

REPORT TO
Risk Management Agency (RMA)
Of
Federal Crop Insurance Corporation (FCIC)
On
Expert Review of
Corporation Proposed Policy (CPP)
For The

FCIC

COST OF PRODUCTION
INSURANCE PLAN FOR COTTON

Prepared by

MUETTERTIES, BENNETT AND ASSOCIATES, INC.

Mountain Lakes, New Jersey
September 15, 2003

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Via E-mail and Federal Express to

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Re: Expert Review
Blanket Purchase Agreement (BPA) 45-RMA1-3-0015
Work Order # RMA-03-0004
Board Memorandum (BM) BM706
FCIC Cost of Production Insurance Plan for Cotton
Target Delivery Date September 15, 2003

Dear Secretary Anderson:

MBA Inc. is pleased to enclose our report in conjunction with the captioned project. The purpose of this report is to present the findings and detail of our expert review of this proposal to the Federal Crop Insurance Corporation in accordance with the Federal Crop Insurance Act (7 U.S.C 1501 et seq.). The Federal Crop Insurance Act requires the FCIC Board of Directors to establish procedures under which any policy or plan of insurance, as well as any related material modification of such a policy or plan of insurance, shall be subject to independent review by persons experienced as actuaries and in underwriting.

MBA Inc. Consultants in Actuarial Science

Transmittal Letter – “FCIC Cost of Production Insurance Plan for Cotton”

The report presents a fair and reasonable review of the proposal for the FCIC Cost of Production Insurance Plan for Cotton. The review is based upon information provided to Muetterties, Bennett and Associates, Inc. (“MBA”). No attempt was made to verify or audit this information. The actuarial analysis and estimates in this report are based upon appropriate actuarial assumptions and procedures as described herein. MBA assumes no responsibility for any loss or damage that might arise from the use of, or reliance upon, this report other than for the purposes set forth herein.

Based on our expert review as documented in this report, we recommend that the proposed program not be approved in its present form at this time. This is a complicated program whose implementation will require producers, approved insurance providers (AIPs), and the FCIC to develop new accounting procedures, new reporting procedures, and new management controls. The costs associated with these changes are not well-documented in the material available for review nor are they spelled out in a meaningful manner..

Further, the interaction of this program with other forms of crop insurance is not analyzed in the submission. Cost of production crop insurance relies more heavily on rating individual producers than do multiple peril crop insurance (MPCI), crop revenue coverage (CRC) and other types of crop insurance. Also, it uses parameter values (e.g., expected price) distinct from corresponding parameters for existing crop insurance products. For these reasons, it is likely that producers will select crop insurance products so as to generate adverse selection from an FCIC perspective.

Under current Federal law, FCIC is required to contract for research and development of cost of production insurance policies for as many commodities as possible using rating procedures that recognize cost differences at the county level. The research thus far demonstrates that implementing such programs is a massive undertaking, and that implementation will add greatly to the costs of delivery the benefits of crop insurance to producers.

It is our opinion that simpler cost of production insurance plans can be designed and implemented. Such designs would serve producers, AIPs, and the FCIC in a more cost-efficient manner both at implementation and as the program is maintained in succeeding years.

We also note that some excellent ideas are embedded in this proposal and should not be dismissed without further research. For example, the submission introduces concepts of individual risk rating and experience rating. It would be worthwhile to investigate possible broader application of experience rating to all forms of crop insurance so as not to create incentives for potential adverse selection. Likewise, whole farm concepts and enterprise risk concepts merit further research independent of the FCIC decision regarding the proposed cost of production insurance plan for cotton.

The current submission does not present the only possible COP insurance product. The submission does not document reasons for selecting these product features over other designs

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Transmittal Letter – “FCIC Cost of Production Insurance Plan for Cotton”

and simpler products. For example, catastrophe coverage is not incorporated in the calculation of rating values for this program. If the FCIC decides to conduct further research into cost of production coverage, we recommend that such research be targeted at simpler products more easily communicated to producers, imposing less burden on producers and AIPs, and using parameters consistent with those selected for existing crop insurance products.

To sum, we recommend that:

1. The current submission not be approved. Many considerations need to be addressed, including policy considerations regarding acceptable cost of delivery.
2. If FCIC decides that further research is appropriate, such research be directed at simpler products using pricing assumptions consistent with current crop insurance programs.

If there are any questions or suggestions regarding this report, or any further information is desired, please do not hesitate to contact us. In particular, we will respond to Board inquiries regarding our expert review in accordance with the Task Order Statement of Work.

We thank you and your colleagues for the opportunity to work with you on this important engagement.

Sincerely,

Alfred O. Weller
Consulting Actuary

Enclosure

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September 15, 2003

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Re: Expert Review
Blanket Purchase Agreement (BPA) 45-RMA1-3-0015
Work Order # RMA-03-0004
Board Memorandum (BM) BM706
FCIC Cost of Production Insurance Plan for Cotton
Target Delivery Date September 15, 2003

Dear Secretary Anderson:

This letter serves to identify the actuaries responsible for this report. The report has been prepared under the supervision of Charles F. Cook by Alfred O. Weller, David Pochettino, and F. Douglas Ryan with peer review by Charles F. Cook and John H. Muetterties.

Sincerely,

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SUMMARY OF FINDINGS
For
Expert Review
Of
Revised Livestock Gross Margin (LGM) Plan of Insurance

Based upon our expert actuarial review of the corporation proposed policy (CPP) for a “Cost of Production Insurance Plan for Cotton” as documented in the attached detailed report of supporting documentation, we conclude:

that: the CPP for the Cost of Production Insurance Plan for Cotton is an innovative program that requires further work and should not be approved at this time.

This is a complicated program with many intricate calculations, heavy administration burden, and a steep learning curve. Substantial simplification is appropriate. Among such simplification and further research we suggest:

1. Incorporation of catastrophe coverage;
2. Fitting of distributions using stronger techniques;
3. Consistent rounding and terminology across materials;
4. Less emphasis on tracking every expense and recognition of the pervasive effects of allocation issues and side contracts in overly detailed approaches.
5. Imposition of less burden on producers and AIPs.
6. Investigation of expenses allowances, reinsurance, and subsidies and their interaction with the proposed coverage.
7. Greater recognition of variation of cost with features such as soil type within counties.

We further note that the FCIC is under legal obligation to investigate cost of production policies for as many commodities as possible. To this end, we suggest investigation of another commodity, distinct from cotton, so as to get a better handle on the administrative and managerial burdens that might be imposed by implementation of cost of production insurance.

Finally, we note that some concepts such as individual risk rating (experience rating) and policies on a whole farm or enterprise risk basis might be better researched as separate items than as part of specific pilot programs.

SUPPORTING DOCUMENTATION
For
Expert Review
Of
FCIC Cost of Production Insurance Plan for Cotton

INTRODUCTION

This report has been prepared in accordance with Blanket Purchase Agreement (BPA) 45-RMA1-3-0015, Work Order # RMA-03-0004, Board Memorandum BM701 regarding expert review of a Corporation Proposed Policy (CPP) for a Cost of Production Insurance Plan for Cotton. The Federal Crop Insurance Act (7 USC 1501 et seq.) requires the FCIC Board of Directors to establish procedures under which any policy or plan of insurance, as well as any related material modification of such a policy or plan of insurance, shall be subject to independent review by persons experienced as actuaries and in underwriting.

This supporting documentation presents details of our expert actuarial review of a Corporation Proposed Policy (CPP) to create a “Cost of Production Insurance Plan for Cotton”.

This report addresses items identified for review in section C.5. Description of Work of the Task Order Statement of Work for Actuarial and Underwriting Reviews of the Revised Ions to the Crop Revenue Coverage Plan of Insurance for the FCIC Board of Directors. Commentary on listed items to be reviewed that are within the scope of the expert reviewers’ knowledge and such additional information as deemed appropriate by the expert reviewers is presented.

The report presents a fair and reasonable review of the crop insurance proposal. The review is based upon information provided to Muetterties, Bennett and Associates, Inc. (“MBA”). No attempt was made to verify or audit this information. The actuarial analysis and estimates in this report are based upon appropriate actuarial assumptions and procedures as described herein. MBA assumes no responsibility for any loss or damage that might arise from the use of, or reliance upon, this report other than for the purposes described above.

Muetterties, Bennett and Associates, Inc. (“MBA Inc.”) is an independent property and casualty actuarial consulting firm, wholly owned by its consultants and not affiliated with any insurer, broker or accounting firm. MBA Inc. consultants include seven actuaries, of whom three are Fellows and three Associates of the Casualty Actuarial Society, and an actuarial data management consultant. The combined experience of MBA consulting staff represents over 175 years of management and actuarial experience spanning the spectrum of insurance and risk management. Because of this broad perspective and experience, MBA Inc. is especially well suited to difficult, complex, and unusual engagements such as the review of proposals for FCIC programs.

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Supporting Documentation – “FCIC Cost of Production Insurance Plan for Cotton”

The structure of this report follows the organization of the task order and is presented in the Table of Contents.

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DESCRIPTION OF METHODOLOGY¹

This report is an expert review by Muetterties, Bennett and Associates, Inc. (MBA Inc.) of a proposal to the Federal Crop Insurance Corporation (FCIC). MBA Inc. was engaged to perform this review in our capacity as a firm of consultants experienced as actuaries and in underwriting. Our approach has been to answer the various questions posed in the work order for this engagement with respect to actuarial and underwriting considerations important to the successful implementation of the proposed program. Details of methods used to evaluate these considerations are described in the answers to individual questions.

The report is not an independent research project but a review of research performed by others. There is no single general methodology that describes our approach to all questions. Rather our approach is best described as responsive analysis for each question with emphasis on actuarial soundness and professional integrity.

A prior CPP submission on a Cost of Production Insurance Plan for Cotton was submitted in 2002. MBA Inc. was an expert reviewer for that submission also. Where appropriate, we have drawn upon and updated our prior work in this review.

¹ Work Order Requirement (a)(1) - A description of the methodology used by the expert reviewer.

(1) PROTECTION OF PRODUCERS’ INTERESTS

The word “producer” can have any of several meanings in an insurance context. A frequent use of “producer” in insurance contexts is to refer to an agent, broker, or insurer employee who “produces” business on behalf of the insurance company as a producer. In crop insurance contexts, the word “producer” refers to farmers (both individuals and corporations) who produce the crops that are the subject of the insurance. In this report the term “producers” is used to refer to the farmers who produce crops unless otherwise noted.

(A) *Does the policy provide meaningful coverage that is of use to producers, and provide it in a cost-efficient manner?*

Cost of production insurance is intended to protect producers by covering a stipulated percentage (e.g., 85%) of costs (i.e., both variable and fixed) expended in production of a crop (in this case cotton). The coverage will only reimburse the excess of insured expenses over revenue, where revenue is broadly defined to include loosely related items such as recoveries under other insurance.

As the exhibits in Appendix 3 show, producers planting over 90% of cotton acres are involved in current FCIC insurance programs. For the proposed coverage to provide a meaningful addition to current crop insurance programs, there would need to be clear incentive for producers to change from current programs to cost of production of coverage. The proposed program does not incorporate catastrophe coverage and indicated rates (see Appendix 5) appear high relative to liability.

Thus, although cost of production could be a meaningful addition to the catalog of FCIC crop insurance programs, it is not clear that this particular cost of production program affords meaningful new coverage for producers.

The submission does not present convincing argument that the proposed coverage is being presented in a cost-efficient manner. Producers will need to introduce new accounting systems to track costs by insured crop and timely notify their insurers (Approved Insurance Providers AIPs) of deviations from approved budgets. AIPs will need to train sales staff, train adjusters, create new data systems, and more in order to administer the program. FCIC will need to consider modifying expense allowance for AIPs in order not to encourage AIPs to produce other forms of crop insurance with higher premiums and less administrative expense. In addition FCIC will need to train its own staff, develop internal controls including audit trails for rate determination, implement techniques to modify introductory rates based on actual experience. Perhaps, most importantly, the illustrative rates in the submission are large enough percentages of liability (i.e., maximum payable indemnity) so that producers are unlikely to view the coverage as efficient.

For these reasons, we conclude that the coverage is marginally meaningful and not provided

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Supporting Documentation – “FCIC Cost of Production Insurance Plan for Cotton”

in a cost-efficient manner.

To sum, we do not believe that material in this submission adequately addresses this question. In keeping with our prior review, we continue to recommend that the proposer be asked to resubmit this proposal with additional information on economic expectations from the producers’ perspective and comparisons² of alternative forms of coverage in their resubmission.

- (B) *Is the policy clearly written such that producers will be able to understand the coverage that they are being offered? Does the policy language permit actuaries to form a clear understanding of the payment contingencies for which they will set rates? Is it likely that an excessive number of disputes or legal actions will arise from misunderstandings over policy language?*

The Cost of Production Insurance Plan for Cotton is a complicated policy that requires that producers implement new accounting systems that identify costs by insured crops and notify insurers of significant deviations from budgeted values. Further concepts like liability that are clear for other FCIC products are likely to lead to confusion for the cost of production insurance plan for cotton. For example, the liability determined when a policy is written will be adjusted for difference between budgeted and actual expenses as well as other sources of income. We expect that many producers will be surprised by actual procedures under this program.

Although we expect that actuaries will be generally be able to form a clear understanding of the payment contingencies under this program, we note that the program involves new procedures that do not have precedent in current FCIC crop programs. In other words, there is no body of experience that actuaries will be able to use to apply their understanding.

In light of the new procedures and the complexity of the program, we expect that the program will generate an excessive number of disputes and legal actions relative to other FCIC crop insurance programs.

- (C) *Is the mechanism for determining liability (i.e., the amount of coverage) clearly stated and supported by an example?*

The submission does not contain a description and an example specifically addressing this question.

A procedure for computing “liability” is described. Unfortunately, the definition of liability for purposes of this computation does not correspond to amounts that will be collected under the policy. For this reason, we expect that this calculation will be a major

² For example, the proposer’s website includes an insightful comparison of MPCIC and CRC at <http://www.amag.com/products/crc.asp>.

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point of controversy in dealing with producers should the program be implemented in its current form.

- (D) *Is the mechanism for determining the amount of premium clearly stated and supported by an example?*

Different sources present different methods for calculating premium. The submission does not contain one designated response to this question that includes an example. Further, the descriptions use different wording and different rounding so that we do not think that a typical producer will necessarily recognize the different sections as a single approach. Consequently, we conclude the mechanism for determining premium is not clearly stated and supported by an example.

- (E) *Are the mechanisms for calculating indemnities clearly stated and supported by an example?*

General description and example in training manuals are clear. However, there is no example clearly labeled as the reply to this question.

Further, we doubt that producers will generally understand the intricacies of filing a claim under this policy at the time they become insured.

- (F) *In the case of price or revenue policies, are the mechanisms for establishing price clearly stated?*

In a sense, cost of production insurance for cotton implicitly provides a type of revenue coverage. Subject to certain constraints, this policy guarantees that revenue will not fall below a guaranty, namely the product of the coverage percentage and expenses.

