6:10kW SS closed, Load verified
7.2.10R	7/11/07	1:15 pm	7.2.11R	7.2.12R, 7.2.13R	S	1:30 pm	DAK	Timer set to 99 sec. Fault initiated, CB 31 opened. SS, CB41, and CB51 remained closed.
7.2.14R	7/11/07	1:30 pm	7.2.15R, 7.2.16R	7.2.17R, 7.2.18R	S	1:45 pm	DAK	Disconnected phases A and C from fault load bank.
7.2.19R	7/11/07	1:45 pm	7.2.20R	7.2.21R	S	2:01 pm	DAK	LB3: 60kW, LB4: 60kW, SS closed, Load verified
7.2.22R	7/11/07	2:01 pm	7.2.23R	7.2.24R, 7.2.25R	S	2:10 pm	DAK	Timer set to 10 sec. Fault initiated, SS opened, all other breakers remained closed.
7.2.26R	711/07	2:10 pm	7.2.27R, 7.2.28R	7.2.29R, 7.2.30R	S	2:25 pm	DAK	Phases A and C reconnected within fault load bank and fault load bank removed from Zone 3
7.3.1R	7/18/07	10:34 am	7.3.2R, 7.3.3R	7.3.4R, 7.3.5R	S	10:35 am	DAK	Fault load bank moved to zone 5. All three phases connected within fault load bank.
7.3.6R	7/18/07	10:35 am	7.3.7R, 7.3.8R	7.3.9R	S	10:37 am	DAK	LB5: 60kW, SS closed, Load verified.
7.3.10R	7/18/07	10:37 am	7.3.11R	7.3.12R, 7.2.13R	S	10:43 am	DAK	Timer set to 99 sec. Fault key armed. Fault initiated.

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								CB51 opened. The SS, CB41 and CB31 remained closed.
7.3.14R	**7/18/07**	**11:48 am**	**7.3.15R, 7.3.16R**	**7.3.17R, 7.3.18R**	**S**	**11:50 am**	**DAK**	**Phases A and B were removed within the fault load bank.**
7.3.19R	**7/18/07**	**11:50 am**	**7.3.20R**	**7.3.21R**	**S**	**11:52 am**	**DAK**	**LB5: 60kW, SS closed, Load verified.**
7.3.22R	**7/18/07**	**11:52 am**	**7.3.23R**	**7.3.24R, 7.3.25R**	**S**	**12:02 pm**	**DAK**	**Timer set to 10 sec. Fault key armed. Fault initiated. CB51 opened. The SS, CB31 and CB41 remained closed.**
7.3.26R	**7/18/07**	**12:02 pm**	**7.3.27R, 7.3.28R**	**7.3.29R, 7.3.30R**	**S**	**12:10 pm**	**DAK**	**Fault load bank was removed from zone 5.**
7.4.1	**7/30/07**	**9:49 am**	**7.4.2 7.4.3**	**7.4.4 7.4.5**	**S**	**10:10 am**	**DAK**	**Fault load connected, armed, and verified.**
7.4.6	**7/30/07**	**10:10 am**	**7.4.7, 7.4.8**	**7.4.9**	**S**	**10:18 am**	**DAK**	**SS Open, Gensets setup and verified. Loads connected and verified**
7.4.10	**7/30/07**	**10:18 am**	**7.4.11**	**7.4.12**	**S**	**11:55 am**	**DAK**	**Genset A1 connected at 10:25. Genset A2 connected at 10:31, causing CB41 to open and shutdown A2. Genset A1 remained online serving zones 2,3, and 5. The primary side fuses of PT42 were found blown. The primary and secondary fuses were swapped on the PT and new fuses were installed. CB41 was reclosed without triggering and the test sequence was picked up where we left off.**

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								Genset A2 was restarted and successfully connected at 11:42. SS was enabled and connected at 11:48
7.4.13	**7/30/07**	**11:55 am**	**7.4.14, 7.4.15**	**7.4.16**	**S**	**1:00 pm**	**DAK**	**Fault timer at 99 sec. LB4 was increased to 65kW due to load drift and generation offset. This was done to insure enough load to trip CB41 under overload. The fault was applied at 11:55 am. Gen A1 tripped off on a low oil pressure alarm which appears as a false alarm. LB4 was reduced to 0 to prevent CB41 from opening and causing another trigger. Genset A1 was checked and restarted. Once started Genset A1 seemed to operate well off its RPM range. Tecogen was contacted.**
7.4.1R	**7/31/07**	**8:45 am**	**7.4.2R, 7.4.3R**	**7.4.4R, 7.4.5R**	**S**	**9:01 am**	**DAK**	**Fault load connected, armed, and verified.**
7.4.6R	**7/31/07**	**9:01 am**	**7.4.7R, 7.4.8R**	**7.4.9R**	**S**	**9:09 am**	**DAK**	**SS Open, Gensets setup and verified. Genset A2 changes its Power Flow mode to "0" constantly, even though the Microgrid Control Status returns unit control mode. Loads connected and verified**
7.4.10R	**7/31/07**	**9:09 am**	**7.4.11R**	**7.4.12R**	**S**	**10:00 am**	**DAK**	**Genset A1 connected at 9:15. Genset A2 connected at 9:20, causing CB41 to open and shutdown A2. Genset A1 remained online serving zones 2,3, and 5. The secondary side phase A fuse of PT42 was found blown. A new fuse was installed. CB41 was reclosed, triggering a capture at 9:33 am and the test**

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								sequence was picked up where we left off. Genset A2 was restarted and successfully connected at 9:49. SS was enabled and connected at 9:55.
7.4.13R	**7/31/07**	**10:00 am**	**7.4.14R, 7.4.15R**	**7.4.16R**	**S**	**10:03 am**	**DAK**	**Fault timer at 99 sec. LB4 was increased to 65kW due to load drift and generation offset. This was done to insure enough load to trip CB41 under overload. The fault was applied at 10: 01am. CB41 opened tripping off Genset A2. The SS opened shortly afterwards on a reverse power trip. CB31 and CB51 remained closed and Genset A1 remained online serving the remaining load.**
7.4.17	**7/31/07**	**10:03 am**			**S**	**10:08am**	**DAK**	**Genset A1 was shutdown causing CB51 to open on undervoltage trip at 10:03**
7.5.1	**7/31/07**	**11:27 am**	**7.5.2, 7.5.3**	**7.5.4, 7.5.5, 7.5.6**	**S**	**11:28 am**	**DAK**	**Fault load connected and verified. Fault key armed.**
7.5.7	**7/31/07**	**11:28 am**	**7.5.8**	**7.5.9**	**S**	**11:29 am**	**DAK**	**LB3: 40kW, LB6:40kW**
7.5.10	**7/31/07**	**11:29 am**	**7.5.11**	**7.5.12**	**S**	**11:41 am**	**DAK**	**Genset A1 connected at 11:32, SS connected at 11:37. Meter1:51kW, Meter2:15kW**
7.5.13	**7/31/07**	**11:41 am**	**7.5.14, 7.5.15**	**7.5.16**	**S**	**11:59 am**	**DAK**	**Fault timer set to 10 sec. SS opened by relay 2 trip, CB31 opened and Genset A1 shutdown. CB51 opened on undervoltage. Ignore accidentally created event at 11:44. Meter1:36kW, Meter2:0kW**
7.5.17	**7/31/07**	**11:59 am**			**S**	**12:02 pm**	**DAK**	

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7.6.1	**7/31/07**	**12:02 pm**	**7.6.2**	**7.6.3**	**S**	**12:10 am**	**DAK**	**Gensets A1 and A2 setup. Fault key armed.**
7.6.4	**7/31/07**	**12:10 pm**	**7.6.5**	**7.6.6, 7.6.7**	**S**	**12:23 pm**	**DAK**	**Triggers disabled, Genset A1 connected at 12:15, Genset A2 connected at 12:19. LB3:40kW, LB4:40kW, LB6:40kW. SS connected at 12:22. Meter1:69kW, Meter2:35kW. Triggers armed**
7.6.8	**7/31/07**	**12:23 pm**	**7.6.9, 7.6.10**	**7.6.11**	**S**	**12:30 pm**	**DAK**	**Fault timer set to 10 sec Fault initiated at 12:25. SS opened, CB31 opened, CB41 Opened, and CB51 opened. Gensets A1 and A2 shutdown. Meter1:36kW, Meter2:0kW**

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
7.6.12	**7/31/07**	**12:30**			**S**	**12:35 pm**	**DAK**	
								Test 7.7 and 7.8 were skipped on 7/31/07 because Genset B1 was not operational and replacement parts had not yet arrived. Replacement parts installed 8/7/07
7.7.1	**8/7/07**	**9:22 am**	**7.7.2, 7.7.3**	**7.7.4, 7.7.5, 7.7.6**	**S**	**9:30 am**	**DAK**	**Fault load verified and connected, Fault key armed**
7.7.7	**8/7/07**	**9:30 am**	**7.7.8**	**7.7.9**	**S**	**9:37 am**	**DAK**	**LB3:40kW, LB6:40kW, Genset B1 setup**

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7.7.10	**8/7/07**	**9:37 am**	**7.7.11**	**7.7.12**	**S**	**9:56 am**	**DAK**	**Genset connected at 9:55 with SS shortly after in same trigger Meter1:52kW Meter2:16kW**
7.7.13	**8/7/07**	**9:56 am**	**7.7.14, 7.7.15**	**7.7.16**	**S**	**10:15 am**	**DAK**	**Fault armed, Fault triggered at 10:09. CB51 opened and Genset B1 shutdown. SS and remaining breakers remained closed.**
7.7.17	**8/7/07**	**10:15 am**			**S**	**10:20 am**	**DAK**	
7.8.1	**8/7/07**	**11:20 am**	**7.8.2**	**7.8.3**	**S**	**11:22 am**	**DAK**	**Breakers closed, Fault key armed.**
7.8.4	**8/7/07**	**11:23 am**	**7.8.5**	**7.8.6, 7.8.7**	**S**	**11:42 am**	**DAK**	**Gensets started, LB3:40kW, LB4:40kW, LB6:40kW SS connected, Meter1:61kW, Meter2:26kW. Note while starting the gensets the SS was left in a disconnect state with manual open asserted. After starting the gensets the SS was found to be in the OFF state. This happened a few times before it would remain in the disconnect state reliable for a period of time. There were no alarms present during this process.**
7.8.8	**8/7/07**	**11:42 am**	**7.8.9, 7.8.10**	**7.8.11**	**S**	**11:47 am**	**DAK**	**Fault timer at 10 sec. Fault triggered at 11:44. CB51 opened and Genset B1 shutdown. SS and remaining breakers remained closed. Meter1:83kW, Meter2:49kW**
7.8.12	**8/7/07**	**11:47 am**			**S**	**12:00 pm**	**DAK**	**Triggers disabled. Before we were able to shutdown the Genset A1 and remove the loads, the Genset shut itself down on a No Field Fault and the SS opened with a PES SCR Failure alarm. From the**

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								relay files it appears that the SS opened first on an SCR alarm, then Genset A1 shutdown due to the overload that remained.
7.9.1	**7/31/07**	**12:36 pm**	**7.9.2, 7.9.3**	**7.9.4, 7.9.5, 7.9.6**	**S**	**12:42 pm**	**DAK**	**Fault load verified, key armed, All breakers closed.**
7.9.7	**7/31/07**	**12:42 pm**	**7.9.8**	**7.9.9**	**S**	**12:49 pm**	**DAK**	**Gensets setup, Triggers disabled, Genset A1 connected at 12:46. Genset A2 connected at 12:48**

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
7.9.10	**7/31/07**	**12:49 pm**	**7.9.11**	**7.9.12**	**S**	**12:55 pm**	**DAK**	**LB3:40kW, LB4:40kW, LB6:40kW, SS connected at 12:54. Meter1:71kW, Meter2:36kW**
7.9.13	**7/31/07**	**12:55 pm**	**7.9.14**	**7.9.15, 7.9.16**	**S**	**1:05 pm**	**DAK**	**Triggers enabled Fault timer set to 10 sec. Fault initiated at 12:57. SS, CB12, and CB51 opened. Genset A1 and A2 shutdown with Skipp 1 faults. CB12 only opens under manual command or under high instantaneous fault current from the utility. This was not the expected outcome of this test.**
7.9.1R	**7/31/07**	**1:35 pm**	**7.9.2R,**	**7.9.4R,**	**S**	**1:42 pm**	**DAK**	**Fault load verified, key armed, All breakers closed.**

