Fire Emissions Joint Forum

Conference Call: 4/26/02

FEJF Participants: Pete Lahm-USDA/Forest Service, Dave Randall-Air Sciences, John Veranth-Utah Environmental Organizations, Bryan Jenkins-UC at Davis, Frances Bernards-Utah Division of Air Quality, Diane Riley-Idaho Department of Environmental Quality, Larry Biland-U.S. Environmental Protection Agency R9, Pat Shaver-USDA/Natural Resources Conservation Service

Other Participants: Rick Sprott-Utah Division of Air Quality (IOC Liaison), James Scarborough-Air Sciences, Patrick Gaffney-California Air Resources Board, Tom Moore-Western Governor's Association (WRAP Technical Coordinator), Trista Glazier-Montana Department of Environmental Quality.

Discussion Topic:

Pat Shaver raised a number of concerns with regards to the ERG developed Agricultural Burn Activity Inventory as represented below. Included below is an analysis of the comments by ERG to help facilitate the discussion. The concerns warranted a conference call of the Forum to determine whether the inventory and subsequent emissions should be used in the WRAP's upcoming Section 309 modeling effort. The call focused on this issue. **The Forum came to consensus on moving forward with the existing inventory as it stands.** Documentation of the limits and issues with the data will be included in the Final Report as mentioned below. There will also be several additional activities undertaken to address Pat Shaver's concerns as well. The activities are listed below. Further budget expansion and contract duration for ERG was briefly discussed and approved by the group. The contract changes will be managed by the Co-Chair and Bryan Jenkins.

Call Discussion and Conclusions:

1. Sensitivity runs for agricultural burning and prescribed fire should be conducted to determine potential effects of the uncertainty in these emission inventories. Action item: Tom Moore will raise the issue with the Modeling Forum to see how and when these could be conducted and will report to the FEJF of the proposed schedule.

2. The range of the sensitivity runs will need to be developed for the Modeling Forum use. The variation should be based on assessment of the how representative the data is for the modeling effort rather than precision of the data. Action item: The FEJF Emissions Task Team will determine what level of variability should be ensconced in the sensitivity runs.

3. A section will be added to the report being written by ERG on the Agricultural Burn Activity Inventory that addresses potential future improvements for the

development of such an inventory. A list of suggested protocol changes from the current inventory methods will be included. This section will augment the already planned efforts of ERG to document review comments and subsequent changes to the inventory for the final report. These recommendations will be covered in the upcoming WRAP Technical Review Workshop scheduled for July 9-10. Action item: ERG will work with Pat Shaver and Air Sciences to develop this section and insure that it is complete.

From: INTERNET:Patrick.Shaver@orst.edu, INTERNET:Patrick.Shaver@orst.edu

Date: 4/15/2002 4:12 PM

RE: Non-Burning Management Alternatives on Agricultural Lands in the Western United States

Pete and members of FEJF,

As you are aware from our several conversations n the last few weeks, I have some serious concerns about the "Non Burning Management Alternatives on Agricultural Lands in the Western United States" report. The major concerns I have deal with the activities data base and not the alternative portion of the report. I would suggest that the two portion of the report be dealt with as separate issues. The statements below are based on my understanding of what was done and how the information was collected. If I am mistaken in any statements I apologize to those affected, please correct me.

* As a Joint forum of the WRAP we are charged with producing products that are technically correct and accurate using the current and correct science. I question whether that was accomplished in this part of the project. I have some serious data quality concerns.
  - To use region wide means or modes (I am not sure which was used) in residue loading may be appropriate for some crops, but not for others. Some residue production within the same crop may vary by an order of magnitude, for example irrigated long stem varieties of wheat vs. dryland short stem varieties of wheat. The difference could be as great as <0.5 tons/ac to over 8 tons/ac. I am reasonably certain that the differences in residue production between these wheat varieties and cultural practices were not taken into account when developing the residue factor used for wheat. To assume the same residue production per crop throughout the WRAP region is a flawed assumption and the data exists to use better estimates.
  - The use of "gap" filled information on acreages burned per crop should not be done. That is also a very flawed assumption that farmers burn the same percentage of the same crops throughout the region based on some average, mean or mode. It does not happen that way. Cultural

practices in crop production, while based in science are very "culturally" oriented and vary dramatically form region of the state to region of the state, let alone state to state or Washington to NM. It appears that there was no attempt to separate the burning of dryland production acres from irrigated acres, another very flawed procedure. For example, the cropland in Curry Co. New Mexico is 65% non-irrigated. Non-irrigated wheat stubble in eastern NM is not burned. The acreage figures for Curry County do not reflect this difference. The data are available to separate these things.