Price data is used in several places in modeling this product. The expected price is the maximum of the loan rate and an Olympic average of prices over the preceding five years.³ This means that producers can be confronted by distinct established prices depending on the selection of crop insurance coverage. However, the cotton to which the established prices apply is the same cotton regardless of plan selection.

We recommend that uniform procedures for establishing prices be determined for any set of insurance programs relating to a particular crop. The selection of FCIC crop insurance program should not depend on the way in which price is established.

³ Pages 6 and 7 of the Pricing Methodology White Paper

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Supporting Documentation – “FCIC Cost of Production Insurance Plan for Cotton”

- (G) *Is adequate, credible, and reliable data available for establishing expected market prices for insured commodities? Is it likely that the data will continue to be available? Is the data vulnerable to tampering if the proposed policy is approved? Is the data likely to be available when needed? Is the proposed system for publishing prices feasible?*

Insofar as existing programs for cotton enjoy adequate, credible and reliable data for establishing expected market prices, our recommendation in response to question (1)(F) would afford an equally viable approach to establishing prices for this product. However, we have not been able to research the procedure recommended in the proposal to determine whether it might also satisfy this requirement. In any case, tampering in the sense of selecting the policy with a market pricing mechanism believed more favorable by the producer will be introduced by COP.

- (H) *Does the policy avoid providing coverage in excess of the expected value of the insured crop?*

The policy explicitly limits coverage to the lesser of approved expenses per acre and expected gross income per acre.

- (I) *Does the policy contain indemnity or other provisions that cannot be objectively verified by loss adjusters, underwriters, or auditors?*

The policy imposes large administrative burdens on adjusters, underwriters and auditors. Although individual purchase agreements and expenses are generally subject to objective assessment, the potential volume of transactions and the need to combine farming and accounting expertise in assessing costs of production could jeopardize objective verification.

Also, there might be related agreements that act to the detriment of cost of production insurance. For example, suppose a producer who has purchased COP coverage gets a discount on a purchase for production not subject to COP coverage as a result of a purchase related to an approved expense for COP coverage. We should not expect that such a discount could be easily reallocated to apply to both the COP covered and the other covered crop.

Lastly, most producers will need to allocate general costs in order to assign costs to particular crops. Such expense allocation processes generally cannot be objectively verified. Variable expenses can be allocated in a way most favorable to the producer: the submission even gives an example of allocating gasoline by either hours or acres, which could give very different results.

In this regard, fixed expenses are only fixed in the sense that they do not change during the policy period. As far as determining them, they appear to be quite arbitrary. Land

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Supporting Documentation – “FCIC Cost of Production Insurance Plan for Cotton”

cost is an estimate and has a lot of room for judgment; owner labor seems completely arbitrary. Not only can these be allocated among crops in the most favorable way, as can the variable expenses, but they can be selected high in total, require no record keeping during the season, and are probably unchallengeable in the claims adjustment process. Variable expenses are limited and total costs are limited. We would anticipate that a rational producer would set his fixed costs to be exactly equal to the difference between the total expense limit and his variable expenses (whether limited or not) regardless of whether that is a fair representation of his fixed expenses. We raised this question at the Kansas City meeting and got no satisfactory response.

(J) *Is the policy likely to treat all similarly-situated producers the same?*

The policy is essentially rated to recognize characteristics and loss experience of individual producers. Therefore, unless these characteristics and loss experience are the only measure of similarity, it is likely that similarly situated producers will be treated differently.

In addition, the submission proposes that prices be established differently for this policy. This means that producers will be treated differently based on the FCIC insurance programs that they select.

Thus, the simple answer to this question is “No.”

(K) *Will insureds be able to comply with all requirements of the policy?*

Although in principle, producers should be able to comply with all requirements of the proposed crop insurance product, tracking actual costs of production in accordance with program requirements will create new accounting and notification burdens that must be maintained throughout the coverage period. Compliance with these requirements will cause difficulties for producers and we doubt that new policyholders will be able to satisfy requirements at inception of their respective policies.

(L) *Does the policy create vulnerabilities to waste, fraud, or abuse?*

Producers have control over actual costs of production, related agreements, and decisions as to when to file claim. While such fraud is possible, we cannot state how likely it is or how easily it might be detected. On the other hand, there are limits on the amounts that can be claimed (e.g., the expected value of the crop). Accordingly, we do not expect that the proposed cost of production insurance plan for cotton creates significant new vulnerabilities to fraud and abuse.

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(M) Is the product likely to adversely affect the agricultural economy of the crop that is proposed for coverage, or of other crops or areas

It is unlikely that the agricultural economy of cotton in pilot states or of other crops in pilot states or other areas in non-pilot states will be adversely affected by the proposed cost of production insurance plan for cotton as proposed. Existing FCIC products have already penetrated more than 90% of planted cotton acres. The proposed COP coverage is complicated, imposes added expenses on AIPs, has relatively high rates relative to liability (as defined in the proposal) and even higher rates relative to probable indemnity. Given these characteristics, we do not expect rapid market penetration and associated possible adverse effects on existing agricultural economies.

(2) ACTUARIAL SOUNDNESS

- (A) *Is adequate, credible, and reliable rate-making data available? Is it likely that the data will continue to be available? Is the data vulnerable to tampering if the proposed policy is approved?*

The submission does not fully address this issue. It treats initial rates for the proposed coverage and does not discuss revision of these rates in light of experience under the proposed program. Data suited to implementation is not the same as data suited to maintenance of a program. Accordingly, this reply discusses the use of data for initial pilot program values.

The proposal employs data from several sources. The submission argues that directly pertinent data are not available and therefore synthetic data must be created. As a consequence there is a basis risk (the risk that actual experience will differ from the data used to analyze it) inherent in the proposal. The data, while reflective of the entire spectrum of cotton producers, is not necessarily reflective of the experience from actual consumers of this insurance product. As such, there is the possibility of adverse selection if consumers of this product are statistically different than the producers used to formulate the ratemaking data. The submission does not test the sensitivity of the synthetic data to variations that might occur and does not provide a basis for assessing the reliability of the synthetic data for initial pricing of the program.

One of the primary tasks then of the ratemaking process is to attempt to combine each of these three data sources and to produce a credible ratemaking database for the experience period. The synthetic loss data is based on actual production statistics for cotton including yield and acreage by farm enterprise. These production statistics for producers are taken from three sources.

1. RMA APH Database
2. NASS Census of Agriculture
3. NASS Agricultural Statistics Database

Each of these data sources had strengths and weaknesses. The RMA databases are available at a unit level and are available for each year, however data is only available for the last ten years and in some cases data for older periods is not available in adequate detail. The NASS Census of Agriculture is probably the most complete data set, but is only available in summary form and is not available for each year. The NASS Agricultural Statistics database had annual data available for an extensive (50 year) experience period, but is not provided at a unit level.

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The other portion of the data is that which is used to determine the loss exposure. Projected Revenues are available through Agrilogics Crop Price Predictor NATMOD. This data is available through the auspices of the Department of Agriculture, we have every reason to suspect that this data will continue to be available in the future. We did not evaluate NATMOD as part of this analysis. However we do note that the interlocking relationship between supply and demand along with the complex interactions of several federal government subsidies make the prediction of future commodity prices an extremely difficult proposition. Additionally, retrospective tests are extremely complex and difficult to perform since the federal governments subsidies of agriculture are always in flux.

The exact source of the cost of production budgets is not entirely clear. We also note that in the past these budgets have been produced for use by producers as guidance to best practices, not as an input to a risk management model. When using any such quantity for a purpose for which it is not intended it leaves the user open to the possibility of manipulation. As such we suspect that these budgets may have the potential to be tampered with as producers become aware that they have an impact on the ratemaking process. Further it should also be noted that as the COP coverage becomes available for other crops, it begins to necessitate a substantial investment in data management and analysis to keep all crop budgets reflective of all of the unique characteristics of each individual crop, growing condition and the most recent agricultural science.

Other data utilized include the Federal Loan rate. We have no reason to doubt that these will be available in the future.

In some cases, the proposed policy will largely rely on the same data that is currently used for both Multiple Peril Crop Insurance (MPCI) and Crop Revenue Coverage (CRC). In such cases, adequate, credible and reliable data is available and will continue to be available. This data will not become vulnerable to tampering if the proposed policy is approved.

However, the Cost of Production for Cotton Insurance Program will require information on the relationship between actual and budgeted costs of production. This information will not be available in as large a volume as other data. Accordingly, actuarial care will need to be exercised in using what data is available for ratemaking purposes. Further, because budget approval will be on an individual policy basis, this data must be viewed as vulnerable to tampering at this time and until appropriate controls are identified and proven.

(B) Are the explicit and implicit assumptions used in the rating process reasonable?

Appendix A of “Cost of Production Insurance Rating Methodology White Paper” affords a listing of explicit assumptions. Accordingly, we will review these assumptions first.

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1. That within each of the five segments of the NASS producer distributions a truncated normal distribution exists.

We reviewed the normal distributions which were generated based on the NASS Census Quintile data for Kern County, CA. We note that the overall sample means generated from their distributions is not the same as the sample means generated from the original Quintile data. In this sense, the methods in the proposal may not reproduce the true mean and distribution of the underlying data.

We also note that the truncation limits employed do not coincide with the ends of quintile ranges. Thus, the application of the assumption can lead to unusual results such as quintile value outside the quintile range.

Consideration of alternative distributions and/or alternate fitting techniques could lead to theoretically stronger methods and, more importantly, different results. More reasonable assumptions should be explored.

2. For producer yield generation, assume producer’s acreage is a constant percentage of the county throughout his production history.

This assumption enables a producer’s characteristics to influence years of synthetic data. However, it is difficult to directly assess the impact of the assumption based on information in the submission. Pending further information, we offer no opinion regarding the reasonableness of this assumption.

3. Producer’s percentage of planted acreage, which is harvested, is equivalent to the county average for that particular year.

This assumption probably understates variation in loss experience. Further, one of the purposes of this rating methodology is to determine the values of losses “in the tail”, i.e., the losses which are missing when looking at county averages. Intuitively, one would expect better producers to harvest a greater percentage of crops and lesser producers to harvest a lower percentage of crops. The submission does not present analysis of the sensitivity of calculations to this assumption. We expect that a more reasonable assumption will produce different results but cannot comment on whether they would be significantly different at this time.

4. Assume as discussed in Appendix E that the central portion of producers within the county yield distribution will participate in the Cost of Production (COP) insurance program.

There is little analysis in the submission of the particular producers who would elect COP coverage over other forms of FCIC crop insurance. One of the stated goals of the proposal is to increase producer participation in risk management programs, but strong argument that this goal will be achieved is lacking. Accordingly pending such presentation, we do not regard this assumption as reasonable pending analysis of economic basis of crop selection demonstrating the characteristics of producers likely to elect COP coverage.

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5. Assume the delivery of the entire cotton crop meeting the standard acceptable quality level (color 41, leaf 4, staple 34, mike 35-36 and 43-49, strength 23.5-25.4) would not have a significant impact on the world cotton market.

The USDA has recently released “An Independent Actuarial Review of Quality Adjustment.” It was not possible for the proposing entities to incorporate findings from this report in their analysis and proposal. Also, the United States has newly received a request from Benin, Burkina Faso, Chad, and Mali to agree to change support for cotton production in the United States.⁴ And no doubt there are other possible influences on cotton protection outside the scope of this submission. Perhaps, a more reasonable statement of the assumption is that interaction of the world cotton market and other forces outside the scope of this proposal have not been considered.

6. All historical deviations in yield from trend are being considered as if they occur for the upcoming year.

This assumption is another way of stating that all historical variations in yield are restated to current benefit levels. This is not actually an assumption, it is more of an expressed hope that all adjustments to data are appropriate. Discussion of the various calculations elsewhere in this supporting documentation therefore translates into discussion of the reasonableness of this assumption.

7. Given the assumption that all historical deviations in yield from trend are being evaluated for the upcoming year, the applicable APH is the average of the actual yields, with appropriate substitutions of 60% of the county T-yield, for the 1992 to 2001 period.

This assumption describes a limitation in calculations of variations in yield - in order to remove deviations in yield due to non-random effects specific to either economic, social, or other causes occurring at a point in time during the historic period, the most recent 10 years of data adjusted with the 60% of county T-yield where appropriate were employed. The rationale for a 60% of T-yield limit is not presented. There are other methods which can be utilized to derive an estimate of APH on a county and producer level for the upcoming year which, based on information available, are statistically justifiable, and less computationally complex. Accordingly, pending further information we have not concluded whether this assumption and limitation in calculations are reasonable.

There are other assumptions implicit in the submission, which are not explicitly identified in Appendix A. For example, in places calculations assume:

8. That temporal variation of yields is based on a uniform random distribution.

This is a very questionable assumption. In actual application, utilizing the uniform distribution to model actual physical world distributions often results in a poor fit.

⁴ The Financial Times, September 11, 2003, page 7.

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To sum, we do not find the implicit and explicit assumptions employed in this submission to be reasonable and appropriate in all cases. In addition various comments from our earlier review of the previous submission continue to apply.

- (C) Are the technical analyses (e.g., stochastic and other simulations) technically correct? Do they provide credible, relevant results?

The technical analyses are illustrated in computer files for Excel spreadsheets that were provided in conjunction with the submission. both the COP rating methodology paper and are further supported by selections from the excel spreadsheets which were used to perform the analysis.

The generation of synthetic data for pricing cost of production insurance for cotton is complex and questionable. Essentially three unique datasets, the NASS census data, the NASS statistical database and the RMA data are combined to generated simulated harvest and yield data for each database. Random number generators are used to generate simulated producers for a given year. Then a second set of random number generators is applied to generate temporal variations for a given producer between years while minimizing the deviation from the quintile specific median and coefficient of variation of the underlying RMA data. This is then compared to projected revenue (also from a statistical model) and used to generate sample rates.

Simulating data can be an effective technique for many purposes including insurance ratemaking. However considerable care must be used at each step of the process to ascertain whether the simulated distribution approximates key characteristics of the original data. Truing up one or two statistics such as the mean and standard deviation (coefficient of variation is the standard deviation divided by the mean) does not necessarily create a distribution with all key properties.

Examples of specific problems in individual spreadsheets include:

1. Reproduction of Sample Mean - On the spreadsheet Prod Yield Gen, the reviewer noticed that the simulated data for Kern County California did not have the same sample mean as the mean from the underlying distribution. The proposal corrects this by adjusting the sample mean to the correct amount, but ignores the issue that if the simulated distribution cannot reproduce the same sample mean, it may indicate that the simulation does not effectively reproduce the distribution. See response to question 2(B) above for further discussion of this issue.
2. Minimum Acreage - There is no support provided for the truncation of the data at a 50-acre minimum in the simulated model presented in Prod Dist Yield.xls. In addition, after the simulated results are “rebased” back to the RMA data, the minimum acreage produced in the Kern County, CA example provided is 16 acres for one of the producers. Further discussion and evaluation of the truncation assumptions and subsequent “rebasings” of results to reflect this assumption should be provided.