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			7.9.3R	7.9.5R, 7.9.6R				
7.9.7R	7/31/07	1:42 pm	7.9.8R	7.9.9R	S	1:47 pm	DAK	Gensets setup, Triggers disabled, Genset A1 connected at 1:44. Genset A2 connected at 1:47
7.9.10R	7/31/07	1:47 pm	7.9.11R	7.9.12R	S	1:51 pm	DAK	LB3:40kW, LB4:40kW, LB6:40kW, SS connected at 1:50. Meter1:69kW, Meter2:34kW
7.9.13R	7/31/07	1:51 pm	7.9.14R	7.9.15R, 7.9.16R	S	2:08 pm	DAK	Triggers enabled. Fault timer set to 10 sec. Fault initiated at 12:57. SS opened, CB41 opened. Genset A2 shutdown. CB31 and CB51 remained closed, Genset A1 remained online serving the remaining load. The SS then reclosed. Also of note even those the fault timer was set to 10 seconds the fault remained on for approximately 1.5 mins. A check needs to be made to determine of the fault timers are working properly.
7.9.17	7/31/07	2:08 pm			S	2:12 pm	DAK	
7.10.1	8/7/07	12:10 pm	7.10.2, 7.10.3	7.10.4, 7.10.5, 7.10.6	S	12:39 pm	DAK	Fault load verified and connected, Fault key armed
7.10.7	8/7/07	12:39 pm	7.10.8	7.10.9	S	12:46 pm	DAK	SS continues to put itself in an OFF state without being commaneded to do so. Gensets started at 12:45
7.10.10	8/7/07	12:46 pm	7.10.11	7.10.12	S	12:48 pm	DAK	LB3:40kW, LB4:40kW, LB6:40kW SS closed at

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								12:47. Meter1:71kW, Meter2:35kW
7.10.13	**8/7/07**	**12:48 pm**	**7.10.14, 7.10.15**	**7.10.16**	**S**	**12:55 pm**	**DAK**	**Fault timer set to 10 sec. Fault initiated at 12:49. SS, CB31, and CB51 opened, Gensets A1 and B1 shutdown.**
7.10.17	**8/7/07**	**12:55 pm**			**S**	**1:05 pm**	**DAK**	
7.11.1	**8/15/07**	**11:32 am**	**7.11.2, 7.11.3**	**7.11.4, 7.11.5, 7.11.6**	**S**	**12:34 pm**	**DAK**	**Fault load verified and connected, Fault key armed.**
7.11.7	**8/15/07**	**12:34 pm**	**7.11.8**	**7.11.9**	**S**	**12:36 pm**	**DAK**	**Genset A1 was found non responsive to the EMS system. An open fuse on the 208V control power feed was found and replaced. The control power battery with the genset was found to be below 6V due to a prolonged power outage. After refusing the battery was allowed to charge for 2 hours before testing was attempted. LB3:40kW, LB6:40kW**
7.11.10	**8/15/07**	**12:36 pm**	**7.11.11**	**7.11.12**			**DAK**	**Genset faulted on a "DC Undervoltage fault". Genset fault cleared and restarted. It was found that due to the significant depletion of the control battery the genset was not able to remain operational. It was decided to allow the battery to continue to charge overnight and to test at a later date.**
7.11.1R	**8/20/07**	**12:20 pm**	**7.11.2, 7.11.3**	**7.11.4, 7.11.5,**	**S**	**12:26 pm**	**DAK**	**Genset A1 was test run successfully prior to beginning this testing.**

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				7.11.6				Fault load verified and connected, Fault key armed.
7.11.7R	8/20/07	12:26 pm	7.11.8	7.11.9	S	12:29 pm	DAK	LB3:40kW, LB6:40kW
7.11.10R	8/20/07	12:29 pm	7.11.11	7.11.12	S	12:32 pm	DAK	Genset A1 connected at 12:30, SS closed at 12:31. Meter1:55kW, Meter2:19kW
7.11.13	8/20/07	12:32 pm	7.11.14, 7.11.15	7.11.16	S	12:48 pm	DAK	Triggers set, Fault timer to 99 sec, Fault initiated at 12:38. SS tripped open by relay 2, Check to confirm that the SS should have opened, After the SS opened there was a short delay,~20 sec and the SS attempted to reconnect. The SS faulted during the reconnect showing the "Fault" state and "PES Alarm". The applied fault continued in Zone 6. After 99 seconds the Zone 6 fault was removed by the PLC and CB13 remained closed. It is believed there was not enough load to trip the CB13 breaker. The C phase current was measured at 135A during the fault.
7.11.1R	8/20/07	12:48:pm	7.11.2, 7.11.3	7.11.4, 7.11.5, 7.11.6	S	12:52 pm	DAK	Additional load was added to LB6 to increase the current on CB13. Fault load verified and connected, Fault key armed.
7.11.7R	8/20/07	12:52 pm	7.11.8	7.11.9	S	12:55 pm	DAK	LB3:40kW, LB6:60kW
7.11.10R	8/20/07	12:55 pm	7.11.11	7.11.12	S	1:00 pm	DAK	Genset A1 remained running from above, The SS was reset clearing the fault and closed at 12:59. Meter1:71kW, Meter2:18kW
7.11.13R	8/20/07	1:00 pm	7.11.14, 7.11.15	7.11.16	S	1:08 pm	DAK	Triggers set, Fault timer to 99 sec, Fault initiated at 1:02. SS opened from relay 2 and faulted. Fault was

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								the control state and the status was PES Alarm. CB13 opened a short while later followed by K62, the fault breaker. Genset A1 did increase and picked up the entire load in Zone 3.
7.11.17	**8/20/07**	**1:08 pm**			**S**	**1:10 pm**	**DAK**	

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
7.12.1	**8/20/07**	**1:10 pm**	**7.12.2, 7.12.3**	**7.12.4**	**S**	**1:28 pm**	**DAK**	**Fault load verified and Fault key armed, Gensets A1 and B1 started first prior to load to make sure generation was greater than load. Genset A1 still running from above, Genset B1 connected at 1:28. LB3:40kW, LB5:40kW, LB6:60kW**
7.12.5	**8/20/07**	**1:28 pm**	**7.12.6**	**7.12.7**	**S**	**1:45 pm**	**DAK**	**SS placed itself in the OFF state position. Reset and Start commands resulted in TEST state followed by OFF state. While troubleshooting the SS both Genset A1 and B1 shut down. A1 showed a No Field Signal, which in the past has meant overload, and Genset B1 showed an External Trip. As the Meter triggers were disabled only the relay files may be of**

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								use.
7.12.1R	**8/20/07**	**1:45 pm**	**7.12.2, 7.12.3**	**7.12.4**	**S**	**2:00 pm**	**DAK**	**Fault load verified and Fault key armed, Gensets A1 and B1 started first prior to load to make sure generation was greater than load. Genset A1 still running from above, Genset B1 connected at 1:28. LB3:40kW, LB5:40kW, LB6:60kW**
7.12.5R	**8/20/07**	**2:00 pm**	**7.12.6**	**7.12.7**	**S**	**2:45 pm**	**DAK**	**SS placed itself in the OFF state position. Reset and Start commands resulted in TEST state followed by OFF state. While troubleshooting the SS both Genset A1 and B1 shut down. A1 showed a No Field Signal, which in the past has meant overload, and Genset B1 showed an External Trip. As the Meter triggers were disabled only the relay files may be of use. We were not able to get the SS to function properly and are waiting for further assistance from the team.**
								The source of the SS problem was found to be an 24v input module between the NPS DSP and the SandC SS. The enable input component was replaced within the SandC SS and the SS was returned to normal operation.
7.12.1R2	**9/05/07**	**12:15 pm**	**7.12.2, 7.12.3**	**7.12.4**	**S**	**1:35 pm**	**DAK**	**Fault load verified and Fault key armed. The SS was returned to normal service however Genset A1 would not operate correctly. At first the generator would attempt to start and then give a**

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								Ground/External fault. After checking the signaling between Relay 3 and the genset all connections and signals appeared to be correct. Relay 3's contact responsible for shutting the generator off was cycled a few times and the generator was started successfully. However before the inverter connected to the microgrid a DC Low Fault was issued. Repeated attempts to reset and restart were unsuccessful with the same DC Low Fault being issued each time. Youtility was contacted.
	9/7/07	**12:00 pm**				**12:45 pm**	**DAK**	**After talking to Youtility is was decided to measure the bus voltages. A scopemeter was attached to the DC bus and the genset was started. The first attempt to start the genset resulted in a Ground/External Fault, the second attempt resulted in a successful start. The DC bus voltages were both measured as 433v positive and negative within 2 volts. Genset B1 was also found to have a Logic Level Fault which was cleared with a power reset. Capture at 12:36 is the engine shutting down normally. Capture at 12:38 is the closing of CB31.**
7.12.1R3	**9/7/07**	**12:45 pm**	**7.12.2, 7.12.3**	**7.12.4**				**Fault load verified and Fault key armed, Gensets A1 and B1 started first prior to load to make sure generation was greater than load. Genset A1 was connected and LB3 set to 40kW, then Genset B1**

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								was connected. Next 40kW of load was applied to LB5 which caused the shutdown of both gensets. Genset A1 had a CAN Bus Comms fault and Genset B1 had a Low Oil Pressure alarm. The gensets were restarted. Loads were removed and genset A1 was restarted. Genset A1 then faulted on SA Operation fault. Genset A1 was reset and restarted. Genset A1 then faulted again on SA Operation fault. Genset A1 was reset and restarted.
7.12.5R3	**8/20/07**	**1:28 pm**	**7.12.6**	**7.12.7**				**SS placed itself in the OFF state position. Reset and Start commands resulted in TEST state followed by OFF state. While troubleshooting the SS both Genset A1 and B1 shut down. A1 showed a No Field Signal, which in the past has meant overload, and Genset B1 showed an External Trip. As the Meter triggers were disabled only the relay files may be of use.**
7.12.1R4	**10/3/07**	**10:26 am**	**7.12.2R4, 7.12.3R4**	**7.12.4R4**	**S**	**10:35 am**	**DAK**	**Fault load verified and Fault key armed, Gensets A1 and B1 started first prior to load to make sure generation was greater than load. LB3:40kW, LB5:40kW, LB6:40kW**
7.12.5R4	**10/3/07**	**10:35 am**	**7.12.6R4**	**7.12.7R4**	**S**	**10:42am**	**DAK**	**SS connected at 10:36. Meter1:70kW, Meter2:34kW Fault triggered at 10:39. The SS opened issuing a PES alarm fault. The fault load cleared but CB13 remained closed. The SS remained open and**

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								faulted, the gensets remained online, increased from 20kW to 36kW to serve LB3 and LB5
7.12.1R5	**10/3/07**	**10:42 am**	**7.12.2R5, 7.12.3R5**	**7.12.4R5**	**S**	**10:45 am**	**DAK**	**Fault load verified and Fault key armed, Gensets A1 and B1 started first prior to load to make sure generation was greater than load. LB3:40kW, LB5:40kW, LB6:60kW**
7.12.5R5	**10/3/07**	**10:45 am**	**7.12.6R5**	**7.12.7R5**	**S**	**10:58 am**	**DAK**	**SS fault cleared and reconnected at 10:46. LB 6 increased to 60kW Meter1:88kW, Meter2:34kW Fault triggered at 10:56. The SS opened issuing a PES alarm fault. CB12 opened and the fault was cleared.**
7.12.8	**10/3/07**	**10:58 am**	**7.12.9, 7.12.10**	**7.12.11, 7.12.12 7.12.13**	**S**	**11:01 am**	**DAK**	**Prior to intentionally shutting down the gensets both shutdown with a No field fault on A1 and a Boost fault on B1. Waveforms were captured at 10:59**
7.13.1	**10/3/07**	**1:26 pm**	**7.13.2, 7.13.3**	**7.13.4, 7.13.5, 7.13.6**	**S**	**1:37 pm**	**DAK**	**Fault load connected and verified. Fault key armed.**
7.13.7	**10/3/07**	**1:37 pm**	**7.13.8**	**7.13.9, 7.13.10**	**S**	**1:43 pm**	**DAK**	**Genset A1 and A2 setup and connected. LB3:40kW, LB4:40kW, LB6:40kW**
7.13.11	**10/3/07**	**1:43 pm**	**7.13.12**		**S**	**1:47 pm**	**DAK**	**SS closed. Meter1:63kW, Meter2:27kW**
7.13.13	**10/3/07**	**1:48 pm**	**7.13.14, 7.13.15**	**7.13.16**	**S**	**1:55 pm**	**DAK**	**Fault initiated at 1:48. SS remained closed, CB41 and CB31 opened shutting down both gensets.**
7.13.17	**10/3/07**	**1:55 pm**			**S**	**1:57 pm**	**DAK**	

