DESIGN REQUIREMENT LIST

Design requriement must (1) be as quantitative, measurable, testable, and precise as possible, (2) describe the need, not the solution, (3) be comprehensive, and (4) be presented in an easy to understand format.

Design Project	Distribution Fault Location
Team Name:	DFL
Team Members	Tracy Adams, Tierra Byrd, Henry Cobb, Hassan Disu, William Reid
Date:	12-Dec-08
Version No.	3

Requriements	Desrciptions	Sources
Overall Function	Accurate distribution fault location is a difficult task for power utility companies across the nation because of distribution systems multi-line designs. Fault location has been a well researched topic for many years and there have been many strides towards real-time accurate detection. San Diego Gas and Electric is looking to upgrade the system that is in place now to a more efficent OMS system.DFL is working with SDG&E to create a working fault detection system that will give accurate fault locations in real-time. The functionality of our system will be to calculate the distance of the fault from the source (substation) using a chosen algorithm. Using a system that would be similar to a control center alarming that an outage has occured on a line (VHDL code and FPGA board). Bringing all of this fault data together into one easily accessible interface to be made availible in real-time to operators for quicker restoration times and more reliable distribution power.	Senior Design
Performance	The expected response time of our small scale power system should be no more than 3 minutes from the time that the fault occurs to the time it is displayed on our website. Delays may occur if there is an issue with the polling system. In that case there may have to be the option for the oporator to manually operate the system to check for fault data. We will test the system to make sure that the complete polling system and accurate locations are made available 95% of the time when phase to ground faults occur. The other 5% will be due to polling issues or fault locations that are outside of 10% of the actual fault range.	San Diego Gas & Electric and DFL
Cost	The tentative budget for this project is $2,177.00: □ Matlab and Simulink Student Version $99.00 □ Simpower Systems Toolbox $59.00 □ PSAT Free Download □ Labview $1249.00 □ Power System Equipment $150.00 □ FPGA Board $120.00 □ Misc. $500.00	DFL
Safety	All data collected will be relevant to the fault specifications and will not invade customer privacy. All federal regulations will be followed.	
Compliance	• Western Electricity Coordinating Council (WECC) Standard VAR- STD-002b-1 Power System Stabilizer • North American Electric Reliability Corporation (NERC) • Federal Energy Regulatory Commission (FERC) • California Public Utility Council (CPUC)	FERCI, NERC, WECC, IEEE

Interfaces	The main interface of this system design is the web-based distribution fault location system. This is where all of the data from the system will be made availible for the use of operators.	
Enery, Power, and Environment	The system that we are creating will not effect the environment, power system or the use of energy negatively but it will actually improve the system outages and improving energy and power consumption.	
Lifespan	This system should last as long as the various fault data components are being polled in real-time and giving accurate locations.	
Size, Weight, Maintenance	Checking the different component and running fault simulations would be the best way to maintain the system and make sure that it is running properly. Adjustments can be made acordingly i.e. new algorithms, or more advanced technologies.	
Timeline and Schedule	November/ December Simulations and testing of single and three phase power systems with faults in Simulink and Labview November / December Research integration options for all fault detection components January Get approval to begin building small scale power system January/ February Creation of the three- phase network with phase to ground faults January/ February Create digital system using FPGA board and VHDL code Create XY node mapping system February/ March Combine all components to create web-based DFL System	