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3. Preservation of Quintiles - When generating producer distributions, it is this reviewers understanding that the set of data with the maximum number of producers as of 1997 is selected (RMA or NASS data). When the RMA for this one year has a higher number of producers, this one year of data is considered representative of the “true” assignment of a producer to a quintile. Simulations for a ten year period are performed and quintile results are trued up to actual RMA statistics, where the initial assignment of quintile is maintained. When NASS data for this one year has a higher number of producers (for this example a Prod Dist Yield.xls sheet sent to this reviewer for Franklin County LA is utilized), after the first phase of simulating the data was completed, over 13% of the producers were assigned a different quintile. From discussions with a representative from AgriLogic, this reassignment is then held constant through the simulations for the ten year period. This rationale for the apparent reassignment for NASS data, and then hold the quintile position fixed when analyzing the ten years of simulated data is not documented and, on the surface, appears to be a questionable assumption.
4. Reproduction of County Values - Producer specific adjustments made to the data and resulting county averages throughout the processes are not always balanced back for all relevant county values. For instance, the effect that surcharges for producers with less than 4 years experience will have on the overall county average rate is not taken into account (this could tend to result in rates which are overall excessive), average development of producer/practice specific rates (irrigated vs non-irrigated) are not compared to the average county base rate (it is unclear if this might produce overall excessive or overall inadequate rates) and varying producer selection of variable and fixed/land percentages insured are not trued up to the overall assumed averages utilized in the development of the underlying the county base rate.

(D) *Is the data used for the analyses appropriate, reliable, and the best available?*

No data under an existing cost of production program for cotton is available. The submission uses synthetic data created from NASS and RMA databases to determine pricing parameters. The submission relies on available data and in this sense is appropriate.

Whether the data is reliable cannot be determined until after business has been underwritten and experience under the program can be compared or other tests of reliability are presented. At this point, we cannot affirm that the data, especially after conversion to a synthetic data database, is reliable.

We do opine that the data is not best available. The creation of the synthetic database suffers from several shortcomings. For example, the rating process fails to include various balancing procedures, does not incorporate appropriate censoring points in reproducing RMA data by quintiles, and suffers from other shortcomings. Shortcomings in the creation of synthetic data can be overcome producing better synthetic data for

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evaluation of this program. Consequently, we conclude that the submission does not use best available data.

(E) *Does the actuary certifying the submission’s rates provide adequate and accurate support for the certification?*

The certification was provided by Dominick Weber, an actuary from Hawthorne Underwriting Group LLC.

The certification letter focuses on the “Nuts and Bolts” of this product communicated in material dated June 13th. It does not address broader aspects of this product as the first example of a unique new risk management tool and cannot be read as an endorsement of cost of production insurance plans. Accordingly, the certification cannot be relied upon as general support of COP insurance.

The following specific comments apply:

- There is a reference to a study dated June 13th. Insufficient information is provided to permit comparison of the information reviewed by Mr. Weber to information in the submission. For example, on page 2 of the certification, reference is made to “a large amount of effort has been done by Agri-Logic to determine the reasoning behind the disparity of rates as determined in their ratemaking methodology as compared to the APH rates as generated by RMA for comparable coverage levels”. Based on information provided to us, we cannot assess this statement.
- Apparently, Mr. Weber supplied a report with his letter of certification. The report is not part of the submission and consequently references to analyses cannot be documented against the actual analyses in the report. In general, we cannot determine from the certification letter what tests were done or not done. If the report is referenced for examples, it should be included with the submission.
- The certification did review specific calculations in the ratemaking process, however the certification did not consider this product as the prototype of a new crop insurance product. It also did not consider the new expense requirements which this program will place on producers (crop growers) and insurers.
- References to compliance with ratemaking standards of the Casualty Actuarial Society and the American of Actuaries do not include description of particular test performed nor does it identify the particular standards considered.

(F) *Does experience from prior years and relevant crops and areas support the validity of the proposed rates?*

The proposed rates are based upon synthetic data and do not tie directly to prior crop experience or experience other crops.

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- (G) *Is the product likely to be sold in a sufficient number such that actuarial projections would be credible?*

Current FCIC products are purchased by producers representing more than 90% of planted cotton in the United States. Experience for these programs is generally viewed as credible for purpose of actuarial projections. Accordingly, to the extent that information from these programs can be used to derive actuarial projections for the cost of production insurance plan for cotton, we expect that they will be similarly credible.

However, it is not clear that sales of COP Cotton Coverage will be sufficient to generate reliable information by itself on actual costs of production. Accordingly, pending further information in a possible resubmission, we do not currently conclude that sufficient information will be available for credible actuarial projections relating to all aspects of COP Cotton Coverage.

Further, nowhere in this submission is the use of information on the cost of production insurance plan to produce actuarial projections and refine rating discussed. Thus, at this time we cannot opine on the credibility of projections for cost of production insurance with respect to specific procedures for revising rates and the rating structure.

- (H) *Does the submission increase or shift risk to another FCIC-reinsured policy?*

If implemented, the proposed policy would compete with existing FCIC crop insurance products, as opposed to transfer risk to them. Producers would choose from among a portfolio of FCIC insurance program. Such choices would increase risk to other FCIC-reinsured policies insofar as producers are likely to elect programs generating the most benefit for the least cost.

We also note that the cost of production insurance plan for cotton is likely to generate increased expense and overhead for administering these policies. Insofar as such costs might be assigned to general overhead, they would in part be funded by general FCIC budgets.

- (I) *Does the submission create potential excessive adverse selection, either by itself or in the presence of any other risk management product, whether reinsured by FCIC or not?*

If FCIC were to implement the proposed cost of production insurance plan for cotton, producers would have to select between class rated and individual risk rated policies using distinct underlying rating parameters (e.g., expected price). Although no result in insurance is guaranteed, such circumstances often lead to adverse selection and produce worse underwriting results for insurers.

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For example, there are certain additional aspects of the rate development that could create potential adverse selection, such as the procedure “Allocation of Additional Risk”. The goal of this procedure is to provide an incentive for a producer to insure all their actual variable costs, and not to over-insure his or her fixed and land costs. This could result in the overall premiums collected to be less than the adequate levels intended in the derivation of the premium rates for the program.

Similarly, the development of a producer-specific base rate for a particular practice (irrigated vs non-irrigated) then weighing the resulting producer/practice-specific base rates together has a stated goal to “enable the producer to insure at the maximum combined expected revenues”. If this procedure results in a lower producer-specific rate than by not developing producer/practice-specific rates, there is a potential for adverse selection, i.e., the producer rates could be inadequate.

To sum, the submission creates potential excessive adverse selection but there is no guarantee that such selection will actually occur.

(J) *Are the proposed premium rates likely to cover anticipated losses and a reasonable reserve?*

There is some evidence supporting the adequacy of rates, but the documentation is incomplete.

For example, first a rate for the county level is produced and is assumed to be an adequate average rate for the aggregate of all producers in the county. Next, adjustments are made for individual producers based on items such as amount of coverage purchased for fixed/land expenses and variable expenses and irrigated or non-irrigated land. After the individual producer rates are determined, there is no discussion in the items provided for our review concerning the overall balancing of the individual rates back to the county level rate. In other words the adjustments could result in rates which are overall inadequate relative to the assumed adequate average county rates or overall excessive relative to the assumed adequate average county rates.

In addition, there is no discussion of producers likely to buy the policy so that it is not possible to fine tune an off-balance calculation to correspond to probable insureds. Also, there is no assessment of corresponding effects on other cotton insurance programs so that FCIC can assess the total impact of the new program.

In regard to apparent errors in calculations, in Table 1 of the response to item (5) Potential crop acreage, production, and liability that could be written, the implied average price for Texas is 28.6% of Liability (Premium/Liability =28.6%) which is (a) absurdly high; and (b) almost 2.5 times the implied Alabama price, second highest at 11.6% of Liability. There has to be an error underlying the table values.

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To sum, inadequate documentation is provided in the submission to answer this question affirmatively. Further discussion regarding technical analyses appears in response to Item (2)(C).

(3) OTHER REVIEW AREAS

- (A) *Does this policy provide coverage that, in whole or in part, is generally available from the private sector?*

We are unaware of any comparable coverage in whole or in part available from the private sector. An internet search and various discussions found no reference to any privately placed version of this product.

- (B) *Does the policy propose to insure a peril that is not authorized by the Act?*

As cited in Appendix 1 of this report, Federal law requires the Federal Crop Insurance Corporation to enter into a contract to research and develop a cost of production insurance policy that recognizes variations in cost at the county level and applies to as many commodities as possible. The current submission for a cost of production insurance plan for cotton is consistent with this law. We have not performed any research to investigate whether this requirements is in conflict with any other portion of Federal law. Such research is best suited to legal review and beyond the scope of our expertise for purposes of this review.

Legal review of this question is appropriate

- (C) *Does the policy place an unreasonable administrative burden on the insureds, AIPs, or the Federal crop insurance program?*

We expect the proposed program to place unreasonable administrative burdens on insureds, AIPs, and the Federal Crop Insurance Program.

Producers will need to develop new accounting systems to track such entries as the cost of fuel spent on plowing particular insured acres. Further, producers will be required to notify their insurers of deviations from approved budgets. Also, in the face of possible insured loss, producers will face the ethical conflict of interest of whether to incur further costs of production before filing a claim. These costs are not covered as part of indemnity under the insurance, nor otherwise subsidized.

AIPs will be required to create new statistical systems to track expenses and report summary data to FCIC. They will need to train staff to sell and adjust losses for this product. We do not expect the product to achieve significant market share. Consequently, we do not expect AIPs to be able to recoup training dollars and other start-up costs through allowances based on premium. Without dramatic revisions in expense

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allowances for AIPs, incentives to produce COP policies in lieu of other forms of crop insurance are weak and the corresponding increase in administrative burden appears to be unreasonable.

FCIC will also incur increased administrative expense. For example, FCIC will probably have to issue guidance on budgeting and budgeted expenses for a variety of production systems. FCIC will need to establish procedures for verifying information reported by AIPs on the direct coverages. And we expect that FCIC will need to spend substantial time answering questions regarding the coverage from policyholders.

In general, these burdens are viewed as unreasonable because one intent of cost of production insurance is to reduce premiums charged to producers. However, cost of production increases administrative costs at the same time as it reduces benefits paid (and hence premiums) for producers. It increases the absolute and relative cost of delivering crop insurance coverage relative to other forms of crop insurance.

Lastly, we note that FCIC is required to investigate cost of production coverage for as many commodities as possible. If FCIC were to implement similar programs for commodities other than cotton then overhead costs would multiply and possibly increase exponentially to the extent whole farm concepts were embedded in the coverage.

The submission does not address the funding of increased administrative cost. Nonetheless, FCIC must address this issue in evaluating the proposal.

(D) *To the extent of the reviewer’s knowledge, does the policy comply with all requirements of the Act and the public policy goals of the Corporation?*

With respect to requirements of the Act, this question is best suited to legal review and beyond the scope of our expertise for purposes of this review.

With respect to public policy goals of the Federal Crop Insurance Corporation, the question is best suited to the management of FCIC and beyond the scope of our expertise for purposes of this review. We recognize that the FCIC has the broad public policy goal of improving the economic stability of agricultural through a sound system of crop insurance and providing the means for the research and experience helpful in devising and establishing such insurance [US Code Title 7 Section 1502(a)]. We further recognize that FCIC has adopted the strategic goals of (1) enhance products and delivery, (2) increase awareness and use of risk management tools, and (3) improve program integrity and protect taxpayer funds. However, our understanding of this engagement is that we are to focus on actuarial aspects of the proposed program and not address its relation to general management issues regarding public policy crop insurance.

(4A) REVIEW ISSUES SPECIFIC TO THIS PLAN OF INSURANCE

Supplemental Review Questions

- (A) *Would it be likely that this product would affect crop selection decisions?*

In our review of the original cost of production, we opined that one risk in insurance is that the insurance product will be utilized for a purpose for which it was not intended or by an individual for whom it was not intended.

Since this new product provides another option with regards to risk management for cotton, this product makes the cultivation of cotton a more economically viable choice. Conversely if cotton is more economically viable, it will inevitably make another crop which the producer can cultivate less desirable from the producers perspective.

One factor preventing this is that this new product does not offer bigger benefits; rather it offers a guarantee that is more linked to risk management.

We therefore conclude that the COP product will not affect crop selection decisions beyond the effects already produced for APH and CRC policies.

- (B) *Would it be likely that this product would affect the Extension crop budget preparation process?*

In our review of the original COP proposal in 2002 we opined that crop budgets are typically prepared by the department of Agricultural Economics of the state Land Grant Universities. A brief survey of several states found that this process varies from state to state. Since each state office is responsible for preparation of budgets for hundreds of different crops per year; computer programs are used for the organization of data and the preparation of budgets. The two states in the originally proposed pilot program (Mississippi and Louisiana) do use the same budgeting software. We have not researched Arkansas and Tennessee.

It should be noted that there is substantial latitude in the underwriting of the revised proposed program so that individual AIPs do not need to hold to extension budgets. Also, there is substantial variety in cotton production systems (e.g., traditional solid cotton with 8-row equipment, skip row, reduced tillage, limited seedbed, ultra-narrow row) with corresponding possible variations in extension budgets.

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(C) *Are existing Extension crop budgets reliable and accurate for insurance purposes?*

In our review of the original COP proposal in 2002, we opined that the reliability and accuracy of a data source for insurance purposes can be assessed along several dimensions. In responding to this question, reliability as a measure of exposure, reliability as a measure as an accurate cost measure, reliability as a risk measure at the county level are discussed.

For a data source to be reliable and accurate for insurance purposes, three conditions should apply.

- (1) It should be readily available; this was discussed in Item 4B
- (2) It should be immune from tampering; this was also discussed in Item 4B.
- (3) It should be a reasonable proxy for the expected value of future benefits.

In proposing the use of budgets for costs of production, we believe it would be appropriate to research extension crop budgets more fully with a view toward using them as a base for cost of production crop insurance. Based on the above, we recommend that these issues be investigated in greater detail to determine their impact.

