

OPERATIONAL STAGES OF THE COST OF PRODUCTION INSURANCE ACTUARIAL RATING MODEL

The Cost of Production Insurance actuarial rating model is organized into several segments for purposes of data management. To explain the model's operation, the Louisiana Crop Reporting District (CRD) 30 will be used as an illustration. The steps involved in processing data through the model consist of 13 specific stages, which are detailed in the attachment "Operational Stages of the Cost of Production Actuarial Model". A more in-depth discussion of the methodology utilized in the series of spreadsheets may be obtained from the "Cost of Production Insurance Rating Methodology White Paper". These spreadsheets contain step-by-step explanations. References to these steps are made in boldface throughout the attachment. If there are any questions please contact us by the following information:

E-mail: cparks@agrilogic.com

Phone: (979) 690-2106 ext 8119

Order of Rating Methodology Files

- 1) Prod Yield Dist (1).xls
- 2) Prod Yield Gen 22041 (2).xls
- 3) Prod LCR Calc (3).xls
- 4) LA CRD 30 DB imp file.xls
- 5) COP Insurance LA (Miss Portal).xls
- 6) COP Final LA CRD 30 85%.xls

Producer Data Generation

- 1) Producer distributions obtained from the National Agricultural Statistics Service (NASS) are applied to county reported acreage, yield, and price information to develop a producer specific data set for each county in the USDA Farm Resource Region (USDA FRR).
- 2) The producer specific data sets are imported into the "Prod Yield Dist.xls" file, which is used

for generating annual liability and loss projections for each producer within a county. The producer's experience is combined with all other producers in the county to develop a

producer specific county total for liability, indemnity, and loss cost ratio (LCR) information. This process refers to **steps 1 and 2** in the “Prod Yield Dist.xls” file.

Loss Cost Ratio Calculation

- 3) Producer specific county total information for liability, indemnities, and LCRs are imported into the “LA CRD 30 data sheet” tab in the “LA CRD 30 DB imp.xls” file. See **step 1** in this file. County data is also imported on the sheet from total harvested and planted acres each year.
- 4) Information imported onto the “LA CRD 30 data sheet” tab is transferred to the “Liab, LCR, Indem” tab, which is **step 2** in the same workbook. This information is referenced to the “COP insurance LA (Miss Portal).xls” file in step 3.
- 5) All available years of county liability and LCR data enters the “COP insurance LA (Miss Portal).xls” file on the “LA 30 C%” tab. In **steps 4 through 7**, this information is then sorted and an appropriate capping percentage is identified.
- 6) The appropriate capping percentage, catastrophic losses, and liability for both the current year and the entire experience period are referenced onto the “LA 30 Co” tab (**step 8**). This sheet is used for identifying the implied district excess loading factor.
- 7) The implied load factor is referenced to the “LA 30” tab in **step 9**, which is used to identify each county’s contribution to the regional catastrophic load for the current year.
- 8) Information from this and other corresponding district sheets is referenced to the “LA Sum” tab, which summarizes all information from each CRD in the Mississippi Portal USDA FRR (Louisiana CRD 30’s FRR). This stage is completed in **steps 10, 11, and 12**.
- 9) These summaries of information for each CRD are referenced into the “COP Final LA CRD 30 85%.xls” file “Reg Load” tab in **steps 13 and 14**. This sheet is used for identifying the appropriate regional load to be assigned to Louisiana CRD 30. The regional load (catastrophic losses collected in the Louisiana CRD 30) is referenced into the “LA Co 30” tab which is the same sheet as was in “COP insurance LA (Miss Portal).xls” file. The difference is that the latter portion of the sheet, which identifies the appropriate load for each county within the CRD, has been completed in **step 15**. This could not be performed earlier due to the absence of a complete summary of catastrophic losses allocated to the regional level.
- 10) A total final load for each county in the district is calculated in **step 16**. The load information is referenced to the “Base Calc – Franklin” tab in addition to the capped county LCR which was also identified on the “LA Co 30” tab.
- 11) Acreage and other county information is referenced to the “Ex Sum” sheet in the “COP Final LA CRD 30 85%.xls” file for each county. See **step 17** for an explanation of the origin of

the data. Coordinates for latitude and longitude are also imported into the sheet from the ArcView GIS software.

Smoothing Operation

- 12)** Smoothing and loading of the base rate is performed in “Base Calc – Franklin” sheet which develops the county base rate in **steps 18 and 19**. The county base rate is referenced to the “Prem Calc (Irr)” and “Prem Calc (Dry)” for calculation of the producer specific premiums under each practice. This is performed in **steps 20 and 21**.
- 13)** The final summation of the producer’s liability and premiums are determined on “Comb Rate” tab. (**See step 22.**) The completion of this step concludes the calculations involved in rating the cost of production insurance policy.