

The history of the Lake Country Power Initiative

In 2001, Lake Country Power Cooperative, a customer owned 41,000 member electric utility headquartered in Grand Rapids Minnesota decided to convert their AM/FM/GIS system to ESRI. Please allow me to give a brief history of this very large service territory. Two additional service centers are located in Virginia and Kettle River Minnesota. Due to their size, Lake Country Power required a Web based GIS system that would be flexible enough to meet its needs.

Under LCP's direction the original scope of the project initially was only to include substations, primary conductor, major primary equipment and customer locations placed in approximate locations based of the original paper maps. Some field verification was necessary for one of the service centers due to some inaccuracies and missing information in the original paper map documentation.

The LCP GIS system had been updated on a yearly basis in an AutoCAD based system developed by Central Area Data Processing Cooperative which is currently known as NISC. AutoCAD map was tied through ADE to an Oracle database. Next, USG staff acquired an NISC Geodatabase model and the conversion tools that were created by NISC in order to complete the export from AutoCAD/NISC to an ESRI personal geodatabase. An extensive amount of cleanup had to be done before the system could be exported from the AutoCAD environment. No transformers or services and secondary conductors were placed at the time and no connectivity could be established due to lack of such data.

LCP staff took over the project and started maintaining the data and establishing connectivity. The issue here was that only one GIS user was available to do updates in ArcMap. Realizing the huge task at hand, more LCP staff members were trained to perform edits in ArcMAP.

A list of connectivity rules were provided to USG by NISC and given to LCP. At the same time USG installed an ArcIMS website and provided technical support and training for the LCP staff. USG staff provided ongoing technical support for both ArcMap and ArcIMS throughout the next two years. Our staff made several trips to LCP to upgrade their software. ArcReader and ArcPublisher were also installed for viewing and query purposes by other staff members at LCP.

A pilot project was started in 2003 using a third party vendor to begin GPS collection of the inventory on nine of their substations. Some quality control issues arose when USG started looking at the collected data. None of the conductor data was tagged with line section numbers and the naming conventions for the conductor did not match the existing naming convention in the model. Transformer data must also be verified in the field. Integration of this data into the GIS system is currently being worked on by USG staff.

It was then determined that USG staff needed to begin upgrading the personal geodatabase to ArcSDE so that they could have multiple LCP staff editing data.

USG staff then installed Microsoft SQL Server and ArcSDE. The issue here was that only one staff member was familiar with database administration or administering versioning, privileges, etc. This resulted in more training for ArcSDE from the ESRI learning center in Minneapolis for both USG staff and LCP staff. A total of four staff members from LCP were also trained as GIS users in ArcSDE. They were assigned the task of establishing connectivity.

Once the editing got underway versioning, conflict resolution, reconciling, and posting, became an issue so USG staff wrote a document for LCP staff to follow to solve this problem.

USG staff then upgraded ArcIMS to look directly at ArcSDE/MS SQL Server data.

At this time LCP staff is still working on the collection of transformer numbers that are in the field but were never input into the earlier systems.

Concurrently, in 2004 LCP was installing a dispatch center and began to utilize Outage Management System (OMS) to predict outage locations for crew dispatching. Since only major equipment was included in the conversion inaccurate outage predictions occurred in the OMS. In the fall of 2004 LCP staff corrected portions of the dispatch model deficiencies using the NISC billing system. Other connectivity issues between transformers and primary line have been slow and completion of connectivity and adding additional fuses takes one to two weeks per small substation and two to four weeks for larger substations. LCP has 38 substations that need connectivity before they can provide an accurate outage prediction. Solutions to speed up this process were purchase two additional ArcEditor Licenses and training staff to help update the system. In order to complete the dispatch model entry for LCP in the time allotted for the project, option one is for additional time to be dedicated by staff members to update the system. The costs incurred for that are not in the LCP budget. Option two is to involve a contractor for a cost of \$90,000 to 120,000 and that is not in the budget either. It was recommended that LCP continue to complete this project with existing staff and re-assess the need for a contractor in the third quarter of the year, if necessary.

The next piece to the puzzle was a staking application. Automated staking software originally was intended to be integrated with the GIS system. At this point that has not occurred.

GIS export to Windmill has been completed successfully.

USG programming staff completed a program to auto-place fuses along selected feeders/substations and populate them with unique ID numbers.

Other GIS tasks still required include:

Exploring the potential of integrating a MS Access schedule created and maintained by LCP to display trucks in the field using the GIS system.

USG staff will research utilizing GIS to update the CIS system.

Possible ties to AMR and SCADA systems have not been completed.

LCP also needs new map books but they are not in the 2005 budget. The last set was printed in 2001 by USG staff. They will defer the decision on printing until 2006. During 2005 LCP will be evaluating the possibility of electronic map books for the line crews. Note that one of the crew of LCP has an electronic map book as a pilot project.

Unfortunately, the completion of the entire LCP system before the storm season in 2005 is unlikely.

Many budget changes have been made due to unforeseen circumstances.

Some priorities have changed from the original scope of the project as they usually do.

LCP staff will significantly influence the outcome of their database. It will be more accurate and will improve the dispatch model tremendously once it is completed.

A long-term written plan for Lake Country Power will be forthcoming in the winter months of 2005.