(4B) REVIEW ISSUES SPECIFIC TO THIS PLAN OF INSURANCE

Supplemental Review Questions from Board Members

1. *Changes in itemized variable expenses more than 20% must be reported. During any given year, these expenses can vary greatly depending upon climatic conditions and unexpected major mechanical problems. This is a severe handicap to make adjustments to the insurance policy with the agent who may be hundreds of miles away during a high stress time of the growing season. Failure to report in time may result in loss of insurance, which probably will be discovered only at claim times. Remember that this is the outline for future COPs for other crops. Cotton is a very low growing expense crop with limited expense items compared with many specialty crops. In specialty crops these numerous expenses can change very rapidly depending on the unique or unusual growing conditions in any one year. One wonders which agents and companies are going to be able to keep track of all this extra paperwork and whether or not problems will arise during claim times.*

The legal requirement is that FCIC contract to research and development cost of production crop insurance for as many commodities as practical. If one takes the voluminous research done thus far and tries to apply it to every commodity crop in every county in every state with annual updates of rating values, the task is truly Herculean. The magnitude of the work is only multiplied when one considers the data to be maintained at the AIP and producer levels. We strongly recommend that FCIC investigate simplifying the current proposal before trying to expand the concept of COP insurance to other crops – both commodity and specialty crops.

2. *Pay close attention to the APH x price ceiling cap. All farmers who have had a disaster year (or years) are heavily penalized with amount of coverage + higher premium rates. Will this cause economic micro shifts in production due to availability for operating loans when loans may be evaluated on coverage amounts? Remember that one bank controls the majority of operating loan funds.*

This issue is not addressed in the submission. We expect that there are cyclical swings in the relationship between APH and current insurance. To our knowledge these relationships have not been formally researched and no corresponding report has been prepared for consideration by the FCIC Board. We believe that the issue merits further investigation and would be pleased to have an opportunity to participate in such investigation.

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3. *Does this insurance offer any more coverage than other plans already available? Previous studies show rare instances for this model to do as much. Usually recovery is less. Less insurance cost does not mean better coverage.*

We agree that less premium does not mean better insurance. A comparison of APH and COP coverage is illustrated in Appendix 5. We believe that it is fair to say that one of the reasons that COP premiums are expected to be lower than APH premiums is that in many cases COP provides less indemnity to the producer in the event of loss. However, it is also possible to construct contrary examples. Accordingly, we conclude that in most cases COP does not offer more coverage than currently available plans.

4. *Due to data needed for policy to determine standard expense ceiling, the policy may be severely limited to few areas that will have adequate 3rd party (excluding banks with conflict of interest) information.*

As actuarial and insurance experts we do not know enough about actual farming conditions to address this issue. We expect that it would warrant clear documentation in any subsequent reproposal.

5. *The past 15 year history has shown sale price decline and inputs quickly increasing with overall production steady or rising ever so little. In the future will this insurance become less attractive than currently?*

The submission does not attempt to identify the producers to whom COP is a more attractive coverage than other forms of crop insurance. Nor does it attempt to assess the demographics of this group over time and whether the coverage will continue to be attractive. Such analysis should be performed.

6. *This cotton policy has failed earlier due to inadequate coverage. This version only begins to fulfill by inserting subsidies into price. As a model for future crops what happens with crops with no supports? Are we putting ourselves into favoritism or worse? Why not build a data bank on cost by region for crops and build the insurance around it? As it stands now are we defeating the purpose why the term Cost of Production is even stated because revenue is the governing factor.*

This question raises some interesting issues. In our capacity as expert reviewers, our job is to relate the question to the proposed program. The proposal does not consider possible expansion of the cost of production insurance plan for cotton to other commodities. The proposed program retains data on cost of production at the AIP level and does not create an FCIC database. Failure to create such a database will also complicate evaluating the accuracy of the proposed rating values. Although not within the scope of our engagement we encourage the FCIC to explore the general issues

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associated with researching and implementing cost of production policies for as many commodities as possible. “Cost of Production” is relevant in that it is a limit on recovery; recovery under CRC is not limited to cost of production.

7. *Is the cost worksheet misleading when it lists harvest costs which can be made up primarily of fixed equipment costs. Is this term meant to reference only custom harvest charges?*

Frankly, we do not know enough about cotton farming to answer this question responsibly and we have not been able to research this issue with farming experts. Hopefully, the proposers of this submission will be able to address it.

8. *Variable costs are supposed to be capped at 125% of county average. This is not explicitly included in the policy provisions, but rather is calculated and placed in the actuarial documents. Does it appear that producers will understand this ‘implicit’ cap?*

We regard this cap as one additional complexity that will confound producers and other trying to apply this policy in practice. Our response to question (1)(B) suggests that the complexities inherent in the current program argue strongly for major simplification before implementation. Nevertheless, such caps can effectively avoid over-insurance.

(4C) REVIEW ISSUES SPECIFIC TO THIS PLAN OF INSURANCE

Supplemental Review Questions from RMA

Background for Questions 1-3: The proposed COP plan reduces indemnities to the extent that production expenses are not incurred. This is substantially similar to a feature called “stages,” which is found in some crop insurance plans.

1. *Could the proposed COP incorporate stages that were not based on production-expense data ?*

A discussion of “stages” was not explicitly included in this proposal. For other products with “stages”, at various points in the growing cycle, the producer receives an indemnity that is some percentage of the maximum indemnity in exchange for destroying the unharvested crop. One possible purpose of this feature is to give the producer an incentive to not invest further in a poor crop solely for the purpose of obtaining the eventual indemnity payment. According to RMA , “Stage guarantees are intended to prevent over-insurance when crops are lost early in the growing season with minimal production costs incurred and make policy premiums more affordable”. We have not reviewed how widespread this feature is nor do we know producers view this feature.

Based on our review, we conclude that the proposed COP policy already has several aspects of a staged policy. The COP rating algorithm recognizes this benefit and passes this onto growers in the form of lower premiums. Creating yet another limitation on indemnity seems to further complicate a product which is already overly complex.

2. *How would this affect the insurance plan in terms of ease of administration ?*

Stages could serve an important role in simplifying this coverage if combined with other simplifications. However, absent other changes in the design of COP coverage, we do not believe that incorporating “stages” as one more feature without other simplifying changes would generally reduce the administrative burden of the proposed program.

3. *Are producers likely to react positively or negatively to the presence of stages in the proposed COP plan ?*

We have no direct expertise on the reaction of producers to the incorporation of “stages”. We expect that it is best not to view stages as an end in themselves but rather a tool that could help make this coverage more understandable to producers when combined with other simplifications.

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4. *Would the premium rates produced by the individualized rating system for COP versus the APH-based rating system for other plans have any negative effect on the actuarial performance of the other plans or FCIC in general?*

Yes. If the individual risk rating performed as designed, the actuarial performance of both COP and other crop insurance programs would deteriorate as a consequence of offering one set of programs with individual risk rating and one set of programs with so-called class rating.

Individual risk rating is inherently a double-edged sword. Risks whose loss experience is generally better than average will receive an adjusted rate which is less than the average rate for the entire population, while the opposite applies for risks whose loss experience is worse than average. As a general rule, risks whose experience is (or is perceived to be) better than average will seek out insurance plans which recognize the better experience, while worse-than-average insureds will seek out plans which rate based on the average of the population.

FCIC indirectly offers all programs to all comers and does not use competing programs as an underwriting tool. In the specific case of cotton crop insurance, if two plans both offer similar indemnities, but differ in the degree of individual risk rating, then FCIC will suffer, relative to only offering one program to all comers.

5. *Are the individualized rates produced by the proposed COP rating model credible?*

For the purposes of this question, it is appropriate to define “credible” to mean rates that are reasonable, accurate predictors of the future loss experience of the respective individual risks.

In our review of the rating methodology we discussed several issues surrounding the creation of synthetic data and the base rates for this program. Accordingly, we conclude that the individualized rates in the current proposal should not be viewed as “credible”.

Going forward, rates for a new program will need to be revised to reflect actual loss experience as the program grows. However the proposal makes no provision for such revision and accordingly we cannot opine on the credibility of individualize rates in future years.

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6. *Production-expense data is used in the proposed COP plan for the following purposes:*
- Insurance Guarantee – Limit the maximum amount of insurance available when reported production expenses are less than the expected gross income (EGI).*
 - Insurance Indemnity – Reduce loss payments when actual production expenses are less than the Approved Expenses.*
- Does the incorporation of production-expense data serve any other function or provide any other benefit in the proposed COP plan ?*

As mentioned cost of production expenses are used as the basis for the indemnity calculations in this proposal. The two cited uses relate to individual policies.

Another use is creation of a database to improve policy rating over time. As the program grows, actual loss data could be used to revise rating values. We expect that such use would require that FCIC collect more data than is contemplated in the proposed submission. This is an important function and merits further FCIC attention.

7. *When its pilot programs contain unusual or controversial features, FCIC sometimes requires that applicants sign a “disclaimer” at the time of purchase. These disclaimers contain a statement whereby the producer acknowledges that the unusual/controversial features exist and that she/he understands and accepts them. Such forms are used to promote a thorough discussion between the agent and the producer before the sale is completed, thereby reducing the probability of angry feelings at loss time. A draft disclaimer for COP, which highlights four features, is included at the end of this Appendix. Should FCIC require COP applicants to sign this or a similar disclaimer? If so, are there other components that should be included in the Disclaimer?*

We have reproduced the disclaimer as Appendix 4 to this report for ease of reference. The disclaimer may afford some legal protections to FCIC and should be reviewed by appropriate counsel. However, we do not believe that the disclaimer can possibly build a stronger relationship with producers.

The major problem is that the proposal involves a complex policy that will place increased burdens on producers, AIPs, and the FCIC itself without promise of corresponding increased benefits. The disclaimer does not help cure this problem.

If the disclaimer approach is pursued, FCIC should consider incorporating wording addressing the impact of the individual risk rating feature. Such wording might be: *“The premiums for this policy will be adjusted by the actual experience of the applicant and, as such, the charged premium may be either greater or less than the average premium for this coverage.”*

Background for Questions 8-9: The entire rating model is based on a set of data that was generated by combining various NASS and RMA data sets and statistics. The goal of the generation process was to create a set of producer level time series yield data. Part of the

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generation procedure involves using NASS 1997 Census of Agriculture Data. The NASS data were reported by county. Within that county NASS grouped the producer yields into five segments. The lowest 20% of yields are quintile one and so on until the highest 20% of yields are quintile five. Each quintile has a set of statistics including number of producers (by definition the same amount in each segment) yield mean and yield standard deviation. In order to generate a data set for 1997, the contractor assumes a normal distribution within each quintile. Then using the normal distribution (for each quintile) and its respective statistics a set of producer yields is generated.

8. *Can this assumption of normality within a quintile in the NASS yield data be safely made?*

No. The censoring of the normal distribution as performed in the submission is inappropriate. Further, the censoring approach does not recognize the overall structure of the distribution.

In more theoretical argot, in their paper, “The role of Research in Producer Risk Management”⁵, authors Coble and Barnett, briefly discuss literature concerning yield variability, “...a few years ago agricultural economists appealed to very simplistic and tractable distributional assumptions,[...]Normality and triangular distributions were generally the norm. More recent research has modeled potential asymmetries and non-unimodality, finding substantial differences in outcomes.”

To give an example, the assumption underlying the techniques utilized in the proposal is that by dividing a county’s producers into to smaller segments (quintiles) based on average yield per acre produced during a single year, these smaller divisions can be adequately modeled by a truncated normal distribution. Based on the sample data set provided for our review as part of the proposal (Kern County, CA), the overall mean yield of the simulated data set is 2% less than the actual mean yield with the first and fifth quintiles being the least optimal fits (percent difference from actual being -3% and +3% respectively). On the surface, this could indicate that the overall distribution of the mean yield is slightly skewed to the right. In order to provide a more complete response to this inquiry regarding the appropriateness of the assumption of normality within the individual quintiles be adequate to produce the overall mean yield distribution, a larger sample of the underlying county quintile statistics and simulated data should be analyzed.

9. *Is there a more appropriate assumption that could be made to generate the set of producer data?*

Yes. Possible alternatives involve and alternative uses of data and alternative fitting techniques.

⁵ “The Role of Research in Producer Risk Management”, Keith H. Coble and Barry J. Barnett, Mississippi State University Department of Agricultural Economics Professional Paper Series 99-001, February 19, 1999.

With respect to data, it is the reviewer’s understanding that the set of producer data for which this question refers will only be generated if the number of producers in a specific county for 1997, as captured by the NASS Agricultural Statistics Database, is greater than the number of producers in that county for 1997, as captured by the RMA APH Database. Based on discussions with a representative from Agrilogic, the data provided from the NASS Special Tabulations Division is not provided at individual producer detail; the highest level of detail provided is at the quintile level for any given county for any given year. Since RMA APH data is available at the producer level detail for various years, additional analysis of the RMA APH data to could provide insight into the underlying mean yield distribution function. Other alternatives could include utilizing RMA data even though the statistics provided from the NASS data is developed from a larger subset of producers in the county, or utilizing RMA data from a year other than 1997.

With respect to alternative fitting techniques, in lieu of using the mean and standard deviations, expression for the means and standard deviations of quintiles in a distribution could be used to fit an overall distribution to selected data.

Background for Questions 10-13: After the data set for 1997 is generated from the quintiles, the yields are plotted relative to the county average. These 1997 yields are then plotted across time keeping the same relationship with the county average as was demonstrated in 1997. A random adjustment is then made to represent variability across years.

10. *Is this adjustment reasonable?*

The “random adjustment” is based on a separate uniform distribution for each quintile of producers. For each quintile, the endpoints of the uniform distribution (and therefore the range) are chosen in order to minimize the relative error between the time average mean of the medians and time average mean of the coefficients of variation of the simulated data and the median and sample coefficient of variation derived from the 1997 RMA APH data.

The appropriateness of the uniform distribution to obtain an uncertainty estimates is subject to on a limited set of conditions being met:

1. A set of minimum bounding limits must be known.
2. The probability of finding values between these limits is unity
3. The probability of obtaining values between these minimum limits is uniform⁶

The adjustment made to represent variability as demonstrated by the Excel Spreadsheet Prod Yield Gen 22041 (2).xls does not satisfy the first condition above. The bounds are not known, but are solved for through an iterative process (running the macro

⁶ “A Critique of the Uniform Distribution”, H. Castrup, PhD., President, Integrated Science Group, January 28, 2000, downloaded from the website http://www.isgmax.com/Articles_Papers/.

“RecalcPercentRanges”), not necessarily producing a unique solution for each quintile. There is no additional documentation provided in the proposal, nor does the underlying theory of the distribution of the mean yield suggest the probability of finding values between the minimum bounding limits which are solved for is unity, therefore the second condition appears not to be met either. We recommend the proposers be asked to further refine the procedures developed to introduce variability into the simulated time series results and that sufficient documentation be included in the resubmission.

To sum, in insurance it has been reasonable to assume a stable distribution that changes location in accordance with temporal trends in areas such as retrospective rating, dividend plans, and the like. The concept is new to crop insurance but could well prove to be equally appropriate here. The particular approach used in this proposal is likely to change as we become more knowledgeable concerning production curves.

11. Is this adjustment constrained by the spatial variability that existed in 1997?

This is can be an intricate question. Time did not permit the analysis needed to address this question in appropriate depth. We would be happy to undertake the research at another time as another engagement.