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7.13.1R1	**10/3/07**	**2:00 pm**	**7.13.2R1, 7.13.3R1**	**7.13.4, 7.13.5, 7.13.6**	**S**	**2:06 pm**	**DAK**	**Fault load connected and verified. Fault key armed.**
7.13.7R1	**10/3/07**	**2:06 pm**	**7.13.8R1**	**7.13.9 R1, 7.13.10 R1**	**S**	**2:09 pm**	**DAK**	**Genset A1 and A2 setup and connected. LB3:40kW, LB4:40kW, LB5:20kW, LB6:40kW**
7.13.11R1	**10/3/07**	**2:09 pm**	**7.13.12 R1**		**S**	**2:11 pm**	**DAK**	**SS closed. Meter1:79kW, Meter2:43kW**
7.13.13R1	**10/3/07**	**1:48 pm**	**7.13.14 R1, 7.13.15 R1**	**7.13.16 R1**				**Fault initiated at 2:12. SS remained closed, CB41 and CB31 opened shutting down both gensets.**
7.13.17R1	**10/3/07**	**2:11 pm**			**S**	**2:12 pm**	**DAK**	
7.14.1	**10/3/07**	**2:25 pm**	**7.14.2, 7.14.3**	**7.14.4, 7.14.5, 7.14.6**	**S**	**2:28 pm**	**DAK**	**Fault load connected and verified. Fault key armed.**
7.14.7	**10/3/07**	**2:28pm**	**7.14.8**	**7.14.9, 7.14.10**	**S**	**4:01 pm**	**DAK**	**Gensets A1 and A2 connected at 4:00. LB3:40kW, LB4:40kW, LB6:40kW**
7.14.11	**10/3/07**	**4:01 pm**	**7.14.12**		**S**	**4:08 pm**	**DAK**	**SS closed, Meter1:65kW, Meter2:30kW**
7.14.13	**10/3/07**	**4:08 pm**	**7.14.14, 7.14.15**	**7.14.16**	**S**	**4:15 pm**	**DAK**	**Fault initiated at 4:09. SS remained closed. CB31 and CB41 opened. Both gensets shutdown.**
7.14.17	**10/3/07**	**4:15 pm**			**S**	**4:18 pm**	**DAK**	

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Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
7.15.1	10/3/07	4:18 pm	7.15.2, 7.15.3	7.15.4, 7.15.5, 7.15.6	S	4:20 pm	DAK	Fault load connected and verified. Fault key armed.
7.15.7	10/3/07	4:20 pm	7.15.8	7.15.9, 7.15.10	S	4:25 pm	DAK	Gensets A1 and B1 connected at 4:24. LB3:40kW, LB5:40kW, LB6:40kW
7.15.11	10/3/07	4:25 pm	7.15.12		S	4:26 pm	DAK	SS closed, Meter1:64kW, Meter2:28kW
7.15.13	10/3/07	4:26pm	7.15.14, 7.15.15	7.15.16	S	4:28 pm	DAK	Fault initiated at 4:28. SS opened. Gensets picked up load. Fault removed after 10 seconds. SS reconnected. The setup returned to the pre-fault conditions
7.15.1R1	10/3/07	4:28 pm	7.15.2R1, 7.15.3R1	7.15.4R1, 7.15.5R1, 7.15.6R1	S	4:30 pm	DAK	Retested to confirm results. Fault load connected and verified. Fault key armed.
7.15.7R1	10/3/07	4:30 pm	7.15.8	7.15.9R1, 7.15.10R1	S	4:32 pm	DAK	Gensets A1 and B1 still connected. LB3:40kW, LB5:40kW, LB6:40kW
7.15.11R1	10/3/07	4:32 pm	7.15.12R1		S	4:34 pm	DAK	SS still closed, Meter1:64kW, Meter2:28kW

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7.15.13	**10/3/07**	**4:33pm**	**7.15.14R, 7.15.15R1**	**7.15.16R1**	**S**	**4:42 pm**	**DAK**	**Fault initiated at 4:41. SS opened. Gensets picked up load. Fault removed after 10 seconds. SS reconnected.**
7.15.17	**10/3/07**	**4:42 pm**			**S**	**4:45 pm**	**DAK**	
7.16.1	**10/3/07**	**4:45 pm**	**7.16.2, 7.16.3**	**7.16.4, 7.16.5, 7.16.6**	**S**	**4:47 pm**	**DAK**	**Fault load connected and verified. Fault key armed.**
7.16.7	**10/3/07**	**4:47 pm**	**7.16.8**	**7.16.9, 7.16.10**	**S**	**4:49 pm**	**DAK**	**Gensets A1 and B1 still connected. LB3:40kW, LB5:40kW, LB6:40kW**
7.16.11	**10/3/07**	**4:49 pm**	**7.16.12**		**S**	**4:51 pm**	**DAK**	**SS still closed, Meter1:65kW, Meter2:28kW**
7.16.13	**10/3/07**	**4:51 pm**	**7.16.14, 7.16,15**	**7.16.16**		**4:55 pm**		**Fault initiated at 4:54. SS opened. CB51 opened and shutdown genset B1. CB41, CB31 and SS remained closed and genset A1 continued to serve load.**
7.16.17	**10/3/07**	**4:55 pm**			**S**	**4:56 pm**	**DAK**	
7.6.1R	**1/23/08**	**2:02 pm**	**7.6.2R**	**7.6.3R**	**S**	**2:10 am**	**DAK**	**Gensets A1 and A2 setup. Fault key armed.**
7.6.4R	**1/23/08**	**2:10 pm**	**7.6.5R**	**7.6.6R, 7.6.7R**	**S**	**2:15 pm**	**DAK**	**Triggers disabled, Genset A1 and A2 connected. LB3:40kW, LB4:40kW, LB6:40kW. SS connected. Meter1:66kW, Meter2:31kW. Triggers armed**
7.6.8R	**1/23/08**	**2:15 pm**	**7.6.9R, 7.6.10R**	**7.6.11R**	**S**	**2:25 pm**	**DAK**	**Fault timer set to 10 sec Fault initiated at 2:16. SS opened, CB31 opened, CB41 Opened, and CB51 opened. Gensets A1 shutdown on External Trip and A2 shutdown on Low Oil Pressure (Stall). Meter1:37kW, Meter2:0kW**

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7.6.12	**1/23/08**	**2:25 pm**			**S**	**2:35 pm**	**DAK**	
7.9.1R	**1/30/08**	**2:40 pm**	**7.9.2R, 7.9.3R**	**7.9.4R, 7.9.5R, 7.9.6R**	**S**	**2:45 pm**	**DAK**	**Fault load verified, key armed, All breakers closed.**
7.9.7R	**1/30/08**	**2:45 pm**	**7.9.8R**	**7.9.9R**	**S**	**2:50 pm**	**DAK**	**Gensets setup, Triggers disabled, Genset A1 and A2 connected**
7.9.10R	**1/30/08**	**2:50 pm**	**7.9.11R**	**7.9.12R**	**S**	**3:15 pm**	**DAK**	**LB3:40kW, LB4:40kW, LB6:40kW, SS connected at 1:41. Meter1:73kW, Meter2:37kW**
7.9.13R	**1/30/08**	**3:15 pm**	**7.9.14R**	**7.9.15R, 7.9.16R**	**S**	**4:00 pm**	**DAK**	**Triggers enabled. Fault timer set to 10 sec. Fault initiated but breaker K42 failed to close in the fault load. The breaker was manually exercised a few times. During this Genset A2 suddenly shutdown with a Skipp3 fault. The fault was cleared and the genset restarted. The Genset shutdown again with a Skipp3 fault and further investigation was performed. The output filter cap was found to be damaged and Youtility was contacted for replacement.**
								The filter capacitors from A2 were replaced with those from B1. The Genset was tested and returned to service. Replacement capacitor filters were order for B1.
7.9.1R	**1/31/08**	**1:35 pm**	**7.9.2R,**	**7.9.4R,**	**S**	**1:38 pm**	**DAK**	**Fault load verified, key armed, All breakers closed.**

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			7.9.3R	7.9.5R, 7.9.6R				
7.9.7R	1/31/08	1:38 pm	7.9.8R	7.9.9R	S	1:40 pm	DAK	Gensets setup, Triggers disabled, Genset A1 and A2 connected
7.9.10R	1/31/08	1:40 pm	7.9.11R	7.9.12R	S	1:42: pm	DAK	LB3:40kW, LB4:40kW, LB6:40kW, SS connected at 3:13. Meter1:71kW, Meter2:33kW
7.9.13R	1/31/08	1:42 pm	7.9.14R	7.9.15R, 7.9.16R	S	1:46 pm	DAK	Triggers enabled. Fault timer set to 10 sec. Fault initiated. SS opened. CB41 opened and Genset A2 Shutdown. CB31 and 51 remained closed. Genset A1 remained online serving the load in Zone 3. The SS reclosed shortly afterwards.
7.9.17R	1/31/08	1:46 pm			S	2:00 pm	DAK	
7.4.1R	1/31/08	2:00 pm	7.4.2R, 7.4.3R	7.4.4R, 7.4.5R	S	2:02 pm	DAK	Fault load connected, armed, and verified.
7.4.6R	1/31/08	2:02 pm	7.4.7R, 7.4.8R	7.4.9R	S	2:07 pm	DAK	Genset A1 and A2 connected. SS closed.
7.4.10R	1/31/08	2:07 pm	7.4.11R	7.4.12R	S	2:10 pm	DAK	LB3:10kW, LB4:65kW, LB6:40kW, Meter1:37kW, Meter2:1kW
7.4.13R	1/31/08	2:10 pm	7.4.14R, 7.4.15R	7.4.16R	S	2:15 pm	DAK	Fault timer at 99 sec. LB4 was increased to 65kW due to load drift and generation offset. This was done to insure enough load to trip CB41 under overload. The fault was applied at 2:11 pm. CB41 opened and Genset A2 shutdown. The SS, CB31, and CB51 remained closed and Genset A1 and the

Appendix C - "CERTS Microgrid Test Bed - Test Log" (S =Successful; U = Unsuccessful)

								utility serving the load. The SS opened after about 50 seconds due to anti-islanding. Genset A1 continued to serve the 10kW load in Zone 3
7.4.17	**1/31/08**	**2:15 am**			**S**	**2:20 pm**	**DAK**	
7.5.1R	**1/31/08**	**2:20 pm**	**7.5.2R, 7.5.3R**	**7.5.4R, 7.5.5R, 7.5.6R**	**S**	**2:36 pm**	**DAK**	**Fault load connected and verified. Fault key armed.**
7.5.7R	**1/31/08**	**2:36 pm**	**7.5.8R**	**7.5.9R**	**S**	**2:37 pm**	**DAK**	**LB3: 40kW, LB6:40kW**
7.5.10R	**1/31/08**	**2:37 pm**	**7.5.11R**	**7.5.12R**	**S**	**2:39 pm**	**DAK**	**Genset A1 connected, SS connected at 2:38pm. Meter1:56kW, Meter2:19kW**
7.5.13R	**1/31/08**	**2:39 pm**	**7.5.14R, 7.5.15R**	**7.5.16R**	**S**	**2:55 pm**	**DAK**	**Fault timer set to 10 sec. Triggers armed. Fault initiated at 2:50pm. The SS opened. CB31 opened shutting down Genset A1. CB41 remained closed. CB51 opened. Meter1:37kW, Meter2:0kW**
7.5.17R	**1/31/08**	**2:55 pm**			**S**	**3:00 pm**	**DAK**	
7.6.1R	**1/31/08**	**3:00 pm**	**7.6.2R**	**7.6.3R**	**S**	**3:03 pm**	**DAK**	**Gensets A1 and A2 setup. Fault key armed.**
7.6.4R	**1/31/08**	**3:03 pm**	**7.6.5R**	**7.6.6R, 7.6.7R**	**S**	**3:06 pm**	**DAK**	**Genset A1 and A2 connected. LB3:40kW, LB4:40kW, LB6:40kW. SS connected. Meter1:70kW, Meter2:34kW. Triggers armed**
7.6.8R	**1/31/08**	**3:06 pm**	**7.6.9R, 7.6.10R**	**7.6.11R**	**S**	**3:09 pm**	**DAK**	**Fault timer set to 10 sec Fault initiated at 3:07. SS opened. CB41 opened and Genset A2 shutdown. CB 31 opened and Genset A1 shutdown. CB 51 opened. Meter1:37kW, Meter2:0kW**

