

UFIM News

Welcome

This is the first UFIM Newsletter. This first newsletter is being provided by S.Chapel Associates to all UFIM users. In the future the intended audience are active users of the Utility Fuel Inventory Model who have purchased the annual *UFIM Software and User Support Service* from S.Chapel Associates.

Current plans are to publish the newsletter twice a year and to cover at least the following topics:

- News
- Technical Discussions
- Training and User Support
- Software Maintenance
- Miscellaneous Items

I welcome comments, suggestions and any other input that the active UFIM users might want to provide.

Email [Stephen Chapel](mailto:Stephen.Chapel)

News

A new version of UFIM is available, UFIM 5.0. The setup file can be downloaded from the link below. Because it is available only to currently licensed users you will need a password to install the file - contact Stephen Chapel for the password.

Link to [UFIM 5.0 Install](#).

The new version has an improved contact sensitive help system. In addition a tutorial chapter has been added to the user manual. The contact sensitive help system has been reorganized and uses the new Microsoft help program. If you select a menu or almost any data input field and hit F1 you will get an explanation of the menu / input field.

Technical Discussions

Two technical issues have come up in recent user support activities. The first was a result of a user running a case that resulted in the following error message:

Error Number: 2001: There is at least one period in which the probability that a disruption or warning arrives is greater than certainty (1.0).

The second issue concerns how to characterize outages costs when a generation plant, during some time periods, is needed for voltage support. Each of these issues is discussed here.

Disruption Probabilities

In UFIM for any given month there are two possible states - disruption and normal. In addition, the model assumes that disruptions are mutually exclusive - that is two or more disruptions cannot occur at the same time.¹ The implication of these two assumptions is the following:

Suppose you have two disruptions A and B. The general formula for the probability of A or B occurring is:

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B).$$

But because in UFIM the disruptions are mutually exclusive ($P(A \text{ and } B) = 0$), $P(A \text{ or } B) = P(A) + P(B)$. The result is for any month the sum of disruption probabilities must be ≤ 1.0 . In our example $P(A) + P(B)$ must be ≤ 1.0 .

To compute the probability of a disruption occurring in a given month you need to know (1) the annual arrival rate of the disruption and (2), when the disruption occurs, the likelihood of the disruption occurring in that month. Specifically if d is the *disruption_i*, m is *month_j* and a is the annual arrival rate for *disruption_i*, the equation for computing the probability of the disruption occurring in *month_j* is:

$$p(d|m) = \frac{1}{a}p(d \text{ occurs in } m \mid d \text{ occurs})$$

For example if (1) the arrival rate for a specific disruption is 0.25 (occurs on average four time a year) and (2), when it occurs, the probability that it occurs in January is 1/10, then the probability that the specific disruption will occur in any January is:

$$p(d|m) = \left(\frac{1}{0.25}\right)\left(\frac{1}{10}\right) = \frac{4}{10} = 0.4$$

¹See UFIM Tips and Traps #5: *Modeling Joint Disruptions*, for a discussion of how to model the effects and likelihoods of joint disruptions.

Shortage Costs

One UFIM user is analyzing inventory needs at a plant that, because of transmission constraints, is needed for voltage support at least part of every day or week. The user has assessed the supply situation at the plant and as a result expects a supply disruption of 1 to 3 weeks to occur on average once a year. The question posed to me was: “what should the shortage cost curve (replacement power cost curve) look like?”

My advice in this situation is the following: If in fact the plant is needed for voltage support at least part of the time, the cost of reducing burn at the plant during such periods will be very high - perhaps \$1000 or more per MWH. The question then is what percent of the time can burn be reduced without reducing burn when the plant is needed for voltage support. If, for example, 25 percent of the time the plant is needed for voltage support, for the remaining 75 percent of the time the cost of burn reduction will likely be significantly less.

Training and User Support

During the past year I have answered UFIM modeling questions for a number of companies – The Technical Discussions section above illustrates some of the support issues. In addition web-based user training has been provided to several companies including Ameren, TVA, OGE and Exelon.

The web-based training seems to work very well. If anyone is interested, I can provide the course outline and training materials. The training is done over several sessions of 1 to 2 hour each. The topics include (1) introduction to model mechanics, (2) first principles of fuel inventory analysis, (3) preparation of inputs and running cases, and (4) development and analysis of company specific inventory cases.

Software Maintenance Issues

One issue that has been reported by Exelon is that if UFIM and Microsoft Power Point are kept open for long periods (days) Power Point freezes. Closing UFIM fixes the problem. To date I have been unable to replicate this problem. However I have had problems with Power Point freezing if I left it open over night or for a couple of days. If anyone else has experienced this UFIM / Power Point problem please let me know.

The computations in UFIM are written in C++ and thus this part of the model should not become obsolete for a very long period of time. The user interface is a different story. The current user interface was written in 2002 in Visual Basic 6. Since then Microsoft has transitioned to the .NET environment and no longer officially supports VB6. The VB6 compiler only works on Windows XP (not Vista or Windows 7). In addition I have had trouble

creating install packages with the VB6 generated code I spent weeks getting the Version 5 install to work. It may be that sometime in the next couple of years the interface is going to have to be upgraded so that it can be compiled using Visual Studio .Net.

Miscellaneous Items

List of Current UFIM Users

1. Jeff Jones and Jamie Loomis, Ameren
2. Sumeet Bidani and Tim Smart, Duke Energy
3. Tim Scanlon and Jose Guerrero, Exelon
4. Gail Varner, East Kentucky Power Coop
5. Ed Blunk, KCLP
6. Joseph Brignola, Nevada Power Company
7. Kevin Lee, OG&E
8. Mike Oaks, Southern Company
9. Leonard Muzyn, TVA

Reference Materials

Link to [UFIM 5.0 User Manual](#)

Link to [UFIM Basic Concepts Manual](#)

Link to [UFIM Tips and Traps](#)

Link to [Fuel Inventory Management Paper](#)

Link to [UFIM Web-Based Training Curricula](#)

Link to [UFIM Bulletin Board](#)