12. This data set is the basis for all rate calculations. Do these data simulation and adjustment procedures generate a set of good data for the purposes of rating?

The appropriateness of the various techniques utilized in simulating and adjusting data in order to true up results to various data sets and introduce a variability component across years have been discussed in our responses to questions 2(B), 2(C), 2(D) and 4C(8)-4C(10). Based on the various questions and concerns raised in our responses, until further documentation is provided to address these issues, it is extremely difficult to assess the appropriateness of the final set of data produced for the purposes of rating. Pending further information, it is not clear that this synthetic data is the information best suited to rating.

13. Is there a better data set that could be used for the rating of this product?

For established routine ratemaking work, identifying data of appropriate detail and quality for review of rates and rating values is an important component of actuarial work. For new programs, often an actuary’s greatest contribution is making best use of weak data. In the case of the current proposal, we do not espouse the various adjustments used to create the synthetic data used to price the proposals. We expect that stronger data sets could have been created which is not the same as saying that we have done the work appropriate to identifying such data sets.

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Background for question 14: The producer’s premium rate is the weighted average of three functions,

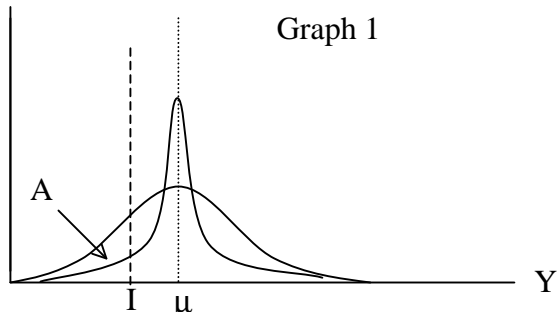
$$\text{Rate} = a*f(\text{PM}_{\text{County}}, \text{PM}_{\text{Producer}}) + b*g(Y_{\text{County}}, Y_{\text{Producer}}) + c*h(\text{CV}_{\text{County}}, \text{CV}_{\text{Producer}}),$$

where PM = profit margin, Y = average yield, CV = coefficient of variance, and $a + b + c = 1$. Each function compares the producer’s variable to the county average and calculates a premium. For example if a producer’s average yield (Y_{Producer}) is greater (lower) than the county average yield (Y_{County}), then the function produces a yield premium rate that is lower (higher) than the county base yield premium rate.

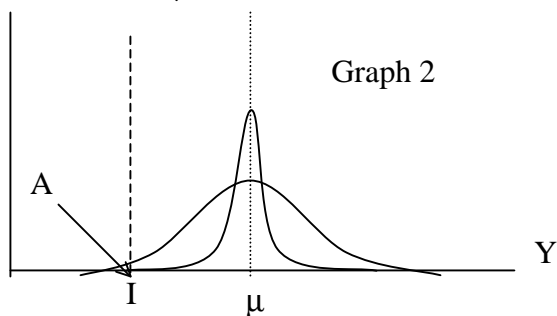
The premium rate formula is the weighted sum of the three functions so that each function (and the variable it uses) is treated as being independent of the other functions. However, there would seem to be interaction between the functions.

For example, it seems that a producer’s average yield should influence the degree to which his or her CV affects the probability of an indemnity.

This point is illustrated in Graphs 1 and 2.



Graph 1 shows the crop yield probability distributions for two producers. They both have the same average yield but different variances. The yield at which the producers indemnify is I. The area labeled A shows the increase in the probability of an indemnity for the producer with the greater yield variance.



Graph 2 shows the same situation except that the two producers have a higher mean. In this case the difference in the probability of an indemnity (area A) for the two producers is much smaller.

This illustrates that a higher mean reduces the effect of variance on the probability of an indemnity. However, the rate formula shown above does not allow for this. The effect of the coefficient of variance on the premium rate is the same no matter what the average yield is.

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14. *Is it appropriate to calculate the premium as the weighted average of three independent functions of profit margin, average yield, and coefficient of variance of yield? In other words, are these functions actually independent?*

Premium rates for a specific practice (irrigated vs non-irrigated) for individual producers is determined as an adjustment factor times to the county coverage level base rate. This adjustment factor will vary by producer due to the following selected factors:

1. Number of consecutive years of cotton production during the period 1993-2002,
2. Accumulated acreage used for cotton production relative to a national average of 420 acres per year (4200 acres) during this same time period,
3. Deviation of the producer’s mean yield from the county mean yield during a the same time period,
4. Deviation of the producer’s coefficient of variation in yield from the county coefficient of variation in yield during the same time period and
5. Deviation of the producer’s average profit margin from the county average profit margin during the same time period.

The weights assigned to each deviation are selected based on the results of a correlation study between each variable and producers actual losses over a 26 year period. The documentation concerning the details of this study, methodologies utilized to determine correlation, the statistical basis for the weighting formula and the statistical basis for the overall adjustment to the county base rate are not included in the proposal. In addition, the proposal does not address other producer-specific factors that could indicate an individual producer’s expected indemnity to vary from the county average, nor does it address interaction between the producer-specific factors chosen above.

In regard to the appropriateness of the calculation, we have raised other issues regarding the approach in the proposal whose resolution will affect our answer to this question.

(5) ADDITIONAL DISCRETIONARY INFORMATION

A. *Actuarial Soundness*

The term “actuarial soundness” has different meanings in different situations. For example, the actuarial soundness of the social security system is a different issue from the actuarial soundness of crop insurance. Both of these in turn are different from concepts of actuarial soundness used in the management of private insurance companies. In private insurance, actuarial soundness can concern the satisfaction of corporate financial goals and achieving a return on net worth. In various contexts, actuarial soundness can also concern the equitable assignment of costs across classes of business and risks within classes.

For purposes of this expert review, we confined our analysis to the questions posed in the Description of Work. We did not attempt to apply any more traditional definition or broader criteria.

Our review concerns the proposed cost of production insurance plan for cotton. In this regard, it should be noted that it is possible for a program to be sound for all cotton farmers and at the same time not be sound for the group of producers electing the particular form of coverage.

B. *Reinsurance Requirements*

Our review is limited to the primary coverage to be afforded cotton producers. We have not investigated the possible complications associated with creating reinsurance for cost of production insurance and its interaction with other forms of crop reinsurance. Our expert review is limited to the primary program as presented in the PSP. Proper design and evaluation of reinsurance arrangements can involve several forms of crop insurance and, in this sense, are best suited to a separate expert review.

If requested to do so by the FCIC, we would be most happy to perform a review of reinsurance arrangements as a distinct engagement.

C. *Capacity of Companies to Perform*

Our review notes the increased administrated burdens placed on AIPs. We did not attempt to assess the capacity of AIPs to perform the increased administrative responsibilities.

(6) DISCUSSION OF ISSUES⁷

Among the issue that arose in review of the proposal are:

1. Does it make sense to have two sets of rating values pegged to different prices for the same crop in the same county in the same year?
2. Does the program have appropriate controls in identifying input in various spreadsheets?
3. Is the work well-suited to implementation and management controls?
4. Does the program impose additional administrative burdens on producers, AIPs, and the FCIC?
5. Do the proposed rates and rating values make intuitive sense in light of the premiums charged and the indemnities available to producers?
6. Should not catastrophe coverage be incorporated in cost of production insurance?
7. Should we review the actuarial equivalence of subsidies for various crop insurance programs?
8. Are expense allowances to insurers sufficient to encourage them to write this business?
9. Does COP coverage support agricultural innovation and encourage the use of more productive techniques in agriculture?
10. Is the submission sufficiently complete to permit complete audit trails?
11. Is there any evidence of *ad hoc* adjustments of pricing formulas and models?
12. How are producers likely to select from among competing programs?

Our discussion of these issues is incorporated in our responses to the interrogatories.

⁷ Work Order Requirement (a)(2) - A discussion of issues surfaced in the review of the items listed in C.5 Description of Work. These issues should be clearly discussed, including the rational for any “yes” or “no” answers.

(7) CONCLUSIONS & RECOMMENDATIONS⁸

Based upon our expert actuarial review of the corporation proposed policy (CPP) for a “Cost of Production Insurance Plan for Cotton” as documented in the preceding analysis, we conclude:

that: the CPP for the Cost of Production Insurance Plan for Cotton is an innovative program that requires further work and should not be approved at this time.

This is a complicated program with many intricate calculations, heavy administration burden, and a steep learning curve. Substantial simplification is appropriate. Among such simplification and further research we suggest:

8. Incorporation of catastrophe coverage;
9. Fitting of distributions using stronger techniques;
10. Consistent rounding and terminology across materials;
11. Less emphasis on tracking every expense and recognition of the pervasive effects of allocation issues and side contracts in overly detailed approaches.
12. Imposition of less burden on producers and AIPs.
13. Investigation of expenses allowances, reinsurance, and subsidies and their interaction with the proposed coverage.
14. Greater recognition of variation of cost with features such as soil type within counties.

We further note that the FCIC is under legal obligation to investigate cost of production policies for as many commodities as possible. To this end, we suggest investigation of another commodity, distinct from cotton, so as to get a better handle on the administrative and managerial burdens that might be imposed by implementation of cost of production insurance.

Finally, we note that some concepts such as individual risk rating (experience rating) and policies on a whole farm or enterprise risk basis might be better researched as separate items than as part of specific pilot programs.

⁸ This section includes Work Order Requirement (a)(3) - A recommendation by the reviewer to the Board – approval, conditional approval, or disapproval. If conditional approval is recommended, the reviewer must explain the conditions that must be met before they would recommend approval. If disapproval is recommended, the reviewer must explain why.

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APPENDIX 1⁹

FEDERAL LAW

Federal law applicable to FCIC products and operation is largely found in United States Code TITLE 7 - AGRICULTURE CHAPTER 36 - CROP INSURANCE sections 1501 through 1524. Law requiring FCIC to investigate cost of production insurance for agricultural commodities was enacted as part of the Crop Insurance Law of 2000. These requirements now appear as the following two subsections of Chapter 36.

1.) Section 1522. Research and development subsection (c) Research and development contracting authority part (9) Contract for cost of production policy, which states:

- (A) Authority
The Corporation shall enter into a contract for research and development regarding a cost of production policy.
- (B) Research and development
The research and development shall –
 - (i) take into consideration the differences in the cost of production on a county-by-county basis; and
 - (ii) cover as many commodities as is practicable.

Section 1522(c)(10) Relation to limitations goes on to state:

A policy developed under this subsection may be prepared without regard to the limitations of this chapter, including –

- (A) the requirement concerning the levels of coverage and rates; and
- (B) the requirement that the price level for each insured agricultural commodity must equal the expected market price for the agricultural commodity, as established by the Board.

2.) Section 1508 Crop Insurance Subsection (c) General coverage levels part (5), which states:

(5) Expected market price

(A) Establishment or approval

For the purposes of this chapter, the Corporation shall establish or approve the price level (referred to in this chapter as the "expected market price") of each agricultural commodity for which insurance is offered.

(B) General rule

⁹ Work Order Requirement (a)(4) - An appendix of supporting material, calculations, etc.

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Except as otherwise provided in subparagraph (C), the expected market price of an agricultural commodity shall be not less than the projected market price of the agricultural commodity, as determined by the Corporation.

(C) Other authorized approaches

The expected market price of an agricultural commodity -

- (i) may be based on the actual market price of the agricultural commodity at the time of harvest, as determined by the Corporation;
- (ii) in the case of revenue and other similar plans of insurance, may be the actual market price of the agricultural commodity, as determined by the Corporation;
- (iii) in the case of cost of production or similar plans of insurance, shall be the projected cost of producing the agricultural commodity, as determined by the Corporation; or
- (iv) in the case of other plans of insurance, may be an appropriate amount, as determined by the Corporation.

Based on this wording, the authorizing legislation does not necessarily require the extent or depth of study in the current proposal.

APPENDIX 2¹⁰

COMBINING CATASTROPHE AND COP COVERAGE

FCIC Catastrophe Coverage costs producers an administrative fee but no premium as such. The catastrophe protection replaces other forms of disaster relief for producers. The FCIC cost of production insurance plan for cotton does not provide catastrophe relief. It cannot be viewed as a form of “buy up” from catastrophe coverage.

Participation in the FCIC crop insurance program is a prerequisite for participation in other USDA programs. FCIC Catastrophe Coverage affords a low cost method of participating in FCIC crop insurance and gaining access to other USDA programs. With the elimination of catastrophe coverage under the cost of production insurance plan for cotton, cotton producers will be paying a premium for the coverage. Thus we expect that cotton producers, if any, whose major motive in contracting for catastrophe coverage is access to USDA program will have little incentive to purchase cost of production insurance protection.

The purpose of this Appendix is to use some mathematical equations to explore the relationship between cost of production and catastrophe coverage.

Catastrophe Formula

The following notation will facilitate expressing the value of catastrophe coverage in a mathematical formula.¹¹ Catastrophic coverage (CAT) pays 55 percent of the established price of the commodity on crop losses in excess of 50 percent of actual production history.

H = Actual Production History or expected production for a producer; both cost of production and catastrophe use the same value of H in any year.

h = a possible value for actual production

f(h) = the probability of a producer actually experiencing actual production of h¹²

P = price established for crop

\$100 = Administrative fee for coverage; not used in formula but should be mentioned

¹⁰ Work Order Requirement (a)(4) - An appendix of supporting material, calculations, etc.

¹¹ The presentation assumes that the insured producer’s share is 100%.

¹² For purposes of this appendix possible differences in probability distributions associated with choice of coverage are not considered.

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$V =$ Dollar value of the catastrophe coverage

Using this notation, the value of catastrophe coverage is:

$$V_{Cat} = 0.55 P \int_0^{0.5H} (0.5H - h) f(h) dh$$

Cost of Production Formula

Cost of production coverage is designed to limit the maximum loss that a producer might have. The following notation will help describe the coverage.

$e_b =$ Approved budgeted expenses per acre (possibly as modified during the policy term)

$e_a =$ Approved actual expenses per acre

$e =$ $\text{Min}(e_a, e_b)$ = expenses per acre for indemnity calculation

$C =$ Coverage level (50%, 55%, 60%, 65%, 70%, 75%, 80% 85%)

$A =$ Insured acreage

$R =$ Dollar value of revenue¹³ defined as the sum of harvested production, appraised production, and other allowable income.

$I =$ Indemnity for given covered expenses and revenue

$$I = \text{Max}(eCA - R, 0)$$

If we define

$p =$ price implicit in R ,

the value of COP coverage is:

$$V_{COP} = \int_0^{eCA/p} (eCA - ph) f(h) dh$$

¹³ Revenue is term introduced by reviewer to simplify reference to amount to be compared with covered expenses.