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7.6.12R	**1/31/08**	**3:09 pm**			**S**	**3:15 pm**	**DAK**	
7.13.1R	**2/1/08**	**2:00 pm**	**7.13.2R, 7.13.3R**	**7.13.4, 7.13.5, 7.13.6**	**S**	**2:10 pm**	**DAK**	**Fault load connected and verified. Fault key armed.**
7.13.7R	**2/1/08**	**2:10 pm**	**7.13.8R**	**7.13.9R, 7.13.10R**	**S**	**2:14 pm**	**DAK**	**Genset A1 and A2 setup and connected. LB3:40kW, LB4:40kW, LB6:40kW**
7.13.11R	**2/1/08**	**2:14 pm**	**7.13.12 R**		**S**	**2:15 pm**	**DAK**	**SS closed at 2:15. Meter1:73kW, Meter2:36kW**
7.13.13R	**2/1/08**	**2:15 pm**	**7.13.14 R, 7.13.15 R**	**7.13.16R**	**S**	**2:19 pm**	**DAK**	**Fault timer set to 10 sec. Triggers armed. Fault initiated at 2:17. SS opened. Genset A1 and A2 picked up the load and remained online. The fault load opened after 10 seconds and the SS reconnected shortly thereafter. All breakers remained closed, all generators remained running.**
7.13.17R	**2/1/08**	**2:19 pm**			**S**	**2:30 pm**	**DAK**	
7.14.1R	**2/1/08**	**2:30 pm**	**7.14.2R, 7.14.3R**	**7.14.4R, 7.14.5R, 7.14.6R**	**S**	**2:33 pm**	**DAK**	**Fault load connected and verified. Fault key armed.**
7.14.7R	**2/1/08**	**2:33 pm**	**7.14.8R**	**7.14.9R, 7.14.10R**	**S**	**2:34 pm**	**DAK**	**Gensets A1 and A2 connected. LB3:40kW, LB4:40kW, LB6:40kW**
7.14.11R	**2/1/08**	**2:34 pm**	**7.14.12R**		**S**	**2:35 pm**	**DAK**	**SS closed, Meter1:71kW, Meter2:35kW**
7.14.13R	**2/1/08**	**2:35 pm**	**7.14.14R, 7.14.15R**	**7.14.16R**	**S**	**2:38 pm**	**DAK**	**Fault timer set 10 sec. Triggers enabled. Fault initiated at 2:36. SS opened. CB41 opened and**

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								Genset A2 shutdown. CB31 and CB51 remained close with Genset A1 serving the load. The SS reconnect shortly thereafter.
7.14.17R	**2/1/08**	**2:38 pm**			**S**			
7.15.1R	**2/6/08**	**12:20 pm**	**7.15.2R, 7.15.3R**	**7.15.4R, 7.15.5R, 7.15.6R**	**S**	**12:25 pm**	**DAK**	**Fault load connected and verified. Fault key armed**
7.15.7R	**2/6/08**	**12:25 pm**	**7.15.8R**	**7.15.9R, 7.15.10R**	**S**	**12:30 pm**	**DAK**	**Gensets A1 and B1 connected. LB3:40kW, LB5:40kW, LB6:40kW**
7.15.11R	**2/6/08**	**12:30 pm**	**7.15.12R**		**S**	**12:35 pm**	**DAK**	**SS closed at 12:35, Meter1:73kW, Meter2:37kW**
7.15.13R	**2/6/08**	**12:35 pm**	**7.15.14R, 7.15.15R**	**7.15.16R**	**S**	**12:43 pm**	**DAK**	**Triggers armed, Fault initiated at 12:38. The SS remained closed. All Gensets and Breakers remained online and closed. No operations, other than the fault load application and removal, occurred.**
7.15.17R	**2/6/08**	**12:43 pm**			**S**	**12:45 pm**	**DAK**	
7.16.1R	**2/6/08**	**12:45 pm**	**7.16.2R, 7.16.3R**	**7.16.4R, 7.16.5R, 7.16.6R**	**S**	**12:47 pm**	**DAK**	**Fault load connected and verified. Fault key armed.**
7.16.7R	**2/6/08**	**12:47 pm**	**7.16.8R**	**7.16.9R, 7.16.10R**	**S**	**12:49 pm**	**DAK**	**Gensets A1 and B1 connected. LB3:40kW, LB5:40kW, LB6:40kW**
7.16.11R	**2/6/08**	**12:49 pm**	**7.16.12R**		**S**	**12:50 pm**	**DAK**	**SS closed, Meter1:70kW, Meter2:34kW**
7.16.13R	**2/6/08**	**12:50 pm**	**7.16.14R,**	**7.16.16R**	**S**	**12:55 pm**	**DAK**	**Triggers armed. Fault initiated at 12:53. SS opened.**

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			7.16.15R					CB51 opened and Genset B1 shutdown. Genset A1 remained online carrying the load. CB 31 and 41 remained closed. SS reconnected shortly thereafter.
7.16.17R	2/6/08	12:55 pm			S	12:58 pm	DAK	
7.7.1R	2/6/08	1:55 pm	7.7.2R, 7.7.3R	7.7.4R, 7.7.5R, 7.7.6R	S	2:00 pm	DAK	Fault load verified and connected, Fault key armed
7.7.7R	2/6/08	2:00 pm	7.7.8R	7.7.9R	S	2:01 pm	DAK	LB3:40kW, LB6:40kW, Genset B1 connected
7.7.10R	2/6/08	2:01 pm	7.7.11R	7.7.12R	S	2:02 pm	DAK	SS closed. Meter1:52kW Meter2:16kW
7.7.13R	2/6/08	2:02 pm	7.7.14R, 7.7.15R	7.7.16R	S	2:06 pm	DAK	Triggers armed. Fault initiated at 2:04. SS opened. CB51 opened and genset B1 shutdown. CB31 and CB41 remained closed. SS remained opened as a Dead Bus was present.
7.7.17R	2/6/08	2:06 pm			S	2:09 pm	DAK	
7.8.1	2/6/08	2:09 pm	7.8.2	7.8.3	S	2:11 pm	DAK	Fault load verified and connected, Fault key armed
7.8.4	2/6/08	2:11 pm	7.8.5	7.8.6, 7.8.7	S	2:15 pm	DAK	Genset A1 and B1 connected, LB3:40kW, LB4:40kW, LB6:40kW. SS closed. Meter1:52kW Meter2:16kW
7.8.8	2/6/08	2:15 pm	7.8.9, 7.8.10	7.8.11	S	2:18 pm	DAK	Triggers armed. Fault initiated at 2:17. CB51 opened and Genset B1 shutdown. SS, CB31 and CB41 remained closed and Genset A1 remained connected.
7.8.12	2/6/08	2:18 pm			S	2:25 pm	DAK	

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7.10.1	**2/6/08**	**2:25 pm**	**7.10.2, 7.10.3**	**7.10.4, 7.10.5, 7.10.6**	**S**	**2:28pm**	**DAK**	**Fault load verified and connected, Fault key armed**
7.10.7	**2/6/08**	**2:28 pm**	**7.10.8**	**7.10.9**	**S**	**2:30 pm**	**DAK**	**Gensets A1 and B1 connected**
7.10.10	**2/6/08**	**2:30 pm**	**7.10.11**	**7.10.12**	**S**	**2:33 pm**	**DAK**	**LB3:40kW, LB4:40kW, LB6:40kW. SS closed. Meter1:70kW, Meter2:34kW**
7.10.13	**2/6/08**	**2:33 pm**	**7.10.14, 7.10.15**	**7.10.16**	**S**	**2:36 pm**	**DAK**	**Triggers armed, Fault initiated at 2:34. SS opened, CB51 opened and Genset B1 shutdown, CB31 opened and Genset A1 shutdown. CB41 remained closed.**
7.10.17	**2/6/08**	**2:36 pm**			**S**	**2:40 pm**	**DAK**	

(S =Successful; U = Unsuccessful)

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
8.1.1	**2/19/08**	**12:30 pm**	**8.1.2**	**8.1.3**	**S**	**12:33 pm**	**DAK**	**CB1, CB12, CB31, CB41, and CB51 Closed, All LBs 0kW, SS Open**
8.1.4	**2/19/08**	**12:33 pm**	**8.1.5**		**S**	**12:40 pm**	**DAK**	**Genset A1 connected, Triggers armed, LB3:20kW**

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								Load increased at 12:36 pm
8.1.6	**2/19/08**	**12:40 pm**	**8.1.7**		**S**	**12:46 pm**	**DAK**	**Triggers armed, LB3:40kW, Load increased at 12:41 pm**
8.1.8	**2/19/08**	**12:46 pm**	**8.1.9**		**S**	**12:54 pm**	**DAK**	**Triggers armed, LB3:60kW, Load increased at 12:48 pm**
8.1.10	**2/19/08**	**12:54 pm**			**S**	**12:59 pm**	**DAK**	**LB3:0kW Voltage set to 291V (+5%)**
8.1.10(8.1.4)	**2/19/08**	**12:59 pm**	**8.1.10(8.1.5)**		**S**	**1:08 pm**	**DAK**	**Triggers armed, LB3:20kW, Load increased at 1:04 pm**
8.1.10(8.1.6)	**2/19/08**	**1:08 pm**	**8.1.10(8.1.7)**		**S**	**1:13 pm**	**DAK**	**Triggers armed, LB3:40kW, Load increased at 1:09 pm**
8.1.10(8.1.8)	**2/19/08**	**1:13 pm**	**8.1.10(8.1.9)**		**S**	**1:20 pm**	**DAK**	**Triggers armed, LB3:60kW, Load increased at 1:14 pm**
8.1.11	**2/19/08**	**1:20 pm**			**S**	**1:21 pm**	**DAK**	**LB3:0kW Voltage set to 263V (-5%)**
8.1.11(8.1.4)	**2/19/08**	**1:21 pm**	**8.1.11(8.1.5)**		**S**	**1:27 pm**	**DAK**	**Triggers armed, LB3:20kW, Load increased at 1:23 pm**
8.1.11(8.1.6)	**2/19/08**	**1:27 pm**	**8.1.11(8.1.7)**		**S**	**1:36 pm**	**DAK**	**Triggers armed, LB3:40kW, Load increased at 1:29 pm**
8.1.11(8.1.8)	**2/19/08**	**1:36 pm**	**8.1.11(8.1.9)**		**S**	**1:50 pm**	**DAK**	**Triggers armed, LB3:60kW, Load increased at 1:45 pm**

Start Test	Test	Start	Verify/	Verify/	Status	End	Initials	Test Event Comments:

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Sequence No.	Date	Time	Action	Action	S or U	Time		
8.1.12	2/19/08	1:50 pm			S	2:02 pm	DAK	LB3:0kW, Genset A1 shutdown
8.1.13(8.1.4)	2/19/08	2:02 pm	8.1.13(8.1.5)		S	2:23 pm	DAK	Genset A2 connected, Triggers armed, LB4:20kW Load increased at 2:19 pm
8.1.13(8.1.6)	2/19/08	2:23 pm	8.1.13(8.1.7)		S	2:29 pm	DAK	Triggers armed, LB4:40kW, Load increased at 2:24 pm
8.1.13(8.1.8)	2/19/08	2:29 pm	8.1.13(8.1.9)		S	2:36 pm	DAK	Triggers armed, LB4:60kW, Load increased at 2:30 pm
8.1.13(8.1.10)	2/19/08	2:36 pm			S	2:37 pm	DAK	LB4:0kW Voltage set to 291V (+5%)
8.1.13(8.1.10(8.1.4))	2/19/08	2:37 pm	8.1.13(8.1.10(8.1.5))		S	2:43 pm	DAK	Triggers armed, LB4:20kW, Load increased at 2:38 pm
8.1.13(8.1.10(8.1.6))	2/19/08	2:43 pm	8.1.13(8.1.10(8.1.7))		S	2:53 pm	DAK	Triggers armed, LB4:40kW, Load increased at 2:49 pm
8.1.13(8.1.10(8.1.8))	2/19/08	2:53 pm	8.1.13(8.1.10(8.1.9))		S	2:59 pm	DAK	Triggers armed, LB4:60kW, Load increased at 2:54 pm
8.1.13(8.1.11)	2/19/08	2:59 pm			S	3:00 pm	DAK	LB4:0kW Voltage set to 263V (-5%)
8.1.13(8.1.11(8.1.4))	2/19/08	3:00 pm	8.1.13(8.1.11(8.1.5))		S	3:04 pm	DAK	Triggers armed, LB4:20kW, Load increased at 3:00 pm
8.1.13(8.1.11(8.1.6))	2/19/08	3:04 pm	8.1.13(8.1.11(8.1.7))		S	3:12 pm	DAK	Triggers armed, LB4:40kW, Load increased at 3:07 pm