- Even using the "best" data base several errors in data quality were found. ERG has corrected at least two (burning of corn harvested for silage and cotton stubble). The corn example was an obvious error caused by assuming if corn is burned all corn is burned regardless of the production and harvesting method. An error similar to the use of one residue figure/crop. The cotton example is a little different type of error. The data base from San Joaquin Valley APCD showed permits were issued to burn cotton fields. In talking to the field person it was discovered that what was actually burned was ditch banks. Very different in terms of residues and acreage. This kind of error, using the "best" data base, makes the quality of all the data questionable in my mind. I am reasonably sure that the cotton example would also hold for most of the corn harvested for grain as well.

* I also have major issues with the quantity of data gather in the inventory. The issues with the North Dakota and Colorado data are examples of this. I have talked to Paula Fields, Dave Randall and you about that. Because of the vast differences in residue production, cultural practices and habits throughout the WRAP region, I am very opposed to "gap" filling data without good anecdotal information to support the estimates (I understand most of the gap filled data has been replaced with anecdotal data). I do not think there is much reliable anecdotal data in the current draft of the report. There are good methods to collect this kind of data, a great example is what occurred in Utah. Frances Bernards, a FEJF member, sat down with Kerry Goodrich, USDA/NRCS State Agronomist and went through the draft report for Utah and developed an activities data base for Utah that is supportable at least by good reasonable antidotal data from experts in the science of agronomy and crop production methods in the state of Utah. This also included information from producers and producer organizations. (I assume that the contractor will re-compute the average percent burned for wheat, barley and corn based on the new figures, it will make a big difference, especially in corn for gap filling other states).

* I have voiced concern that professionals involved in production agriculture were not contacted to provide input into the activities data base. I was told that the State Extension officials were contacted. After looking at the "List of Informal Survey Participants and Contact Information" appendix C it appears that only the Deans or Directors of Extension were contacted, not the State Extension Agronomist and that they were asked only about "alternatives" not about burning activities. The

group of professional represented by the USDA Natural Resources Conservation Service Field Offices and the County Extension Offices are not included and these are the individuals I would expect to have the best anecdotal data concerning burning activity on croplands.

My main concerns deals with the "kind" of errors made more that the accuracy of the numbers. The kind of errors made indicate to me that the developers did not understand the appropriate data entry fields or the appropriate data entry values for such a data base. This causes me to question the validity of the entire data base. Again it is not the errors in numbers, that can be fixed, it is the kind of errors. To include burning of corn harvested for silage, to not question a data entry that shows cotton stubble being burned, to show crop residue being burned in only three counties in ND and all counties of SD and Montana, not separating or discussing the difference in irrigated vs. non-irrigated cultural practices and that effect on burning activity and residue, not contacting and discussing activities and residue loadings with agricultural production professionals, and the great difference in the data base for Utah before and after including such professionals in the discussion all lead me to question the validity of the entire data base.

The data are available to create a good accurate inventory of agricultural burning activities, although not a precise one. I have a real concern that the data as presented will be accepted as both accurate and precise "enough" by the user. After a short discussion with Mike George concerning the need for accuracy and completeness of the data base, I cannot agree that the report, as I have seen it, meets the need of the FEJF and cannot at this time agree to accept it. Any acceptance would be predicated on reviewing changes made and clearly stating in the report all deficiencies that would affect the accuracy and completeness for the data for use in modeling and prediction.

I am aware that Paula is working extremely hard and long on several of my concerns. I am hopeful that she can solve the problems that I perceive in the data base.

I would appreciate and welcome comments and feed back for the FEJF members and others.

Thank you,

Pat L. Shaver

Pat L. Shaver
Rangeland Management Specialist

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ERG Cover Letter sent to Pete Lahm, FEJF Co-Chair

Pete:

Attached are my responses to Pat Shaver's comments documented in his e-mail on 4/15/02. I would like to preface my responses with a few comments of my own:

First, I'd like to commend Pat on a thorough review of the ag burn database, and assisting with the peer review process by facilitating review by many state NRCS staff. (These comments were submitted in a letter to me dated March 7, 2002). This review contributed to several improvements in the agricultural burning data that we submitted in final form to you and Air Sciences on 4/15/02. Fortunately, we were able to address most of Pat's and other NRCS comments within the final database. Those comments that could not be address were either (1) too extensive to address within the current scope/budget/schedule and/or (2) represented significant changes to the methodology or basic data that, in my view, should not be done without prior review by the FEJF. In particular, the issue of yield-based residue loading was not addressed in every case due to the extensive research that would need to be done to collect these data for every state.

Secondly, I am very disturbed by Pat's comment that ERG did not understand the appropriate data entry fields or the appropriate data entry values for such a database, resulting in his questioning the validity of the entire database. We understand the database very well—we designed it based on FEJF's needs for emissions inventory development. It's not perfect, but it's the best possible given the time and resources allocated to the effort. As is the case with most emission inventories, including their activity data, improvements can always be made. We will make sure that the final report contains details on the accuracy and completeness of the data.