Combining Catastrophe and Cost of Production Coverage

Combining the two equations for value yields:

$$V_{Cat\&COP} = \int_0^{MAX(0.5H, eCA/p)} MAX(eCA - ph, .55P(0.5H - h)) f(h) dh$$

The point of this exercise is to indicate that the Catastrophe coverage and Cost of Production coverage can be combined. Cost of Production coverage does not need to exclude Catastrophe Coverage. Actually doing so will be more complicated than the simple mathematics in this appendix. But there is nothing inherent in cost of production coverage that requires it to have a unique status among FCIC programs.

We recommend that models use the formula for joint coverage.

One advantage to using the equation for the combined coverage in modeling this coverage is that cost of catastrophe coverage can be subtracted from the cost of Cost of Production coverage so that COP rates do not include charges for coverage that is provided free of charge to producers in general.

APPENDIX 3¹⁴

FCIC COTTON EXPERIENCE

The four exhibits in this Appendix compare covered acres per FCIC participation data to total planted acres per NASS data by state for the years 1999, 2000, 2001 and 2002. There appear to be some discrepancies in rounding in the two data bases so that for some states in some years more than 100% of planted acres are covered by FCIC insurance products.

For all years, more than 90% of planted acres are covered by current FCIC insurance programs. This means that the FCIC Cost of Production Insurance Program can only gain substantial market share by displacing already existing insurance coverage.

This in turn leads to issues regarding adverse selection resulting from diverse rating systems for cost of production coverage and for other CIC coverages. Such issues are discussed more fully in response to corresponding questions in the Supporting Documentation section of the report.

In addition, it should be noted that the applicable coverage for approximately 25% of planted acres on a countrywide basis and more than 70% of planted acres in some states is catastrophe coverage. FCIC Cat coverage is heavily subsidized (free except for administrative fees) and not available in the cost of production program. It is unlikely that producers will forego free coverage for cost of production coverage which charges a premium for coverage in addition to fees.

¹⁴ Work Order Requirement (a)(4) - An appendix of supporting material, calculations, etc.

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Appendix 3 Exhibit 1													
2002 Cotton													
Acres by Type of Insurance													
	APH	APH	CRC	Group Risk	Inc. Protect.	Insured	Total	APH	APH	CRC	Group Risk	Inc. Protect.	Total
State	Cat ^(a)	Buyup ^(a)	Buyup ^(a)	Buyup ^(a)	Buyup ^(a)	Acres	Acres ^(b)	Cat	Buyup	Buyup	Buyup	Buyup	Crop Ins
ALABAMA	47,284	443,858	82,641	0	4,979	578,762	590,000	8.0%	75.2%	14.0%	0.0%	0.8%	98.1%
ARIZONA	69,070	128,136	9,554	0	0	206,760	215,000	32.1%	59.6%	4.4%	0.0%	0.0%	96.2%
ARKANSAS	685,586	140,025	34,285	0	0	859,896	960,000	71.4%	14.6%	3.6%	0.0%	0.0%	89.6%
CALIFORNIA	272,010	131,628	18,959	0	0	422,597	480,000	56.7%	27.4%	3.9%	0.0%	0.0%	88.0%
FLORIDA	13,758	45,161	58,079	0	0	116,998	120,000	11.5%	37.6%	48.4%	0.0%	0.0%	97.5%
GEORGIA	263,646	926,093	193,968	0	7,993	1,391,700	1,450,000	18.2%	63.9%	13.4%	0.0%	0.6%	96.0%
KANSAS	6,935	55,010	7,131	0	0	69,076	80,000	8.7%	68.8%	8.9%	0.0%	0.0%	86.3%
LOUISIANA	246,312	250,637	5,741	1,674	0	504,364	520,000	47.4%	48.2%	1.1%	0.3%	0.0%	97.0%
MISSISSIPPI	491,561	585,458	55,867	10,150	0	1,143,036	1,170,000	42.0%	50.0%	4.8%	0.9%	0.0%	97.7%
MISSOURI	294,945	36,403	11,975	638	0	343,961	380,000	77.6%	9.6%	3.2%	0.2%	0.0%	90.5%
NEW MEXICO	13,192	27,256	7,405	0	0	47,853	54,000	24.4%	50.5%	13.7%	0.0%	0.0%	88.6%
NORTH CAROLINA	252,451	443,884	160,309	0	0	856,644	940,000	26.9%	47.2%	17.1%	0.0%	0.0%	91.1%
OKLAHOMA	9,140	136,567	22,467	0	0	168,174	200,000	4.6%	68.3%	11.2%	0.0%	0.0%	84.1%
SOUTH CAROLINA	98,473	156,745	27,546	0	0	282,764	290,000	34.0%	54.1%	9.5%	0.0%	0.0%	97.5%
TENNESSEE	266,118	63,687	106,862	15,618	0	452,285	565,000	47.1%	11.3%	18.9%	2.8%	0.0%	80.1%
TEXAS	273,428	4,528,468	425,582	177,855	0	5,405,333	5,600,000	4.9%	80.9%	7.6%	3.2%	0.0%	96.5%
VIRGINIA	24,411	26,136	33,589	0	0	84,136	100,000	24.4%	26.1%	33.6%	0.0%	0.0%	84.1%
OTHER	0	0	0	0	0	0	174,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
UNITED STATES	3,328,320	8,125,152	1,261,960	205,935	12,972	12,934,339	13,888,000	24.0%	58.5%	9.1%	1.5%	0.1%	93.1%
Data Sources:													
(a)	http://www.rma.usda.gov/data/												
(b)	http://www.nass.usda.gov:81/ipedb/												

MBA Inc Consultants in Actuarial Science

Supporting Documentation – “FCIC Cost of Production Insurance Plan for Cotton”

Appendix 3 Exhibit 2													
2001 Cotton													
Acres by Type of Insurance													
State	APH Cat ^(a)	APH Buyup ^(a)	CRC Buyup ^(a)	Group Risk Buyup ^(a)	Inc. Protect. Buyup ^(a)	Insured Acres	Total Acres ^(b)	APH Cat	APH Buyup	CRC Buyup	Group Risk Buyup	Inc. Protect. Buyup	Total Crop Ins
ALABAMA	47,617	426,678	119,844	0	5,118	599,257	610,000	7.8%	69.9%	19.6%	0.0%	0.8%	98.2%
ARIZONA	82,994	133,798	25,933	0	0	242,725	295,000	28.1%	45.4%	8.8%	0.0%	0.0%	82.3%
ARKANSAS	726,970	187,450	63,459	0	0	977,879	1,080,000	67.3%	17.4%	5.9%	0.0%	0.0%	90.5%
CALIFORNIA	352,593	171,791	20,772	0	0	545,156	630,000	56.0%	27.3%	3.3%	0.0%	0.0%	86.5%
FLORIDA	11,432	74,648	38,241	0	0	124,321	125,000	9.1%	59.7%	30.6%	0.0%	0.0%	99.5%
GEORGIA	243,352	978,424	214,445	0	6,354	1,442,575	1,490,000	16.3%	65.7%	14.4%	0.0%	0.4%	96.8%
KANSAS	8,567	17,710	6,252	0	0	32,529	40,500	21.2%	43.7%	15.4%	0.0%	0.0%	80.3%
LOUISIANA	311,984	506,229	21,119	1,674	0	841,006	870,000	35.9%	58.2%	2.4%	0.2%	0.0%	96.7%
MISSISSIPPI	402,820	1,021,242	117,946	29,596	0	1,571,604	1,620,000	24.9%	63.0%	7.3%	1.8%	0.0%	97.0%
MISSOURI	300,911	33,499	19,729	7,360	0	361,499	405,000	74.3%	8.3%	4.9%	1.8%	0.0%	89.3%
NEW MEXICO	17,654	26,002	12,053	0	0	55,709	68,000	26.0%	38.2%	17.7%	0.0%	0.0%	81.9%
NORTH CAROLINA	283,284	452,871	148,039	0	0	884,194	970,000	29.2%	46.7%	15.3%	0.0%	0.0%	91.2%
OKLAHOMA	11,912	208,175	32,593	0	0	252,680	270,000	4.4%	77.1%	12.1%	0.0%	0.0%	93.6%
SOUTH CAROLINA	103,177	173,216	32,228	0	0	308,621	300,000	34.4%	57.7%	10.7%	0.0%	0.0%	102.9%
TENNESSEE	294,312	87,829	64,627	66,449	0	513,217	620,000	47.5%	14.2%	10.4%	10.7%	0.0%	82.8%
TEXAS	294,836	4,491,012	985,967	70,198	0	5,842,013	6,000,000	4.9%	74.9%	16.4%	1.2%	0.0%	97.4%
VIRGINIA	35,927	32,169	11,642	0	0	79,738	105,000	34.2%	30.6%	11.1%	0.0%	0.0%	75.9%
OTHER	0	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
UNITED STATES	3,530,342	9,022,743	1,934,889	175,277	11,472	14,674,723	15,498,500	22.8%	58.2%	12.5%	1.1%	0.1%	94.7%
Data Sources:													
(a)	http://www.rma.usda.gov/data/												
(b)	http://www.nass.usda.gov/81/ipedb/												

MBA Inc Consultants in Actuarial Science

Supporting Documentation – “FCIC Cost of Production Insurance Plan for Cotton”

Appendix 3 Exhibit 3													
2000 Cotton													
Acres by Type of Insurance													
State	APH Cat ^(a)	APH Buyup ^(a)	CRC Buyup ^(a)	Group Risk Buyup ^(a)	Inc. Protect. Buyup ^(a)	Insured Acres	Total Acres ^(b)	APH Cat	APH Buyup	CRC Buyup	Group Risk Buyup	Inc. Protect. Buyup	Total Crop Ins
ALABAMA	62,352	433,773	70,249	0	2,776	569,150	590,000	10.6%	73.5%	11.9%	0.0%	0.5%	96.5%
ARIZONA	115,033	135,765	16,951	0	0	267,749	280,000	41.1%	48.5%	6.1%	0.0%	0.0%	95.6%
ARKANSAS	763,239	99,675	9,966	0	0	872,880	960,000	79.5%	10.4%	1.0%	0.0%	0.0%	90.9%
CALIFORNIA	530,330	114,987	9,793	0	0	655,110	775,000	68.4%	14.8%	1.3%	0.0%	0.0%	84.5%
FLORIDA	18,313	83,094	23,395	0	0	124,802	130,000	14.1%	63.9%	18.0%	0.0%	0.0%	96.0%
GEORGIA	346,327	926,725	188,937	0	6,241	1,468,230	1,500,000	23.1%	61.8%	12.6%	0.0%	0.4%	97.9%
KANSAS	9,154	17,023	2,427	0	0	28,604	40,000	22.9%	42.6%	6.1%	0.0%	0.0%	71.5%
LOUISIANA	305,575	366,280	15,933	0	0	687,788	710,000	43.0%	51.6%	2.2%	0.0%	0.0%	96.9%
MISSISSIPPI	590,303	604,514	58,645	0	0	1,253,462	1,300,000	45.4%	46.5%	4.5%	0.0%	0.0%	96.4%
MISSOURI	313,615	31,895	9,658	0	0	355,168	400,000	78.4%	8.0%	2.4%	0.0%	0.0%	88.8%
NEW MEXICO	23,679	33,638	6,724	0	0	64,041	72,000	32.9%	46.7%	9.3%	0.0%	0.0%	88.9%
NORTH CAROLINA	308,022	433,975	80,087	0	0	822,084	930,000	33.1%	46.7%	8.6%	0.0%	0.0%	88.4%
OKLAHOMA	13,594	229,011	14,584	0	0	257,189	280,000	4.9%	81.8%	5.2%	0.0%	0.0%	91.9%
SOUTH CAROLINA	142,245	148,165	14,481	0	0	304,891	300,000	47.4%	49.4%	4.8%	0.0%	0.0%	101.6%
TENNESSEE	290,553	120,793	44,709	5,075	0	461,130	570,000	51.0%	21.2%	7.8%	0.9%	0.0%	80.9%
TEXAS	298,814	5,655,941	305,512	60,576	0	6,320,843	6,400,000	4.7%	88.4%	4.8%	0.9%	0.0%	98.8%
VIRGINIA	46,660	30,906	5,644	0	0	83,210	110,000	42.4%	28.1%	5.1%	0.0%	0.0%	75.6%
OTHER	0	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
UNITED STATES	4,177,808	9,466,160	877,695	65,651	9,017	14,596,331	15,347,000	27.2%	61.7%	5.7%	0.4%	0.1%	95.1%
Data Sources:													
(a)	http://www.rma.usda.gov/data/												
(b)	http://www.nass.usda.gov/81/ipedb/												

MBA Inc Consultants in Actuarial Science

Supporting Documentation – “FCIC Cost of Production Insurance Plan for Cotton”

Appendix 3 Exhibit 4													
1999 Cotton													
Acres by Type of Insurance													
State	APH Cat ^(a)	APH Buyup ^(a)	CRC Buyup ^(a)	Group Risk Buyup ^(a)	Inc. Protect. Buyup ^(a)	Insured Acres	Total Acres ^(b)	APH Cat	APH Buyup	CRC Buyup	Group Risk Buyup	Inc. Protect. Buyup	Total Crop Ins
ALABAMA	72,841	433,272	33,039	0	108	539,260	565,000	12.9%	76.7%	5.8%	0.0%	0.0%	95.4%
ARIZONA	110,740	97,357	21,927	0	0	230,024	270,000	41.0%	36.1%	8.1%	0.0%	0.0%	85.2%
ARKANSAS	809,306	23,274	17,850	0	0	850,430	970,000	83.4%	2.4%	1.8%	0.0%	0.0%	87.7%
CALIFORNIA	400,166	85,759	3,527	0	0	489,452	610,000	65.6%	14.1%	0.6%	0.0%	0.0%	80.2%
FLORIDA	20,289	69,371	12,337	0	0	101,997	107,000	19.0%	64.8%	11.5%	0.0%	0.0%	95.3%
GEORGIA	445,760	828,642	129,573	0	4,255	1,408,230	1,470,000	30.3%	56.4%	8.8%	0.0%	0.3%	95.8%
KANSAS	8,763	11,642	1,734	0	0	22,139	33,000	26.6%	35.3%	5.3%	0.0%	0.0%	67.1%
LOUISIANA	498,356	83,387	38,870	0	0	620,613	615,000	81.0%	13.6%	6.3%	0.0%	0.0%	100.9%
MISSISSIPPI	825,689	180,331	97,927	1,114	0	1,105,061	1,200,000	68.8%	15.0%	8.2%	0.1%	0.0%	92.1%
MISSOURI	287,409	24,400	9,400	0	0	321,209	380,000	75.6%	6.4%	2.5%	0.0%	0.0%	84.5%
NEW MEXICO	27,851	38,471	7,324	0	0	73,646	84,000	33.2%	45.8%	8.7%	0.0%	0.0%	87.7%
NORTH CAROLINA	355,099	317,480	62,896	0	0	735,475	880,000	40.4%	36.1%	7.1%	0.0%	0.0%	83.6%
OKLAHOMA	11,159	194,974	10,920	0	0	217,053	240,000	4.6%	81.2%	4.6%	0.0%	0.0%	90.4%
SOUTH CAROLINA	217,225	78,230	2,289	0	0	297,744	330,000	65.8%	23.7%	0.7%	0.0%	0.0%	90.2%
TENNESSEE	267,986	94,902	27,747	0	0	390,635	570,000	47.0%	16.6%	4.9%	0.0%	0.0%	68.5%
TEXAS	393,782	5,329,871	310,214	22,404	0	6,056,271	6,150,000	6.4%	86.7%	5.0%	0.4%	0.0%	98.5%
VIRGINIA	56,001	24,481	2,972	0	0	83,454	110,000	50.9%	22.3%	2.7%	0.0%	0.0%	75.9%
OTHER	0	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
UNITED STATES	4,808,422	7,915,844	790,546	23,518	4,363	13,542,693	14,584,000	33.0%	54.3%	5.4%	0.2%	0.0%	92.9%
Data Sources:													
(a)	http://www.rma.usda.gov/data/												
(b)	http://www.nass.usda.gov/81/ipedb/												

APPENDIX 4¹⁵

DISCLAIMER

Draft Disclaimer Form

Cost-of-Production (COP)
Pilot Crop-Revenue Insurance Plan

I ACKNOWLEDGE THAT I UNDERSTAND THE FOLLOWING:

1. **Amount of Insurance** – The maximum amount of crop insurance available under this plan in any year may be less or more than the amounts available under other crop insurance plans.
2. **Premiums** – Rates and premiums charged for coverage under this plan in any year may be less or more than the rates and premiums charged for other crop insurance plans.
3. **Indemnities** – Indemnities payable at loss time will be reduced to the extent that:
 - a. Actual production expenses are less than the Approved Expenses;
 - b. A Loan Deficiency Payment is receivable on the insured crop.