DTC Registered Procedure - CERTS Microgrid Test Plan Appendix C: TEST LOG			
Dolan Technology Center	Document No: DTC212812.207.01A		
Written by: AEP	Effective Date: 23 Feb 2007	Target Group: Assigned	
Approved by: K. P. Loving	Procedure Review Date: 23 Feb. 2008		

Appendix C - "CERTS Microgrid Test Bed - Test Log" (S =Successful; U = Unsuccessful)

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
8.1.13(8.1.11(8.1.8))	2/19/08	3:12 pm	8.1.13(8.1.11(8.1.9))		S	3:17 pm	DAK	Triggers armed, LB4:60kW, Load increased at 3:12 pm
8.1.14	2/19/08	3:17 pm			S	3:25 pm	DAK	LB4:0kW, Genset A2 shutdown
8.1.15(8.1.4)	2/21/08	9:45 am	8.1.15(8.1.5)		S	9:57 am	DAK	Genset B1 connected, Triggers armed, LB5:20kW Load increased at 9:52 am
8.1.15(8.1.6)	2/21/08	9:57 am	8.1.15(8.1.7)		S	10:08 am	DAK	Triggers armed, LB5:40kW, Load increased at 10:03 am
8.1.15(8.1.8)	2/21/08	10:08 am	8.1.15(8.1.9)		S	10:14 am	DAK	Triggers armed, LB5:60kW, Load increased at 10:09 am
8.1.15(8.1.10)	2/21/08	10:14 am			S	10:15 am	DAK	LB5:0kW Voltage set to 291V (+5%)

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8.1.15(8.1.10(8.1.4))	**2/21/08**	**10:15 am**	**8.1.15(8.1.10(8.1.5))**		**S**	**10:22 am**	**DAK**	**Triggers armed, LB5:20kW, Load increased at 10:17 am**
8.1.15(8.1.10(8.1.6))	**2/21/08**	**10:22 am**	**8.1.15(8.1.10(8.1.7))**		**S**	**10:26 am**	**DAK**	**Triggers armed, LB5:40kW, Load increased at 10:22 am**
8.1.15(8.1.10(8.1.8))	**2/21/08**	**10:26 am**	**8.1.15(8.1.10(8.1.9))**		**S**	**10:31 am**	**DAK**	**Triggers armed, LB5:60kW, Load increased at 10:27 am**
8.1.15(8.1.11)	**2/21/08**	**10:31 am**			**S**	**10:33 am**	**DAK**	**LB5:0kW Voltage set to 263V (-5%)**
8.1.15(8.1.11(8.1.4))	**2/21/08**	**10:33 am**	**8.1.15(8.1.11(8.1.5))**		**S**	**10:39 am**	**DAK**	**Triggers armed, LB5:20kW, Load increased at 10:34 am**

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
8.1.15(8.1.11(8.1.6))	**2/21/08**	**10:39 am**	**8.1.15(8.1.11(8.1.7))**		**S**	**10:44 am**	**DAK**	**Triggers armed, LB5:40kW, Load increased at 10:40 am**

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8.1.15(8.1.11(8.1.8))	**2/21/08**	**10:44 am**	**8.1.15(8.1.11(8.1.9))**		**S**	**10:49 am**	**DAK**	**Triggers armed, LB5:60kW, Load increased at 10:45 am**
8.1.16	**2/21/08**	**10:49 am**			**S**	**10:50 am**	**DAK**	**LB5:0kW, Genset B1 shutdown**
8.2.1	**2/21/08**	**10:50 am**	**8.2.2**		**S**	**11:10 am**	**DAK**	**Weak grid. SS, CB12, CB31, CB41, CB51 Closed. Gensets in unit mode and setup. LB3:20kW, LB4:20kW, LB6:30kW, LB6 increased to 30kW to prevent reverse power condition at SS. This was necessary due to unbalance power at the PCC. Meter 1:6kW**
8.2.3	**2/21/08**	**11:10 am**	**8.2.4**	**8.2.5**	**S**	**11:16 am**	**DAK**	**Triggers armed. SS manual open asserted at 11:11 am. SS opened with a Fault Status and PES alarm. Genset A1:0kW, Genset A2:37kW Meter1:0kW**
8.2.6	**2/21/08**	**11:16 am**	**8.2.7**	**8.2.8**	**S**	**11:28 am**	**DAK**	**SS was reset. Triggers armed. Manual open was removed at 11:23 am. SS closed. Genset A1:5kW Genset A2:55kW, Meter1:7kW. At 11:25 the SS opened unexpectedly under reverse power.**
8.2.9	**2/21/08**	**11:28 am**			**S**	**11:40 am**	**DAK**	**Genset A1 was shutdown. The SS was allowed to reconnect. A trigger was setup when Genset A2 was shutdown to get a baseline of the unbalance due solely to the utility. The event occurred at 11:36 am**
8.3.1	**2/21/08**	**11:40 am**	**8.3.2**		**S**	**11:43 am**	**DAK**	**Weak grid. SS, CB12, CB31, CB41, CB51 Closed. Gensets in unit mode and setup. LB3:60kW,**

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								LB4:40kW. Meter 1:34kW
8.3.3	**2/21/08**	**11:43 am**	**8.3.4**	**8.3.5**	**S**	**11:49 am**	**DAK**	**Triggers armed. SS manual open asserted at 11:45 am. SS opened with a Fault Status and PES alarm. Genset A1:29kW, Genset A2:60kW Meter1:0kW**
8.3.6	**2/21/08**	**11:49 am**	**8.3.7**	**8.3.8**	**S**	**12:03 pm**	**DAK**	**SS was reset. Triggers armed. Manual open was removed at 11:50 am. SS closed. Genset A1:4kW Genset A2:53kW, Meter1:35kW. Triggers disabled. Genset A2 shutdown on an overfield fault at 11:54.**
8.3.9	**2/21/08**	**12:03 pm**			**S**	**12:05 pm**	**DAK**	**Genset A1 was shutdown normally. All loads removed.**

(S =Successful; U = Unsuccessful)

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
8.4.1	**2/26/08**	**10:26 am**	**8.4.2**		**S**	**10:46 am**	**DAK**	**SS manual open asserted. CB12, CB31, CB41, CB51 closed. Gensets setup and connected. LB3:60kW, MeterA1:13kW, MeterA2:43kW**
8.4.3	**2/26/08**	**10:46 am**	**8.4.4**	**8.4.5**	**S**	**10:51 am**	**DAK**	**Triggers armed. Load decreased at 10:48 am. MeterA1:4kW, MeterA2:34kW**
8.4.6	**2/26/08**	**10:51 am**						**LB3:0kW, Genset A1 and A2 shutdown.**

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8.5.1	**2/26/08**	**11:03 am**	**8.5.2**		**S**	**11:05 am**	**DAK**	**SS closed, All breakers closed, Gensets setup and connected, LB3:35kW, LB4:35kW**
8.5.3	**2/26/08**	**11:05 am**	**8.5.4**	**8.5.5**	**S**	**11:20 am**	**DAK**	**Meter3:57kW, MeterA1:5kW, MeterA2:6kW, Triggers armed. LB3:85kW Load increased at 11:15 am. Meter3:58kW, MeterA1:48kW, MeterA2:6kW**
8.5.6	**2/26/08**	**11:20 am**			**S**	**11:22 am**		**A mistake with the dispatch was noticed. Genset A1 was accidentally set for 0kW in feeder mode. The test was repeated. Gensets were not shutdown but instead redispatched.**
8.5.1R	**2/26/08**	**11:22 am**	**8.5.2R**		**S**	**11:28 am**	**DAK**	**SS closed, All breakers closed, Gensets setup and connected, LB3:35kW, LB4:35kW, Meter3:51kW, MeterA1:10kW, MeterA2:6kW,**
8.5.3R	**2/26/08**	**11:28 am**	**8.5.4R**	**8.5.5R**	**S**	**11:36 am**	**DAK**	**Triggers armed. LB3:85kW Load increased at 11:31 am. Meter3:52kW, MeterA1:52kW, MeterA2:7kW**
8.5.6R	**2/26/08**	**11:36 am**			**S**	**11:37 am**	**DAK**	
8.6.1	**2/26/08**	**11:37 am**	**8.6.2**		**S**	**11:38 am**	**DAK**	**SS closed, All breakers closed, Gensets setup and connected, LB3:75kW, LB4:35kW, Meter3:51kW, MeterA1:44kW, MeterA2:7kW**
8.6.3	**2/26/08**	**11:38 am**	**8.6.4**	**8.6.5**	**S**	**11:45 am**	**DAK**	**Triggers armed. LB4:55kW Load increased at 11:39 am. Meter3:58kW, MeterA1:58kW,**

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								MeterA2:5kW
8.6.6	**2/26/08**	**11:45 am**			**S**	**11:46 am**	**DAK**	**Gensets and loads redispatched instead of shutdown**
8.7.1	**2/26/08**	**11:46 am**	**8.7.2**		**S**	**11:49 am**	**DAK**	**SS closed, All breakers closed, Gensets setup and connected, LB3:85kW, LB4:35kW, Meter3:54kW, MeterA1:51kW, MeterA2:6kW**
8.7.3	**2/26/08**	**11:49 am**	**8.7.4**	**8.7.5**	**S**	**12:02 pm**	**DAK**	**Manually triggered at 11:52. Setpoint changed at 11:53 am. Manually triggered at 11:57. Meter3:103kW, MeterA1:0kW, MeterA2:6kW**
8.7.6	**2/26/08**	**12:02 pm**			**S**	**12:03 pm**	**DAK**	**Gensets and loads redispatched instead of shutdown**

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
8.8.1	**2/26/08**	**12:03 pm**	**8.8.2**		**S**	**12:07 pm**	**DAK**	**SS closed, All breakers closed, Gensets setup and connected, LB3:35kW, LB4:35kW, Meter3:47kW, MeterA1:14kW, MeterA2:6kW**
8.8.3	**2/26/08**	**12:07 pm**	**8.8.4**	**8.8.5**	**S**	**12:15 pm**	**DAK**	**Triggers armed. Manual Open asserted at 12:08. Meter3:-2kW, MeterA1:9kW, MeterA2:58kW**

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								At approx 12:10 both gensets shutdown, Low Oil Pressure on A1, and Underspeed on A2. Testing repeated.
8.8.6	**2/26/08**	**12:15 pm**	**8.8.7**	**8.8.8**	**S**	**12:20 pm**	**DAK**	**Gensets shutdown unexpectedly, Loads were removed.**
8.8.1	**2/26/08**	**12:03 pm**	**8.8.2**		**S**	**12:07 pm**	**DAK**	**SS closed, All breakers closed, Gensets setup and connected, LB3:35kW, LB4:35kW, Meter3:47kW, MeterA1:14kW, MeterA2:6kW**
8.8.3	**2/26/08**	**12:07 pm**	**8.8.4**	**8.8.5**	**S**	**12:15 pm**	**DAK**	**Triggers armed. Manual Open asserted at 12:08. Meter3:-2kW, MeterA1:9kW, MeterA2:58kW At approx 12:10 both gensets shutdown, Low Oil Pressure on A1, and Underspeed on A2. Testing repeated.**
8.8.1R	**2/26/08**	**1:08 pm**	**8.8.2R**		**S**	**1:18 pm**	**DAK**	**SS closed, All breakers closed, Gensets setup and connected, LB3:35kW, LB4:35kW, Meter3:48kW, MeterA1:14kW, MeterA2:56kW**
8.8.3R	**2/26/08**	**1:18 pm**	**8.8.4R**	**8.8.5R**	**S**	**1:25 pm**	**DAK**	**Triggers armed. Manual Open asserted at 1:21. Meter3:-2kW, MeterA1:9kW, MeterA2:59kW, Freq 59.57Hz**
8.8.6R	**2/26/08**	**1:25 pm**	**8.8.7R**	**8.8.8R**	**S**	**1:32 pm**	**DAK**	**Manual Open removed at 1:27. SS Closed. Meter3:49kW, MeterA1:14kW, MeterA2:4kW**
8.8.9R	**2/26/08**	**1:32 pm**			**S**	**1:33 pm**	**DAK**	**Gensets and loads redispatched instead of shutdown.**

