

Ethics Paper

In today's modern, software-controlled world, there are so many places where a single bug in a single line of code can throw off an entire system's ability to run smoothly. Then there are issues that stem entirely from the human's that supply the inputs to that software, or a combination of a simple error by one human that gets compounded by a software system that is not designed to catch human error the way it should be. In the article that I have chosen, I will analyze its ethical successes, failures, and dilemmas, after providing a full synopsis of the article and the basic problems at hand in the article.

The topic of the article is the causes of the rolling blackouts that plagued over 50 million people in the eastern and central United States and Canada in August of 2003. As well as the reasons those events could have been prevented. There are three distinct portions of the article that I will outline here as well. The opening statement, the "monitor and predict" section, and the "unstoppable cascade" section.

In the opening section, the article speaks about how this disaster that was characterized by "communication failures, software misuse, and power line shut-downs" caused rolling blackouts the likes of which not seen in the United States in its history. This opening statement has a quote from the head of the US-Canada Power System Outage Task Force, which talks about how if the critical procedures, that are designed to handle mistakes and issues, are not followed, then a few small problems can easily grow into a catastrophe.

The "monitor and predict" section speaks about the NERC standards that recommend the use of "predictive and monitoring" software that watches the known power sources, and predicts the voltages in lines that are not actively monitored so that accurate models can be kept and that it is ensured that there are no problems that must be addressed. It also states that in this disaster's case, a shut-down on a power line was not reported, causing the estimating software to make a bad estimate. Which then resulted in the analysis tool, which took that estimate as an input, to misinterpret the actual scenario going on, resulting in an incorrect real-time model.

That incorrect model, was caused by an analyst who forgot to enter the correct estimate into the analysis tool, and then “went out to lunch” right after that. As a result of this issue, and many other similar issues happening on the same day, these failures and faults then were said to have “propagated” through the different layers of predictive software. Unbeknownst to everyone, these issues could have been entirely prevented, yet instead these issues went unknown until the entire US northeast and eastern Canada were without power.

There are very few ethical successes detailed in this article, however it is stated that as a result of this catastrophe, the NERC standards, that prior to this event were only recommended, became mandatory in early 2004 after this event shed light on the problems associated with these standards not being mandatory. Although it is unknown whether or not making these standards mandatory will prevent future blackouts, it is a step in the right direction towards truly preventative methods in the future. However, forcing mandatory standards cannot make anyone choose the right decision or to not cut corners.

There are many ethical failures in this case, however the most prominent of these is that of the employee who “promptly went out to lunch” as soon as they were aware of one of the shut-downs, and as a result did not turn on the analysis tool so that further model estimates could be made, which could have enlightened others as to the problems occurring and allowed the companies involved to attempt to repair the issues. The dilemmas that are brought to light by this event would include the fact that you cannot force individuals to be ethical, as well as the problem of how can a company design software that can possibly predict or recognize possible human error and alert the necessary people of that error. The software in use by the companies involved with this catastrophe was not designed to recognize human error, but only to calculate a model of the grid based on inputs that are assumed to be correct.

As an industry, we as engineers, especially electrical and computer engineers, can absolutely not assume that those who utilize our products and services will know everything that they are doing, as well as we cannot assume these users will utilize good ethical conduct in their work environment either. Therefore we must design our products to be as ironclad as possible in accounting for all possible failing scenarios. Just as well, we can educate those same

users to be aware of possible issues like the ones here that could have been identified and prevented far before they cascaded into the rolling blackouts that ended up occurring.

In the end, it is important to highlight that in this disaster, the health and safety of many people was put at risk, which is the number one ethical concern for engineers. Just as well, in this catastrophe, it was observed how easily that a relatively well-designed system could have small problems cascade through it until they were unable to be controlled any longer. Above all else, these events could have been prevented as long as each issue is reported as soon as it is known, instead of waiting until a later time and then forgetting about it. As Tigers, we are expected to adhere to the highest standards of ethics, as for us, best is the standard.

Article is located at this link:

<https://www.newscientist.com/article/dn4405-preventable-failures-caused-us-power-blackout/>