I accept the terms of the Basic Provisions and the Cost-of-Production (COP) Pilot Crop-Revenue Insurance Plan and understand the statements listed above.

INSURED’S SIGNATURE

| DATE

AGENT’S SIGNATURE AS WITNESS

| DATE

¹⁵ Work Order Requirement (a)(4) - An appendix of supporting material, calculations, etc.

APPENDIX 5¹⁶

APH – COP COMPARISON

The purpose of this Appendix is to illustrate the relationship between APH and COP coverage using an example from the submission. Other examples are possible and can generate different relationships. The example in the Appendix is for purposes of illustration only.

In the Cost Of Production Pilot Insurance Program Instructor Training Package For Upland Cotton, Appendix I and J, a premium calculation is presented for COP Insurance. Based on the County Actuarial Table in Appendix G and Appendix H as well as the reference to the Excel workbook tab Prem Calc (Non Irr), the example is premium calculated for a specific producer in Franklin County, LA for year 2004. The overall premium calculation produces a total producer premium of \$17,907.

Producer specific inputs for the rating are:

- 1) Yields for the years 1995-2002 of 760, 524, 515, 627, 420, 533, 567 and 422 respectively.
- 2) Accumulated Acreage of 4000 over the above mentioned eight-year period.
- 3) Elected Cost coverage per acre of \$335 for variable expenses, \$50 for fixed expenses and \$60 for land with a total allowable expense (after limitations applied) of \$445.
- 4) The allowable APH for the producer is 559.
- 5) The forecasted price per bushel is \$0.573
- 6) The coverage level selected is 85%
- 7) The Acreage insured is 500.

Utilizing the RMA on-line Premium calculator, and the above provided inputs, coverage under an APH policy with a price election of \$0.52 (100%) and a coverage level of 85% (2003 used since 2004 was not yet available) resulted in a producer premium of \$29,837.00. A price election of \$0.44 (85%) and a coverage level of 85% resulted in a producer premium of \$25,247.00.

Based on the above premium values, the relative price of COP coverage to APH coverage is in the range of 60-70%. We note that the policy example given in the text was chosen with the expectation of a loss on the cotton crop for the year (expected revenue is less than expected expense).

Differences to note in the inputs at various steps in the calculation process and other source material provided include:

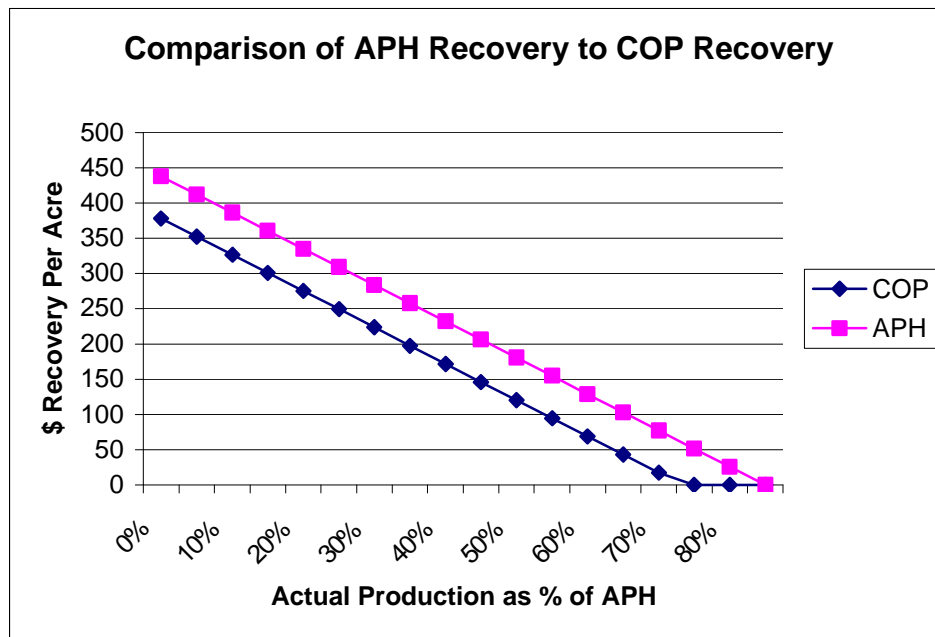
¹⁶ Work Order Requirement (a)(4) - An appendix of supporting material, calculations, etc.

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Supporting Documentation – “FCIC Cost of Production Insurance Plan for Cotton”

- 1) The County weighted yield table provided both in Appendix H of the Cost Of Production Pilot Insurance Program Instructor Training Package For Upland Cotton, and in the Word Document “C(3)-COP_FCI-35_Template-Franklin_LA_2.doc” provided as part of the proposal package list a value of 583 for year 2002, while the example uses 590.
- 2) The weighting to be applied to the deviations in mean yield, coefficient of variation of yield and mean profit margin, as documented in the white paper “Cost of Insurance Production Methodology”, are 29%, 33% and 37% respectively while the example uses 27%, 37% and 36% respectively.
- 3) The allowable APH in the example premium calculation is 559. This is not reproducible in the Excel workbook “COP Final LA CRD 30 85%.xls” and it’s derivation is not explained in the text of Cost Of Production Pilot Insurance Program Instructor Training Package For Upland Cotton.

The graph below displays the recoveries under both an APH policy and a COP policy for varying actual returns. In this example we are assuming an expected profit on the cotton crop.



Our assumptions are:

- 1) The coverage level selected is 85%
- 2) The forecasted price per bushel is \$0.573
- 3) The APH for the producer is 900.
- 4) Elected Cost coverage per acre of \$335 for variable expenses, \$50 for fixed expenses and \$60 for land with a total allowable expense (after limitations applied) of \$445.

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Supporting Documentation – “FCIC Cost of Production Insurance Plan for Cotton”

Items to note in the results:

- 1) The recoveries under the APH policy are a fixed dollar amount above the recoveries under the COP policy, for each production level.
- 2) At higher production levels there is no recovery under the COP policy, but there continue to be recoveries under the APH policy up to the point when actual production is 85% of APH.
- 3) The lower the covered expense level under the COP policy, the larger the fixed dollar amount difference between recoveries under the APH and COP policies.

ACTUARIAL RESUMES AND EXPERIENCE¹⁷
For
Expert Review
Of
FCIC Cost of Production Insurance Plan for Cotton

Muetterties Bennett and Associates, Inc. (MBA Inc.) has performed the following expert reviews for the Risk Management Agency (RMA) of the United States Department of Agriculture (USDA).

- A. Raspberry and Blackberry Pilot Crop Insurance Program, a Corporation Proposed Policy (CPP) – Expert review submitted on October 16, 2000 in accordance with Task Order 1 for Raspberry / Blackberry Pilot Program, Basic Ordering Agreement Number 460000797, Prime Contract Number T00AJM009, and Purchase Order Number 4400032105.
- B. Forage Seed Pilot Crop Insurance Program, a Corporation Proposed Policy (CPP) – Expert review submitted on November 6, 2000 in accordance with Task Order Statement for Expert Review of Forage Seed Pilot Program, FCIC Board Memorandum 584, RFP #60-2016-367, Basic Ordering Agreement Number 460000797, SAIC Prime Contract Number T00AJM009, and Purchase Order Number 4400032105.
- C. Timber Crop Insurance Program, a Corporation Proposed Policy (CPP) – Expert review submitted on November 6, 2000 in accordance with Task Order 2 for Timber Crop Coverage, Basic Ordering Agreement Number 460000797, SAIC Prime Contract Number T00AJM009, and Purchase Order Number 4400032105
- D. Livestock Gross Margin Insurance Policy, a Corporation Proposed Policy (CPP) – Expert review submitted on August 10, 2001 in accordance with Board Memorandum BM613, Work Order #RMA-01-0001, and Blanket Purchase Agreement (BPA) 45-6401-1-0119.
- E. Nutrient Management: Best Management Practices (BMP) Insurance Program - Expert Review submitted on August 24, 2001 in accordance with Board Memorandum (BM) BM615, Work Order # RMA-01-0002, and Blanket Purchase Agreement (BPA) 45-6401-1-0119.

¹⁷ Work Order Requirement (a)(5) - Short biographies (not to exceed one page) for each person who took substantial part in the expert review. The biography should include any experience, degrees, certificates, or other information to support the qualifications of the participant.

MBA Inc Consultants in Casualty Actuarial Science

Actuarial Resumes & Experience – “FCIC Cost of Production for Cotton Insurance Program”

- F. Hybrid Seed Price Endorsement – Expert Review submitted on October 24, 2001 in accordance with Board Memorandum (BM) BM627, Work Order #RMA-01-0003, and Blanket Purchase Agreement (BPA) 45-6401-1-0119.
- G. Timber Coverage Crop Insurance Program – Expert Review submitted on April 1, 2002 in accordance with Board Memorandum (BM) BM641, Work Order #RMA-020001, and Blanket Purchase Agreement (BPA) 45-RMA1-2-0015.
- H. Cost of Production Insurance Plan for Cotton – Expert Review submitted on June 25, 2002 in accordance with Board Memorandum (BM) BM654, Work Order #RMA 02-0002, and Blanket Purchase Agreement (BPA) 45 – RMA 1-2-0015.
- I. FCIC Cost of Production Insurance Plan for Cotton – Expert Review submitted on September 23, 2002 in accordance with Board Memorandum (BM) BM 659, Work Order #RMA-02-0003, and Blanket Purchase Agreement (BPA) 45 – RMA1-2-0015.
- J. Revised Nutrient Management Best Management Practice (BMP) Crop Insurance Program - Expert Review submitted on September 23, 2002 in accordance with Board Memorandum (BM) BM 665, Work Order #RMA-02-0004, and Blanket Purchase Agreement (BPA) 45 – RMA1-2-0015
- K. Crop 1 Production Dollar Plan of Insurance - Expert Review submitted on November 29, 2002 in accordance with Board Memorandum (BM) BM2141, Work Order # RMA-03-0001, and Blanket Purchase Agreement (BPA) RMA 1-3-0015.
- L. Revisions to the Crop Revenue Coverage Plan of Insurance - Expert Review submitted on December 31,2002 in accordance with Board Memorandum (BM) BM686 , Work Order # RMA-03-0002, and Blanket Purchase Agreement(BPA) RMA1-3-0015.
- M. Revised Livestock Gross Margin (LGM) Plan of Insurance - Expert Review submitted on June 13, 2003 in accordance with Board Memorandum (BM) BM701, Work Order # RMA-03-0003, and Blanket Purchase Agreement (BPA) 45-RMA1-3-0015.

In addition, MBA Inc. will perform:

- N. Corn Silage Price Election Enhancement Endorsement Option to MPC1 APH Policy – Expert Review to be submitted on October 13, 2003 in accordance with Board Memorandum (BM) BM713, Work Order # RMA-03-0005, and Blanket Purchase Agreement (BPA) 45-RMA1-3-0015.

MBA Inc. consulting actuaries participating in the current engagement are Charles F. Cook, John H. Muetterties, Dave Pochettino, F. Douglas Ryan, and Alfred O. Weller. One-page resumes for each of the actuaries in our firm follow.

MBA Inc Consultants in Casualty Actuarial Science

Actuarial Resumes & Experience – “FCIC Cost of Production for Cotton Insurance Program”

CHARLES F. COOK, FCAS, MAAA, FCA, CPCU

Charles F. Cook graduated from Princeton University in 1963, majoring in Mathematics. He became a Fellow of the Casualty Actuarial Society in 1966, and a Member of the American Academy of Actuaries in 1971. He received his MBA degree in finance from St. Mary's University of Texas in 1974. In 1977 he received the designation of Chartered Property and Casualty Underwriter. Mr. Cook served on the Casualty Actuarial Society Board and the Committees on Examination and Education, Review of Papers, Theory of Risk and Long Range Planning.

From 1963 to 1965, he worked in the Actuarial and Research departments at the National Bureau of Casualty Underwriters. During 1965 to 1968, Mr. Cook was Assistant Actuary at the Continental Insurance companies in New York. Between 1968 and 1970, he was Actuary at General Accident Insurance in Philadelphia.

Mr. Cook was Vice President and Chief Actuary of United Services Automobile Association in San Antonio from 1970 to 1975, where he had authority for all pricing and related matters. He was also responsible for all reinsurance, did extensive work in financial planning and built USAA's first financial model. He was involved in long-range strategic planning, product design, systems design and statistical coding plans.

From 1975 to 1982, Mr. Cook held several positions with American International Group. He was first Senior VP and Assistant to the President of American International Underwriters Division, with Line responsibility for Auto insurance in 130 countries outside North America. He had staff coordinating responsibility for overseas underwriting for all lines-budget signoff, jumbo risk signoff, reinsurance treaties, and exceptions to policy. He then became Senior VP and Chief Underwriting Officer of the New Hampshire Insurance Group, with line responsibility for all underwriting, plus the Actuarial and Research and Product Development departments. Throughout his years at AIG, he also managed US domestic auto and homeowners mass marketing, a part of the American Home division of AIG.