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8.9.1	**2/26/08**	**1:33 pm**	**8.9.2**		**S**	**1:40 pm**	**DAK**	**SS closed, All breakers closed, Gensets setup and connected, LB3:60kW, LB4:60kW, Meter3:55kW, MeterA1:51kW, MeterA2:4kW**
8.9.3	**2/26/08**	**1:40 pm**	**8.9.4**	**8.9.5**	**S**	**1:52 pm**	**DAK**	**Triggers armed. Manual Open asserted at 1:42 pm. SS opened. Genset A1 shutdown with a Overload Alarm, Genset A2 shutdown with a Low Oil Pressure alarm. Test repeated**
8.9.1R	**2/26/08**	**1:52 pm**	**8.9.2R**		**S**	**2:02 pm**	**DAK**	**SS closed, All breakers closed, Gensets setup and connected, LB3:60kW, LB4:60kW, Meter3:51kW, MeterA1:52kW, MeterA2:9kW**
8.9.3R	**2/26/08**	**2:02 pm**	**8.9.4R**	**8.9.5R**	**S**	**208 pm**	**DAK**	**Triggers armed. Manual Open asserted at 2:03 pm. SS opened. Meter3:-2kW, MeterA1:47kW, MeterA2:60kW**
8.9.6R	**2/26/08**	**2:08 pm**	**8.9.7R**	**8.9.8R**	**S**	**2:14 pm**	**DAK**	**Manual Open removed at 2:09. SS Closed. Meter3:56kW, MeterA1:48kW, MeterA2:3kW**
8.9.9R	**2/26/08**	**2:14 pm**			**S**	**2:15 pm**	**DAK**	**Genset A2 shutdown, Genset A1 and loads redispatched.**
8.10.1	**2/26/08**	**2:15 pm**	**8.10.2**		**S**	**2:27 pm**	**DAK**	**SS closed, All breakers closed, Gensets setup and connected, LB3:40kW, LB5:50kW, Meter3:36kW, MeterA1:0kW, Meter5:10kW, MeterB1:37kW**
8.10.3	**2/26/08**	**2:27 pm**	**8.10.4**	**8.10.5**	**S**	**2:35 pm**	**DAK**	**Triggers armed. Manual Open asserted at 2:30 pm. SS opened. Meter3:13kW, MeterA1:21kW, Meter5: -15kW, MeterB1:61kW.**

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8.10.6	**2/26/08**	**2:35**	**8.10.7**	**8.10.8**	**S**	**2:40 pm**	**DAK**	**Manual Open removed at 2:36. SS Closed. Meter3:36kW, MeterA1:0kW, Meter5:12kW, MeterB1:34kW**
8.10.9	**2/26/08**	**2:40 pm**			**S**	**2:50 pm**	**DAK**	**Gensets shutdown.**

(S =Successful; U = Unsuccessful)

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
8.11.1	**2/26/08**	**3:00 pm**	**8.11.2**		**S**	**3:07 pm**	**DAK**	**SS closed, All breakers closed, Gensets setup and connected, LB3:20kW, LB5:40kW, LB6:20kW. Meter3:-25kW, MeterA1:43kW, Meter5:22kW, MeterB1:14kW, Meter2:-1kW, Meter1:18kW**
8.11.3	**2/26/08**	**3:07 pm**	**8.11.4**	**8.11.5**	**S**	**3:15 pm**	**DAK**	**Triggers armed. Manual Open asserted at 3:11 pm. SS opened with PES Alarm. Meter3:-25kW, MeterA1:43kW, Meter5:23kW, MeterB1:12kW, Meter2:0kW, Meter1:19kW**
8.11.6	**2/26/08**	**3:15 pm**	**8.11.7**	**8.11.8**	**S**	**3:21 pm**	**DAK**	**Manual Open removed at 3:16. SS Closed. Meter3:-26kW, MeterA1:45kW, Meter5:21kW, MeterB1:15kW, Meter2:-2kW, Meter1:16kW**
8.11.9	**2/26/08**	**3:21 pm**			**S**	**3:22 pm**	**DAK**	**Gensets shutdown and loads removed.**

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8.12.1	**2/27/08**	**9:54 am**	**8.12.2**		**S**	**10:31 am**	**DAK**	**CB12 open, Gensets setup to 20kW in unit control and connected.**
8.12.3	**2/27/08**	**10:31 am**			**S**	**10:34 am**	**DAK**	**LB3:25kW, 10kVar, LB4:25kW, 10kVar, LB5:25kW, 10kVar, LB6:5kW, 10kVar. Load was added to LB6 to pull the isolated bus voltage down to near zero volts, it was floating near 80 volts prior. Manual open removed.**
8.12.4	**2/27/08**	**10:34 am**	**8.12.5**		**S**	**10:49 am**		**CB12 closed at 10:38:10. SS closed at 10:43:10**
8.12.6	**2/27/08**	**10:49 am**			**S**	**11:12 am**		**DAS system did trigger on the closing of the SS. At 11:01 the SS opened on reverse power and locked out. The meter triggers were disabled and only the relays captured this event.**

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
8.13.1	**2/27/08**	**11:12 am**	**8.13.2**		**S**	**11:16 am**	**DAK**	**CB12 opened, Genset setup to 20kW unit control.**
8.13.3.1	**2/27/08**	**11:16 am**	**8.13.3.2**		**S**	**11:18 am**	**DAK**	**Manual Open asserted. LB3:20kW ,20kVar**

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8.13.3.3	**2/27/08**	**11:18 am**	**8.13.3.4**		**S**	**11:24 am**	**DAK**	**Triggers armed. Genset A1 connected at 11:20 am Meter3:-2kW, -3kVar, MeterA1:20kW 20kVar, LoadMeter3:17kW 18kVar**
8.13.3.5	**2/27/08**	**11:24 am**	**8.13.3.6**		**S**	**11:25 am**	**DAK**	**Genset A1 shutdown. LB3:35kW, 20kVar**
8.13.3.7	**2/27/08**	**11:25 am**	**8.13.3.8**		**S**	**11:31 am**	**DAK**	**Triggers armed. Genset A1 connected at 11:26 am Meter3:-2kW, -3kVar, MeterA1:33kW, 21kVar LoadMeter3:31kW, 18kVar**
8.13.3.9	**2/27/08**	**11:31 am**	**8.13.3.10**		**S**	**11:45 am**	**DAK**	**Genset A1 shutdown. LB3:55kW, 20kVar**
8.13.3.11	**2/27/08**	**11:45 am**	**8.13.3.12**		**S**	**11:52 am**	**DAK**	**Triggers armed. Genset A1 connected at 11:47 am Meter3:-2kW, -3kVar, MeterA1:51kW 21kVar, LoadMeter3:47kW 18kVar**
8.13.3.13	**2/27/08**	**11:52 am**	**8.13.3.14**		**S**	**11:54 am**	**DAK**	**Genset A1 shutdown. LB3:60kW, 30kVar**
8.13.3.15	**2/27/08**	**11:54 am**	**8.13.3.16**		**S**	**12:00 pm**	**DAK**	**Triggers armed. Genset A1 connected at 11:55 am Meter3:-2kW, -2kVar, MeterA1:50kW 29kVar, LoadMeter3:47kW 26kVar**
8.13.3.13 B	**2/27/08**	**12:00 am**	**8.13.3.14 B**		**S**	**12:02 pm**	**DAK**	**Genset A1 shutdown. LB3:70kW, 30kVar. Load was increased a final time as the actual load is always less than that which is dispatched.**
8.13.3.15B	**2/27/08**	**12:02 pm**	**8.13.3.16 B**		**S**	**12:09 pm**	**DAK**	**Triggers armed. Genset A1 connected at 12:04 pm Meter3:-2kW, -2kVar, MeterA1:60kW 29kVar, LoadMeter3:57kW 26kVar**

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8.13.3.17	**2/27/08**	**12:09 pm**			**S**	**12:20 pm**	**DAK**	**Genset A1 shutdown and loads removed.**

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
9.1.7(9.1.1)	**3/5/08**	**10:28 am**	**9.1.7(9.1.2)**		**S**	**11:12 am**	**DAK**	**Gensets setup an d connected. SS closed. LB3:40kW 20kVar, LB4:40kW 20kVar, LB5:40kW 20kVar, LB6:20kW 10kVar, Meter2:28kW, Meter3:17kW, Meter4:6kW, Meter5:9kW**
9.1.7(9.1.3)	**3/5/08**	**11:12 am**	**9.1.7(9.1.4)**		**S**	**11:37 am**	**DAK**	**Triggers armed, Manual Open asserted at 11:16. SS opened with PES Alarm. Meter2:0kW, Meter3:-2kW, Meter4:-4kW, Meter5:0kW Meters triggered when SS was reset.**
9.1.7(9.1.5)	**3/5/08**	**11:37 am**	**9.1.7(9.1.6)**		**S**	**11: 43 am**	**DAK**	**Triggers armed, Manual Open removed at 11:38. SS closed. Meter2:29kW, Meter3:17kW, Meter4:6kW, Meter5:10kW**
9.1.8(9.1.1)	**3/5/08**	**11:43 am**	**9.1.8(9.1.2)**		**S**	**11:51 am**	**DAK**	**Gensets setup an d connected. SS closed. LB3:20kW 10kVar, LB4:40kW 20kVar, LB5:50kW 20kVar, LB6:20kW 10kVar, Meter2:21kW, Meter3:-8kW,**

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								Meter4:7kW, Meter5:25kW
9.1.8(9.1.3)	**3/5/08**	**11:51 am**	**9.1.8(9.1.4)**		**S**	**12:01 pm**	**DAK**	**Triggers armed, Manual Open asserted at 11:54. SS opened with PES Alarm. Meter2:0kW, Meter3:-21kW, Meter4:0kW, Meter5:18kW**
9.1.8(9.1.5)	**3/5/08**	**12:01 pm**	**9.1.8(9.1.6)**		**S**	**12:15 pm**	**DAK**	**Triggers armed, Manual Open removed at 12:09. SS closed. Meter2:14kW, Meter3:-12kW, Meter4:5kW, Meter5:23kW**
9.1.9(9.1.1)	**3/5/08**	**1:10 pm**	**9.1.9(9.1.2)**		**S**	**1:17 pm**	**DAK**	**Gensets setup an d connected. SS closed. LB3:20kW 10kVar, LB4:15kW 10kVar, LB5:50kW 20kVar, LB6:30kW 10kVar, Meter2:-12kW, Meter3:-32kW, Meter4:-15kW, Meter5:17kW**
9.1.9(9.1.3)	**3/5/08**	**1:17 pm**	**9.1.9(9.1.4)**		**S**	**1:24 pm**	**DAK**	**Triggers armed, Manual Open asserted at 1:19. SS opened with PES Alarm. Meter2:0kW, Meter3:-23kW, Meter4:-11kW, Meter5:21kW**
9.1.9(9.1.5)	**3/5/08**	**1:24 pm**	**9.1.9(9.1.6)**		**S**	**1:31 pm**	**DAK**	**Triggers armed, Manual Open removed at 1:26. SS closed. Meter2:-17kW, Meter3:-35kW, Meter4:-17kW, Meter5:16kW**
9.1.10(9.1.1)	**3/5/08**	**1:31 pm**	**9.1.10(9.1.2)**		**S**	**1:43 pm**	**DAK**	**Gensets setup an d connected. SS closed. LB3:50kW 20kVar, LB4:40kW 20kVar, LB5:25kW 10kVar, LB6:30kW 10kVar, Meter2:19kW, Meter3:34kW, Meter4:15kW, Meter5:-18kW**
9.1.10(9.1.3)	**3/5/08**	**1:43 pm**	**9.1.10(9.1.4)**		**S**	**1:54 pm**	**DAK**	**Triggers armed, Manual Open asserted at 1:45. SS opened with PES Alarm. Meter2:0kW,**

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								Meter3:21kW, Meter4:10kW, Meter5:-23kW
9.1.10(9.1.5)	**3/5/08**	**1:54 pm**	**9.1.10(9.1 .6)**		**S**	**2:05 pm**	**DAK**	**Triggers armed, Manual Open removed at 2:00. SS closed. Meter2:14kW, Meter3:30kW, Meter4:14kW, Meter5:??kW. Genset B1 shutdown on Low Oil Pressure approx 30 secs after the SS closed.**

DTC Registered Procedure - CERTS Microgrid Test Plan Appendix C: TEST LOG			
Dolan Technology Center	Document No: DTC212812.207.01A		
Written by: AEP	Effective Date: 23 Feb 2007	Target Group: Assigned	
Approved by: K. P. Loving	Procedure Review Date: 23 Feb. 2008		

