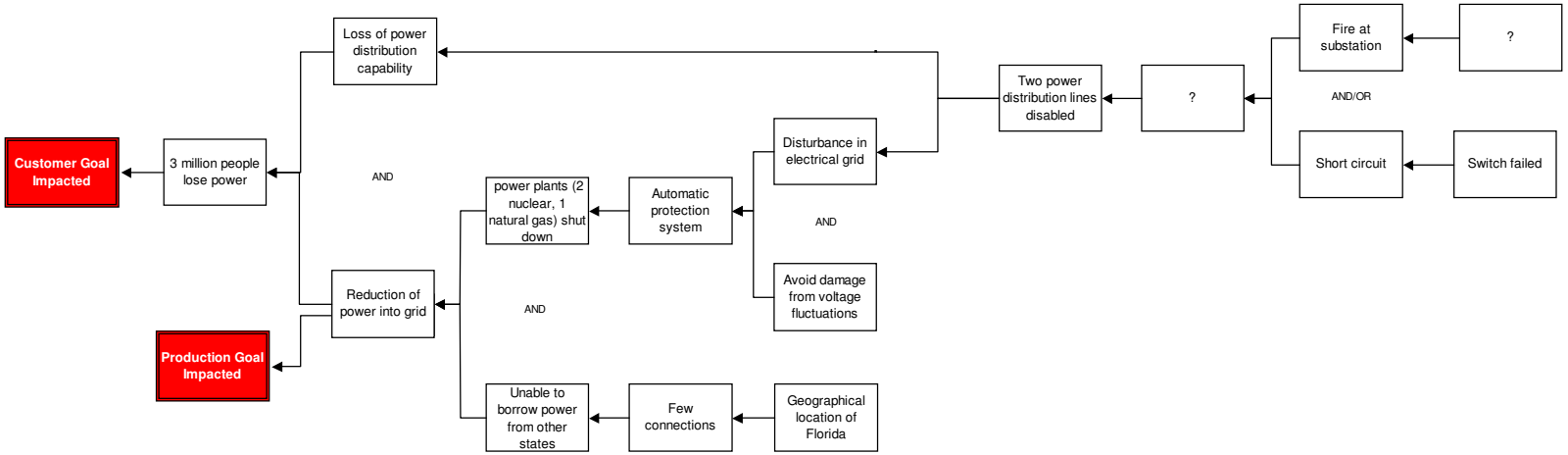
Florida Power Outage
February 26, 2008

Florida Officials can't figure out what caused the power outages that occurred Tuesday. There are many things that contributed to the outages, but none of them should have been sufficient to cause outages of the extent that occurred. A root-cause analysis can come in handy, even if all the causes aren't known. The whole purpose of these analyses is to show the factors that caused a given problem. Frequently we do that simply by arranging root causes that we already know, to ensure that we've covered all the bases. Well, we can do the same thing in the middle of an investigation, even if we're not sure what all the causes were. In fact, the exercise can assist us in finding the problem. So, we'll map what we know, leaving question marks in areas of uncertainty. A root cause analysis, based on what is known at the time, is shown below.



First, what is the impact to the goals? Well, a power company strives to provide electricity, so when 3 million people are left without power, it's an impact to the customer service goals. Additionally, having a reduction in the amount of electricity available is an impact to the production goal. People lost power for two reasons: 1) the decrease in power distribution capability and 2) the reduction of power available. There was less power available because Florida was unable to borrow from other states, due to the fact that it has fewer connections because of its geographic distance from other states.

There was also less power because three power plants (2 nuclear, 1 natural gas) were shut down. These plants automatically shut down when they register a disturbance in the electrical grid in order to protect the equipment from voltage fluctuations. The disturbance in the electrical grid (and the reason for the decrease in power distribution capability) was due to the disabling of two power distribution lines. After this is where it gets fuzzy. We're not sure why the two lines were disabled. We know that there was a fire at the substation, and a failed switch, which caused a short circuit. But we're not sure how those happened either. It's possible that the short circuit was the root cause of the fire, but for now we'll just leave it like this. Looking below, we see that we have a high-level root cause analysis nearly completed, and that the focus of our analysis should be on what caused the disabling of the power distribution lines, and what caused the fire and switch failure at the substation.

A thorough root cause analysis built as a Cause Map can capture all of the causes in a simple, intuitive format that fits on one page. Even if our thoughts on a problem aren't complete, it can help immensely to organize them by performing a root cause analysis, even if there are some holes (shown with question marks). It's a great place to begin!

More detail can be added to this Cause Map as the analysis continues. As with any investigation the level of detail in the analysis is based on the impact of the incident on the organization's overall goals.

Cause Map
Detail Level

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Why?

Effect ← Cause

NOTE: Read the Cause Map from left to right with the phrase "Was Caused By" in place of each arrow.