Mr. Cook was President and Chief Executive Officer of American Universal Group from 1982 to 1988. When he took it over, it was essentially bankrupt due to simultaneous crises in reinsurance, Excess and Surplus Lines underwriting, and loss reserves. He replaced all reinsurance, 80% of management, 70% of systems and 85% of the business, with a drastic realignment of markets. The premium volume was approximately the same in 1988 as in 1982 - but profitable and much shorter-tailed.

In 1988, Mr. Cook became a consulting actuary, specializing in finance, organization, systems integration, market analysis and product development.

MBA Inc Consultants in Casualty Actuarial Science

Actuarial Resumes & Experience – “FCIC Cost of Production for Cotton Insurance Program”

JOHN H. MUETTERTIES, FCAS, MAAA, FCA

John H. Muetterties was born in Elgin, Illinois. His college studies were interrupted and he served for 3 years during World War II in the United States Navy, seeing action in the Pacific and obtaining the rank of Lieutenant.

He graduated from the University of Wisconsin in 1948 with a major in statistics and was employed as a casualty actuary by the Insurance Department for the State of Wisconsin, with responsibility for the supervision of casualty filings and examinations.

From 1955 to 1959, Mr. Muetterties was employed by the Industrial Indemnity Company, San Francisco, California, as Casualty Actuary and as head of the Actuarial Department. In 1959, he joined the Sentry Insurance Company in Stevens Point, Wisconsin as Actuary and Officer in Charge of the property and Casualty Actuarial Department. He served on the Actuarial Committees of the CRIB, PCAA, NCCI, Mutual Bureau and the Alliance.

Mr. Muetterties came to New York City in 1970 to head the Actuarial-Statistical Department of the Insurance Rating Board. In 1971, at the time of its merger into Insurance Services Office, he was named Actuary, continuing his responsibility as an officer and head of the Actuarial-Statistical department of the newly-formed, all lines, property-casualty organization. Later he became Vice President for Governmental and Industry Relations of ISO. Mr. Muetterties' extensive work in property-casualty insurance has included testimony at many rate hearings and court cases.

In 1978, Mr. Muetterties became a consultant in the property-casualty actuarial area. Current and past work has included large self-insureds in hazardous industries and projects involving experience rating plans for Workers' Compensation insurance for coal miners, Ocean Marine rate and reserve analysis, and rate and reserve analysis for more traditional business.

Mr. Muetterties became a Fellow of the Casualty Actuarial Society by examination in 1956, was a member of the Professional Conduct Committee, was an advisor to the Examination Committee of the Society, served on the Education Committee for many years, and was on the Board of Directors from 1972 through 1974. He is also a charter member of the American Academy of Actuaries and served on its Professional Conduct Committee. He is a member of the International Congress of Actuaries, ASTIN section and a fellow and former member of the Board and past President of the Conference of Consulting Actuaries. He was President of the Midwest Actuarial Forum during 1970.

Mr. Muetterties resides in Mountain Lakes, New Jersey.

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Actuarial Resumes & Experience – “FCIC Cost of Production for Cotton Insurance Program”

W. H. ODELL, FSA, ACAS, MAAA, FCA

Mr. Odell graduated from the University of Pennsylvania Wharton School of Finance and Commerce in 1954 with a B. S. in Economics. He became a Fellow of the Society of Actuaries in 1958, a Member of the American Academy of Actuaries in 1965, a Fellow of the Conference of Consulting actuaries in 1975. He became an Associate of the Casualty Actuarial Society in 1981, and was an Enrolled Actuary from 1975-1993.

Mr. Odell began his actuarial career at the Prudential Insurance Company of America's Newark headquarters in their Management Development and Actuarial Development Programs. His areas of concentration included group Life and Health and Systems. After completing these programs and attaining Fellowship in the Society of Actuaries in only 4 years, Mr. Odell moved South with the Prudential to their Jacksonville regional office in 1959. There he practiced in underwriting and servicing of individual Life and Health and small groups.

He moved on to Life of Georgia in 1964 where he added Annual Statements, product development, and Group Annuities to his repertoire.

At Commonwealth Life of Kentucky in 1968, he integrated Actuarial and financial controls and entered general and financial management, providing advice and counsel to top management on the present and future state of the business.

Mr. Odell became Vice President of Capital Holding Company in Louisville in 1971, responsible for the integration, coordination, and measurement of subsidiaries.

He has been a consulting actuary for 30 years, first as Senior Vice President of Booke & Company in Winston-Salem, where he managed their Actuarial Consulting and Education Divisions. In 1982 he founded Odell & Associates, which he has headed for 20 years.

Mr. Odell has been active in industry and professional affairs. He has chaired committees at the American Academy, the Society of Actuaries, the Conference of Consulting Actuaries, and Liaison Committees of the NAIC. He has been a Director of the Academy and the Conference, and Vice President of the Conference. He has also served as Editor, Secretary-Treasurer, Vice President, and President of regional actuarial clubs.

He has published a dozen papers and articles in six different Journals, several of them refereed journals. He has frequently offered expert testimony in State, Federal, and Tax Courts, as well as before Congressional Committees and Insurance Departments. Additional information and details are available upon request.

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DAVID J. POCHETTINO, ACAS, MAAA

Dave Pochettino graduated from Penn State University in 1986 with a Bachelor of Science degree in Physics. He is a member of Sigma Pi Sigma, the National Physics honor society. He also received a Master of Science degree in Electrical Engineering from Drexel University in 1986. He became an Associate of the Casualty Actuarial Society and a Member of the American Academy of Actuaries in 1997.

Mr. Pochettino began his career with General Electric Aerospace in 1986 as part of GE’s Advanced Engineering Concepts Department. He performed in a variety of functions including staff physicist, computer programmer, systems engineer and orbit operations engineer. His work was recognized by the U.S. Air Force in 1987, and in 1991 he was named as GE Aerospace’s employee of the quarter.

Mr. Pochettino began his actuarial career with Prudential Reinsurance (now Everest Re) as an actuary in the valuation unit. His responsibilities included commutation analyses and quarterly reserve reviews. He also analyzed Prudential Re’s asbestos and environmental liability reserves.

In 1995 Mr. Pochettino joined CIGNA Property and Casualty as an actuary supporting CIGNA’s financial controller. He supported CIGNA’s bifurcation into ongoing and runoff operations, fielding questions from state regulators and industry rating agencies. He also revised the tax-preferred company utilization strategy and analyzed CIGNA’s expense structure relative to industry peers.

In 1996 Mr. Pochettino transferred to CIGNA’s Commercial Lines Division where he was responsible for rate adequacy and reserving for CIGNA’s small business program. He converted the program from an independent rate plan to a bureau-based rate plan. Later, he was given ratemaking and reserving responsibility for CIGNA’s commercial general liability, commercial property and commercial auto lines. He also supported underwriters directly in the pricing of large and unusual insureds.

In 1998 Mr. Pochettino became the actuary for CIGNA’s specialty commercial and professional liability lines. His duties included rate adequacy monitoring and quarterly reserve analyses for both segments. He also participated directly in producer relations, visited current and prospective producers, and assisted in product development and the crafting of producer profit sharing agreements. He was responsible for pricing large professional liability accounts.

He joined MBA as a Consulting Actuary in 1999 and provides a wide range of actuarial services to clients in the area of loss reserving, rate relativity analysis, dynamic financial analysis, financial modeling, reinsurance placement, and market assessment.

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F. DOUGLAS RYAN, ACAS, MAAA

Doug Ryan graduated from the University of North Carolina at Asheville in 1990 with a Bachelor of Arts in Theoretical Mathematics. He received a Master of Science in Applied Mathematics from North Carolina State University in 1994 with concentration in Probability Theory and a minor in Statistics.

Mr. Ryan began his actuarial career in 1994 with Liberty Mutual Insurance Group in Boston as an Actuarial Analyst. He worked in Commercial Lines Pricing before transferring to Commercial Lines Research & Development. Mr. Ryan's responsibilities included: reviewing state/line rate adequacy for all major commercial lines; organizing and preparing rate filings/responses for submission to state insurance departments; designing account level profitability reports for division management and; developing methods for pricing then implementing Workers' Compensation medium dollar deductible products for various states. Mr. Ryan designed new and streamlined existing PC and mainframe software tools to automate the Workers' Compensation rate review process. Mr. Ryan also participated directly with a reinsurance pooling project designed to reduce divisional need to seek external reinsurance coverage.

In 1997, Mr. Ryan joined GMAC Insurance Personal Lines in Winston-Salem, North Carolina as a Senior Analyst-Personal Lines Pricing. Along with his duties of rate adequacy monitoring and rate filing preparation, in this role he designed and implemented a multi-state rate indication methodology for the motorcycle program, and designed a template to determine on-level factors for private passenger auto based on a varying exposure method.

Later, Mr. Ryan became Supervisor-Actuarial Data Management Unit, direct supervisor for 2 Senior Analysts. He designed and/or taught training sessions for data access/analysis tools and techniques specifically geared for the Actuarial unit, and participated directly in testing and selecting the corporate data mining and data access tools. He oversaw the design and maintenance of new databases and existing database sources used by the pricing and reserving units, and developed stopgap data gathering techniques to circumvent data flow problems during the integration of the enterprise systems. He developed better inter-departmental communication by jointly designing methodologies and procedures to efficiently automate data sources maintenance and updating.

Mr. Ryan also served as Project Manager-Product Development. He developed and implemented a modeling process for determining VIN based symbol relativity curves and model year/vehicle age relativity curves based on enterprise loss experience, including market analysis comparison. He developed tools to automate the rate effect analysis and recommended changes to the rating system design.

In December of 2000, he joined MBA, Inc. as a consulting actuary assigned to its affiliate Odell Associates office in Winston-Salem, North Carolina and provides a wide range of actuarial services in the areas of loss reserving, rate relativity analysis, statistical modeling, and market assessment.

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JIM TOOLE FSA, MAAA

Jim Toole spent two years in Princeton University’s engineering program before graduating cum laude from Wake Forest University with a Bachelor of Science degree in Mathematics in 1987.

He began his actuarial career at Integon Insurance Company in Winston–Salem before joining MetLife in the New York City office. With an eye toward international markets, he joined Tillinghast-Towers Perrin’s Mexico City office where he lived and worked for two years before moving to Milliman Global. During his years at Milliman Global, he helped establish the Latin America practice as the leading provider of merger and acquisition services in the region. He is fluent in English and Spanish and has a working knowledge of Portuguese.

Mr. Toole has more than 15 years of management and technical experience in the insurance industry. He has worked in various lines of business including life (individual and group), annuity, P&C and health. Individual life product experience includes term, whole life (non-par, par and excess interest), universal life, variable universal life and COLI, as well as a variety of health riders and stand alone products. He has worked with a broad range of distribution channels including career agency, brokerage, independent, worksite marketing, bancassurance, direct marketing as well as an assortment of individually tailored “designer” deals.

His project background includes experience analysis, product development and pricing, cash flow testing, budgeting, loss reserving, U.S. GAAP (historic and purchase), mergers and acquisitions (appraisals and due diligence), bancassurance (product, financial and strategic analysis), financial process re-engineering and demutualization.

For more than a decade, Mr. Toole has been a frequent speaker at industry meetings, seminars and universities in the United States and Latin America. He has written and/or edited numerous publications in the industry, with a focus on international and technology issues. His most recent paper, “Actuarial Considerations in Insurance M&A: An International Perspective”, has been published as part of the Society of Actuaries Monograph series and selected for inclusion on the Course 8 Finance exam syllabus.

Mr. Toole participates energetically in Society of Actuaries (SOA) sponsored activities. Founder of the SOA Latin America Committee, he is also a member of the SOA Strategic Planning Committee and is currently on the ballot for the SOA board of directors. He is a past chair of the International Section council and past member of the Computer Science Section council. In 1996, he founded and edited the inaugural Actuarial Speculative Fiction contest; in 2001, he spearheaded the global effort to update SOA Table Manager database.

Mr. Toole joined the firm in October of 2002 in the capacity of Managing Director of the Life and Health division of MBA. He is also responsible for the day to day operations of the Winston-Salem office.

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ALFRED O. WELLER, FCA, FCAS, MAAA

Alfred O. Weller graduated from Swarthmore College in 1969 with a BA in mathematics and from Indiana University in 1971 with a MA in mathematical statistics. He became a Member of the American Academy of Actuaries (MAAA) in 1979, a Fellow of the Casualty Actuarial Society (FCAS) in 1981, and a Fellow of the Conference of Consulting Actuaries (FCA) in 1986. He is active in actuarial societies serving on Boards of Directors, Committees and Task Forces. He has published numerous papers and is a frequent speaker at industry meetings. Al received a 1975-76 Recognition Award from the Central New Jersey Lung Association for assistance in its carboxyhemoglobin study, and received the 1989 Actuarial Practitioners Award from the Actuarial Education and Research Fund (AERF) for his work on generalized Bondy development.

Al began his career with the National Council on Compensation Insurance in 1971 and had advanced to Actuary on the Executive Staff when he left in 1978. He managed the design and implementation of improved actuarial methods for trend factors, classification rate making, benefit evaluation, automation of rate making and individual risk rating.

After NCCI, Al joined the Continental Insurance Companies (now CNA) as Director of Actuarial Services. His responsibilities included general actuarial support for large commercial accounts and various special projects (e.g., excess workers compensation, captive insurance companies).

In 1982, Al joined Frank B. Hall & Co., Inc. (now AON) as a Vice President for Actuarial Consulting. His work included self-insurance programs, association programs, captive insurance companies in sundry domiciles, and client support in the evaluation and negotiation of insured programs. From 1983 to 1985, Al was Vice President for BRI Coverage Corp. (the twentieth largest broker) with actuarial, marketing, and operational responsibilities. From 1985 to 1987, Al was head actuary for Fred. S. James and Co., Inc. (now Marsh) with responsibility for actuarial support of brokerage operations and client services.

From 1987 to 1995 Al was a Senior Consulting Actuary with Ernst & Young. In addition to serving as the qualified actuary opining on loss and loss adjustment expenses reserves for between 15 and 20 insurers each year, he afforded audit support for roughly thirty insurers, and performed consulting engagements relating to new product development, mergers and acquisitions, automated case reserves, and more. In terms of lines of business, his clients underwrote such diverse lines as financial guaranty insurance, non-standard automobile, excess and surplus lines, surety, directors and officers liability, and others on both a primary and reinsurance basis.

Mr. Weller was President of the Workers Compensation Reinsurance Bureau in 1995 and 1996. The WCRB is the oldest and largest insurance pool affording excess workers compensation insurance. After the two largest members (CNA and Continental) merged, the WCRB went into runoff in 1996.

After WCRB, Al served as an independent consultant specializing in the analysis of financial reinsurance. In 1997 Al joined the Insurance Services Office (ISO) as Principal responsible for product development and marketing to new markets such as risk managers and industry associations. In late 1999 ISO returned to its traditional sales approach for these markets and Al returned to consulting.

Al Weller joined MBA, Inc. in 2000. He brings strong expertise in alternative markets and risk management, workers compensation and commercial insurance, and reinsurance and financial products.