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Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
10.2.1	3/13/08	2:20 pm	10.2.2	10.2.3	S	2:25 pm	DAK	Weak Grid Installed.
10.2.12(10.1.1)	3/18/08	11:40 am	10.2.12(10.1.2)	10.2.12(10.1.3)	S	11:44 am	DAK	Test revised to remove unavailable Genset B1. Genset A1 and A2 setup and connected. LB3:10kW, LB4:40kW, LB6:40kW. LB5 is unused. LB6 increased to prevent reverse power trip. SS closed
10.2.12(10.1.4)	3/18/08	11:44 am	10.2.12(10.1.5)		S	11:50 am	DAK	Dyno set to 100%, Triggers enabled. Motor started at 11:45. Meter1:23kW 25kVar, Meter3:-18kW 19kVar, Meter4:6kW 2kVar
10.2.12(10.1.6)	3/18/08	11:50 am	10.2.12(10.1.7)		S	11:56am	DAK	SS manual open asserted at 11:51. SS opened with a fault and PES alarm. Meter1:37kW 1kVar, Meter3:-2kW -4kVar, Meter4:15kW -7kVar
10.2.12(10.1.8)	3/18/08	11:56am	10.2.12(10.1.9)		S	12:04 pm	DAK	Motor started at 11:59. Meter1:37kW 1kVar, Meter3:-2kW -4kVar, Meter4:11kW 10kVar
10.2.12(10.1.10)	3/18/08	12:04 pm	10.2.12(10.1.11)		S	12:10 pm	DAK	SS manual open removed at 12:06. Meter1:24kW 27kVar, Meter3:-14kW 21kVar, Meter4:6kW 3kVar
10.2.14(10.1.1)	3/14/08	8:02 am	10.2.14(10.1.2)	10.2.14(10.1.3)	S	8:16 am	DAK	Genset A1 setup LB3:10kW, LB6:40kW. LB6 increased to prevent reverse power trip.
10.2.14(10.1	3/14/08	8:16 am	10.2.14(10.		S	8:26 am	DAK	Dyno set to 100%, Triggers enabled. Motor started at

Appendix C - "CERTS Microgrid Test Bed - Test Log" (S =Successful; U = Unsuccessful)

.4)			**1.5)**					**8:21. Meter3:-21kW 19kVar**

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
10.2.14(10.1.8)	**3/14/08**	**8:33 am**	**10.2.14(10.1.9)**		**S**	**8:39 am**	**DAK**	**Motor started at 8:34. Meter3:-2kW -3kVar**
10.2.14(10.1.10)	**3/14/08**	**8:39 am**	**10.2.14(10.1.11)**		**S**	**8:46 am**	**DAK**	**SS manual open removed at 8:41. Meter3:-21kW 19kVar**
10.2.15(10.1.1)	**3/18/08**	**12:10 pm**	**10.2.15(10.1.2)**	**10.2.15(10.1.3)**	**S**	**12:15 am**	**DAK**	**Test revised to remove unavailable Genset B1 and test the gensets closer to capacity. Genset A1 and A2 setup and connected. LB3:50kW, LB4:50kW, LB6:40kW, LB5 is unused. LB6 increased to prevent reverse power trip. SS closed**
10.2.15(10.1.4)	**3/18/08**	**12:15 am**	**10.2.15(10.1.5)**		**S**	**12:21 pm**	**DAK**	**Dyno set to 100%, Triggers enabled. Motor started at 12:16. Meter1:69kW 21kVar, Meter3:29kW 15kVar, Meter4:14kW -1kVar**
10.2.15(10.1.6)	**3/18/08**	**12:21 pm**	**10.2.15(10.1.7)**		**S**	**12:32 pm**	**DAK**	**SS manual open asserted at 12:26. SS opened with a fault and PES alarm. Meter1:37kW 1kVar, Meter3:-2kW -4kVar, Meter4:2kW -7kVar**

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10.2.15(10.1.8)	**3/18/08**	**12:32 pm**	**10.2.15(10.1.9)**		**S**	**12:38 pm**	**DAK**	**Motor started at 12:33. Meter1:37kW 1kVar, Meter3:-2kW -4kVar, Meter4:-1kW 10kVar**
10.2.15(10.1.10)	**3/18/08**	**12:38 pm**	**10.2.15(10.1.11)**		**S**	**12:43 pm**	**DAK**	**SS manual open removed at 12:38. Meter1:70kW 22kVar, Meter3:31kW 16kVar, Meter4:16kW 0kVar**

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
10.2.16(10.1.8)			**10.2.16(10.1.9)**					
10.2.16(10.1.10)			**10.2.16(10.1.11)**					
10.2.17(10.1.1)	**3/14/08**	**8:46 am**	**10.2.17(10.1.2)**	**10.2.17(10.1.3)**	**S**	**8:54 am**	**DAK**	**Genset A1 setup LB3:20kW, LB6:40kW, LB6 increased to prevent reverse power trip.**
10.2.17(10.1.4)	**3/14/08**	**8:54 am**	**10.2.17(10.1.5)**		**S**	**9:00 am**	**DAK**	**Dyno set to 100%, Triggers enabled. Motor started at 8:55. Meter3:-13kW 18kVar**
10.2.17(10.1.6)	**3/14/08**	**9:00 am**	**10.2.17(10.1.7)**		**S**	**9:07 am**	**DAK**	**SS manual open asserted at 9:02. Meter3:-2kW -3kVar. The motor was still running for this capture.**
10.2.17(10.1.8)	**3/14/08**	**9:07 am**	**10.2.17(10.1.9)**		**S**	**9:13 am**	**DAK**	**Motor started at 9:09. Meter3:-2kW -3kVar**

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10.2.17(10.1.10)	**3/14/08**	**9:13 am**	**10.2.17(10.1.11)**		**S**	**9:20 am**	**DAK**	**SS manual open removed at 9:14. Meter3:-11kW 17kVar**
10.2.18(10.1.1)	**3/18/08**	**12:43 pm**	**10.2.18(10.1.2)**	**10.2.18(10.1.3)**	**S**	**12:46 pm**	**DAK**	**Test revised to remove unavailable Genset B1.Genset A1 and A2 setup and connected. LB3:20kW, LB4:40kW, LB6:40kW, LB5 is unused. LB6 increased to prevent reverse power trip. SS closed**
10.2.18(10.1.4)	**3/18/08**	**12:46 pm**	**10.2.18(10.1.5)**		**S**	**12:51 pm**	**DAK**	**Dyno set to 100%, Triggers enabled. Motor started at 12:46. Meter1:33kW 25kVar, Meter3:-5kW 19kVar, Meter4:13kW 1kVar**
10.2.18(10.1.6)	**3/18/08**	**12:51 pm**	**10.2.18(10.1.7)**		**S**	**12:58 pm**	**DAK**	**SS manual open asserted at 12:53. SS opened with a fault and PES alarm. Meter1:37kW 1kVar, Meter3:-2kW -4kVar, Meter4:17kW -7kVar**
10.2.18(10.1.8)	**3/18/08**	**12:58 pm**	**10.2.18(10.1.9)**		**S**	**1:14 pm**	**DAK**	**Motor started at 1:09. Meter1:37kW 1kVar, Meter3:-2kW -4kVar, Meter4:17kW 11kVar**
10.2.18(10.1.10)	**3/18/08**	**1:14 pm**	**10.2.18(10.1.11)**		**S**	**1:20 pm**	**DAK**	**SS manual open removed at 1:15. Meter1:32kW 29kVar, Meter3:-8kW 21kVar, Meter4:10kW 3kVar**

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:

Appendix C - "CERTS Microgrid Test Bed - Test Log" (S =Successful; U = Unsuccessful)

10.2.19(10.1.1)			**10.2.19(10.1.2)**	**10.2.19(10.1.3)**				
10.2.19(10.1.4)			**10.2.19(10.1.5)**					
10.2.19(10.1.6)			**10.2.19(10.1.7)**					
10.2.19(10.1.8)			**10.2.19(10.1.9)**					
10.2.19(10.1.10)			**10.2.19(10.1.11)**					
10.2.20(10.1.1)	**3/14/08**	**9:20 am**	**10.2.20(10.1.2)**	**10.2.20(10.1.3)**	**S**	**9:36 am**	**DAK**	**Genset A1 setup LB3:20kW, LB6:40kW. LB6 increased to prevent reverse power trip.**
10.2.20(10.1.4)	**3/14/08**	**9:36 am**	**10.2.20(10.1.5)**		**S**	**9:42 am**	**DAK**	**Dyno set to 100%, Triggers enabled. Motor started at 9:37. Meter3:-16kW 18kVar**
10.2.20(10.1.6)	**3/14/08**	**9:42 am**	**10.2.20(10.1.7)**		**S**	**9:48 am**	**DAK**	**SS manual open asserted at 9:43. Meter3:-2kW -4kVar.**
10.2.20(10.1.8)	**3/14/08**	**9:48 am**	**10.2.20(10.1.9)**		**S**	**9:55 am**	**DAK**	**Motor started at 9:50. Meter3:-2kW -3kVar**
10.2.20(10.1.10)	**3/14/08**	**9:55 am**	**10.2.20(10.1.11)**		**S**	**10:03 am**	**DAK**	**SS manual open removed at 9:57. Meter3:-15kW 18kVar**

DTC Registered Procedure - CERTS Microgrid Test Plan Appendix C: TEST LOG			
Dolan Technology Center	Document No: DTC212812.207.01A		
Written by: AEP	Effective Date: 23 Feb 2007	Target Group: Assigned	
Approved by: K. P. Loving	Procedure Review Date: 23 Feb. 2008		

Appendix C - "CERTS Microgrid Test Bed - Test Log" (S =Successful; U = Unsuccessful)

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
10.3.12(10.1.1)	3/18/08	1:20 pm	10.3.12(10.1.2)	10.3.12(10.1.3)	S	1:31 pm	DAK	Test revised to remove unavailable Genset B1. Genset A1 and A2 setup and connected. LB3:20kW, LB4:10AkW 15BkW 15CkW, LB6:10AkW 20BkW 10CkW. LB5 is unused. LB6 increased to prevent reverse power trip. SS closed
10.3.12(10.1.4)	3/18/08	1:31 pm	10.3.12(10.1.5)		S	1:39 pm	DAK	Dyno set to 100%, Triggers enabled. Motor started at 1:33. Meter1:36kW 27kVar, Meter3:-3kW 21kVar, Meter4:8kW 2kVar
10.3.12(10.1.6)	3/18/08	1:39 pm	10.3.12(10.1.7)		S	1:44 pm	DAK	SS manual open asserted at 1:39. SS opened. Meter1:38kW 1kVar, Meter3:-2kW -4kVar, Meter4:12kW -7kVar
10.3.12(10.1.8)	3/18/08	1:44 pm	10.3.12(10.1.9)		S	1:49 pm	DAK	Motor started at 1:44. Meter1:38kW 1kVar, Meter3:-1kW -4kVar, Meter4:9kW 10kVar
10.3.12(10.1.10)	3/18/08	1:49 pm	10.3.12(10.1.11)		S	1:55 pm	DAK	SS manual open removed at 1:50. Meter1:32kW 24kVar, Meter3:-7kW 18kVar, Meter4:6kW 1kVar

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:

Appendix C - "CERTS Microgrid Test Bed - Test Log" (S =Successful; U = Unsuccessful)

10.3.14(10.1.1)	**3/14/08**	**10:03 am**	**10.3.14(10.1.2)**	**10.3.14(10.1.3)**	**S**	**10:09 am**	**DAK**	**Genset A1 setup LB3:10kW, LB6:10AkW 20BkW 10CkW. LB6 increased to prevent reverse power trip.**
10.3.14(10.1.4)	**3/14/08**	**10:09 am**	**10.3.14(10.1.5)**		**S**	**10:15 am**	**DAK**	**Dyno set to 100%, Triggers enabled. Motor started at 10:10. Meter3:-19kW 18kVar**
10.3.14(10.1.6)	**3/14/08**	**10:15 am**	**10.3.14(10.1.7)**		**S**	**10:21 am**	**DAK**	**SS manual open asserted at 10:16. Meter3:-2kW -4kVar.**
10.3.14(10.1.8)	**3/14/08**	**10:21 am**	**10.3.14(10.1.9)**		**S**	**10:27 am**	**DAK**	**Motor started at 10:22. Meter3:-2kW -3kVar**
10.3.14(10.1.10)	**3/14/08**	**10:27 am**	**10.3.14(10.1.11)**		**S**	**10:35 am**	**DAK**	**SS manual open removed at 10:28. Meter3:-19kW 19kVar**
10.3.15(10.1.1)	**3/18/08**	**1:55 pm**	**10.3.15(10.1.2)**	**10.3.15(10.1.3)**	**S**	**1:56 pm**	**DAK**	**Test revised to remove unavailable Genset B1 and test the gensets closer to capacity. Genset A1 and A2 setup and connected. LB3:50kW, LB4:10AkW 20BkW 20CkW, LB6: 10AkW 20BkW 10CkW. LB5 is unused. LB6 increased to prevent reverse power trip. SS closed**
10.3.15(10.1.4)	3/18/08	**1:56 pm**	**10.3.15(10.1.5)**		**S**	**2:01 pm**	**DAK**	**Dyno set to 100%, Triggers enabled. Motor started at 1:56. Meter1:69kW 20kVar, Meter3:29kW 14kVar, Meter4:14kW -1kVar**
10.3.15(10.1.6)	3/18/08	**2:01 pm**	**10.3.15(10.1.7)**		**S**	**2:07 pm**	**DAK**	**SS manual open asserted at 2:02. SS opened with a fault and a PES alarm. Meter1:38kW 1kVar, Meter3:-1kW -4kVar, Meter4:2kW -9kVar**
10.3.15(10.1.8)	3/18/08	**2:07 pm**	**10.3.15(10.1.9)**		**S**	**2:13 pm**	**DAK**	**Motor started at 2:08. Meter1:38kW 1kVar, Meter3:-2kW -4kVar, Meter4:-2kW -9kVar**

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10.3.15(10.1 .10)	**3/18/08**	**2:13 pm**	**10.3.15(1 0.1.11)**		**S**	**2:19 pm**	**DAK**	**SS manual open removed at 2:14. Meter1:66kW 23kVar, Meter3:26kW 16kVar, Meter4:13kW 0kVar**

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
10.3.17(10.1 .1)	**3/14/08**	**11:58 am**	**10.3.17(1 0.1.2)**	**10.3.17(1 0.1.3)**	**S**	**12:02 pm**	**DAK**	**Genset A1 setup LB3:20kW, LB6:10AkW 20BkW 10CkW, LB6 increased to prevent reverse power trip.**
10.3.17(10.1 .4)	**3/14/08**	**12:02 pm**	**10.3.17(1 0.1.5)**		**S**	**12:09 pm**	**DAK**	**Dyno set to 100%, Triggers enabled. Motor started at 12:04. Meter3:-9kW 18kVar**
10.3.17(10.1 .6)	**3/14/08**	**12:09 pm**	**10.3.17(1 0.1.7)**		**S**	**12:16 pm**	**DAK**	**SS manual open asserted at 12:10. Meter3:-2kW -4kVar.**
10.3.17(10.1 .8)	**3/14/08**	**12:16 pm**	**10.3.17(1 0.1.9)**		**S**	**12:22 pm**	**DAK**	**Motor started at 12:17. Meter3:-2kW -3kVar**
10.3.17(10.1 .10)	**3/14/08**	**12:22 pm**	**10.3.17(1 0.1.11)**		**S**	**12:28 pm**	**DAK**	**SS manual open removed at 12:22. Meter3:-12kW 18kVar**
10.3.18(10.1 .1)	**3/18/08**	**2:19 pm**	**10.3.18(1 0.1.2)**	**10.3.18(1 0.1.3)**	**S**	**2:20 pm**	**DAK**	**Test revised to remove unavailable Genset B1. Genset A1 and A2 setup and connected. LB3:20kW, LB4:10AkW 15BkW, 15CkW, LB6: 10AkW 20BkW, 10CkW, LB5 is unused. LB6 increased to prevent reverse power trip. SS closed**

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10.3.18(10.1 .4)	**3/18/08**	**2:20 pm**	**10.3.18(1 0.1.5)**		**S**	**2:26 pm**	**DAK**	**Dyno set to 100%, Triggers enabled. Motor started at 2:21. Meter1:32kW 25kVar, Meter3:-8kW 19kVar, Meter4:9kW 2kVar**
10.3.18(10.1 .6)	**3/18/08**	**2:26 pm**	**10.3.18(1 0.1.7)**		**S**	**2:32 pm**	**DAK**	**SS manual open asserted at 2:27. SS opened with a fault and a PES alarm. Meter1:38kW 1kVar, Meter3:-2kW -4kVar, Meter4:17kW -8kVar**
10.3.18(10.1 .8)	**3/18/08**	**2:32 pm**	**10.3.18(1 0.1.9)**		**S**	**2:37 pm**	**DAK**	**Motor started at 2:32. Meter1:38kW 1kVar, Meter3:-2kW -4kVar, Meter4:17kW 11kVar**
10.3.18(10.1 .10)	**3/18/08**	**2:37 pm**	**10.3.18(1 0.1.11)**		**S**	**2:**	**DAK**	**SS manual open removed at 2:38. Meter1:33kW 27kVar, Meter3:-8kW 21kVar, Meter4:10kW 2kVar**

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
10.3.20(10.1 .1)	**3/14/08**	**12:28 pm**	**10.3.20(1 0.1.2)**	**10.3.20(1 0.1.3)**	**S**	**12:29 pm**	**DAK**	**Genset A1 setup LB3:20kW, LB6:10AkW 20BkW 10CkW, LB6 increased to prevent reverse power trip.**
10.3.20(10.1 .4)	**3/14/08**	**12:29 pm**	**10.3.20(1 0.1.5)**		**S**	**12:34 pm**	**DAK**	**Dyno set to 100%, Triggers enabled. Motor started at 12:29. Meter3:-14kW, 19kVar**
10.3.20(10.1 .6)	**3/14/08**	**12:34 pm**	**10.3.20(1 0.1.7)**		**S**	**12:40 pm**	**DAK**	**SS manual open asserted at 12:35. Meter3:-2kW, -4kVar.**
10.3.20(10.1 .8)	**3/14/08**	**12:40 pm**	**10.3.20(1 0.1.9)**		**S**	**12:45 pm**	**DAK**	**Motor started at 12:40. Meter3:-2kW, -3kVar**

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10.3.20(10.1 .10)	**3/14/08**	**12:45 pm**	**10.3.20(1 0.1.11)**		**S**	**12:51 pm**	**DAK**	**SS manual open removed at 12:45. Meter3:-16kW, 19kVar**

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
10.4.12(10.1 .1)	**3/20/08**	**8:30 am**	**10.4.12(1 0.1.2)**	**10.4.12(1 0.1.3)**	**S**	**8:35 am**	**DAK**	**Genset A1 setup. LB3:3.3AkW 3.3BkW 3.3CkW, LB4:13.3AkW 13.3BkW 13.3CkW, LB6:13.3AkW 13.3BkW 13.3CkW. LB6 increased to prevent reverse power trip.**
10.4.12(10.4 .2)	3/20/08	**8:35 am**	**10.4.12(1 0.4.3)**		**S**	**8:45 am**	**DAK**	**LB3:1.6AkW 3.3BkW 3.3CkW, LB6:6.66AkW 13.3BkW 13.3CkW. Triggers enabled. SS opened shortly afterward on reverse power. SS opened with a fault and a PES alarm. LB4 was still at 40kW load prior to the SS opening.**
10.4.12(10.4 .4)	3/20/08	**8:45 am**	**10.4.12(1 0.4.5)**		**S**	**8:46 am**	**DAK**	**SS reset and started with manual open asserted**
10.4.12(10.4 .6)	3/20/08	**8:46 am**	**10.4.12(1 0.4.7)**		**S**	**8:51 am**	**DAK**	**LB3:0AkW 3.3BkW 3.3CkW, LB6:3.3AkW 13.3BkW 13.3CkW.Triggers enabled. LB4 reduced at 8:46. LB4:3.33AkW, 13.3BkW, 13.3CkW**
10.4.12(10.4 .8)	3/20/08	**8:51 am**	**10.4.12(1 0.4.9)**		**S**	**8:56 am**	**DAK**	**LB3:0AkW 3.3BkW 3.3CkW, LB6:3.3AkW 13.3BkW 13.3CkW.Triggers enabled. LB4 reduced at 8:51. LB4:3.33AkW, 13.3BkW, 13.3CkW**

Appendix C - "CERTS Microgrid Test Bed - Test Log" (S =Successful; U = Unsuccessful)

10.4.12(10.4.10)	**3/20/08**	**8:56 am**	**10.4.12(10.4.11)**		**S**	**9:01 am**	**DAK**	**SS manual open removed at 8:56. SS closed. SS opened shortly afterward on reverse power trip. SS opened with a fault and a PES alarm.**

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
10.4.14(10.1.1)	**3/14/08**	**12:51 pm**	**10.4.14(10.1.2)**	**10.4.14(10.1.3)**	**S**	**1:01 pm**	**DAK**	**Genset A1 setup. LB3:3.3AkW, 3.3BkW, 3.3CkW, LB6:13.3AkW, 13.3BkW, 13.3CkW. LB6 increased to prevent reverse power trip.**
10.4.14(10.4.2)	**3/14/08**	**1:01 pm**	**10.4.14(10.4.3)**		**S**	**1:13 pm**	**DAK**	**LB6:6.6AkW, 13.3BkW, 13.3CkW. Triggers enabled. SS opened on reverse power at 1:08. Load step altered to prevent reverse power trip.**
10.4.14(10.4.2R)	**3/14/08**	**1:13 pm**	**10.4.14(10.4.3R)**		**S**	**1:21 pm**	**DAK**	**LB3:1.6AkW, 3.3BkW, 3.3CkW. Triggers enabled. LB6 reduced at 1:16. LB6:6.6AkW, 13.3BkW, 13.3CkW. SS opened shortly afterward on reverse power. SS opened with a fault and a PES alarm.**
10.4.14(10.4.4)	**3/14/08**	**2:07 pm**	**10.4.14(10.4.5)**		**S**	**2:18 pm**	**DAK**	**Test skipped briefly and returned to at 2:10pm. SS reset and started with manual open asserted**
10.4.14(10.4.6)	**3/14/08**	**2:18 pm**	**10.4.14(10.4.7)**		**S**	**2:23 pm**	**DAK**	**LB6:3.3AkW, 13.3BkW, 13.3CkW. Triggers enabled. LB3 reduced at 2:18. LB3:0AkW, 3.3BkW, 3.3CkW**
10.4.14(10.4	**3/14/08**	**2:23 pm**	**10.4.14(1**		**S**	**2:29 pm**	**DAK**	**LB3:0kW, 3.3BkW, 3.3CkW. Triggers enabled. LB6**

Appendix C - "CERTS Microgrid Test Bed - Test Log" (S =Successful; U = Unsuccessful)

.8)			**0.4.9)**					**reduced at 2:24. LB6:0AkW, 13.3BkW, 13.3CkW.**
10.4.14(10.4 .10)	**3/14/08**	**2:29 pm**	**10.4.14(1 0.4.11)**		**S**	**2:37 pm**	**DAK**	**SS manual open removed at 2:31. SS closed. SS opened shortly afterward on reverse power trip.**

Start Test Sequence No.	Test Date	Start Time	Verify/ Action	Verify/ Action	Status S or U	End Time	Initials	Test Event Comments:
10.4.17(10.1 .1)	**3/14/08**	**1:21 pm**	**10.4.17(1 0.1.2)**	**10.4.17(1 0.1.3)**	**S**	**1:30 pm**	**DAK**	**Genset A1 setup. LB3:6.6AkW, 6.6BkW, 6.6CkW, LB6:13.3AkW, 13.3BkW, 13.3CkW. LB6 increased to prevent reverse power trip.**
10.4.17(10.4 .2)	**3/14/08**	**1:30 pm**	**10.4.17(1 0.4.3)**		**S**	**1:38 pm**	**DAK**	**LB3:3.3AkW, 6.6BkW, 6.6CkW. Triggers enabled. LB6 reduced at 1:33. LB6:6.6AkW, 13.3BkW, 13.3CkW.**
10.4.17(10.4 .4)	**3/14/08**	**1:38 pm**	**10.4.17(1 0.4.5)**		**S**	**1:49 pm**	**DAK**	**SS manual open asserted at 1:39. SS opened with a fault and a PES alarm. SS reset and started**
10.4.17(10.4 .6)	**3/14/08**	**1:49 pm**	**10.4.17(1 0.4.7)**		**S**	**1:56 pm**	**DAK**	**LB6:3.3AkW, 13.3BkW, 13.3CkW. Triggers enabled. LB3 reduced at 1:51. LB3:1.6AkW, 6.6BkW, 6.6CkW**
10.4.17(10.4 .8)	**3/14/08**	**1:56 pm**	**10.4.17(1 0.4.9)**		**S**	**2:01 pm**	**DAK**	**LB6:0AkW, 13.3BkW, 13.3CkW. Triggers enabled. LB3 reduced at 1:56. LB3:0kW, 6.6BkW, 6.6CkW**
10.4.17(10.4 .10)	**3/14/08**	**2:01 pm**	**10.4.17(1 0.4.11)**		**S**	**2:07 pm**	**DAK**	**SS manual open removed at 2:02. SS closed. SS opened shortly afterward on reverse power trip.**