Please call if you have any questions about the attachment. I'll do whatever it takes to facilitate a consensus by the FEJF pertaining to our project deliverables.

Regards,
Paula

ERG Attachment – Response to Pat Shaver Concerns

Pat's Shaver's comments are in regular font. ***My responses are in bold italics.***

As you are aware from our several conversations n the last few weeks, I have some serious concerns about the "Non Burning Management Alternatives on Agricultural Lands in the Western United States" report. The major concerns I have deal with the activities data base and not the alternative portion of the report. I would suggest that the two portion of the report be dealt with as separate issues.

ERG supports this suggestion to break the reports into 2 documents (1 containing the crop and burn databases and associated discussion; 1 containing the nonburning alternatives analyses).

The statements below are based on my understanding of what was done and how the information was collected. If I am mistaken in any statements I apologize to those affected, please correct me.

This comment warrants a review of the process and sources involved in the data collection (i.e., "what was done and how the information was collected"), compilation, and reporting of agricultural burning data (i.e., acres burned by crop and county, residue loadings, and database design and population). The process and sources to be contacted were described in our contract SOW and in meetings with the FEJF conducted throughout this process. Our SOW (which is based mainly on the approach we submitted via our proposal on August 24, 2000) contains the following data collection protocol:

Subtask 2.1.A: Collect crop data. Our SOW says "It is desirable to collect as much data on crops grown in the 15 western states—as reported by crop, year, season, region, state, county and/or geographical area—as possible. At a minimum, information must be gathered on crop types, acres planted/harvested, residue quantities, amount of residue burned, and time or duration of burning." We were to collect these data based on 3 tiers of sources. "The first tier of sources would have the highest quality data…the second tier of sources would have readily available data, but it is anticipated to take more time to contact them and/or disseminate their information…the third tier sources are anticipated to provide additional crop, state, or regionally-specific information."

The tier 1 sources included:

- ***FSA;***
- ***Economic Research Service; and***
- ***National Agricultural Statistics Service (NASS).***

The tier 2 sources included:

- ***USDA within each state;***
- ***Land Grant Universities;***
- ***Joint agency working groups or task forces; and***
- ***Other agricultural institutions.***

The tier 3 sources included "various private consortiums, which may include growers, producers and distributors, professional agricultural organizations, and information clearing houses."

Subtask 2.1.B: Characterize Nonburning Alternatives. Again, three tiers of sources were identified.

The tier 1 sources included:

- ***USDA within each state;***
- ***Federal Agricultural Research Centers***
- ***NASS; and***
- ***NRCS.***

The tier 2 sources included various state-level groups:

- ***Universities and Land Grant Institutions;***
- ***(State) Agricultural Research Centers;***
- ***University Agricultural Extension Services;***
- ***Agricultural Statistic Services;***
- ***Division or Departments of Pesticide Management; and***
- ***Working groups or task forces such as the CA Advisory Committee on Alternatives to Rice Straw Burning.***

The tier 3 sources included various private consortiums, such as growers, etc.

Our intention in writing this approach, and our interpretation of this within our SOW, was to contact all tier 1 sources, and to the extent resources and schedule allowed, we would contact tier 2 and 3 sources. Our goal in this subtask was always to develop the best possible database of crop and agricultural burning data, and a sound foundation for emissions inventory development and analyzing nonburning management alternatives, as possible within the budget and schedule allowed.

For subtask 2.1.A, we obtained most of our crop data from tier 1 (i.e., NASS) and tier 2 (i.e., USDA state-level databases and the 1997 Census of Agriculture). The ag burning data came first from tier 2 sources (i.e., FEJF Emissions Task Team via Mike Ziolko, FEJF survey conducted by EC/R); this information was augmented with data we collected directly from state air agencies (i.e., OR, ID, WA, UT, and CA San Joaquin Valley). For subtask 2.1.B, we obtained most of our information on alternatives from tier 1 sources. (Note that NRCS was identified in the SOW as a tier 1 source pertaining mainly to the alternatives subtask, not the crop or agricultural burning subtask.)

As you know, the information on agricultural burning activity was disperse, varied in content, coverage, and quality; and for some states (i.e., CO, ND, SD, NM, MT) was nonexistent (thus the impact on our schedule and budget). At a meeting in Rapid City,

SD, on July 12, 2001, I made a presentation to the FEJF on our progress to date. Slide 7 of that presentation showed the following list of data sources that were to be used to estimate county-level residues burned by crop:

- ***WESTAR and FEJF surveys (all states)***
- ***Previous FEJF inventory efforts (Mike Ziolko)***
- ***FEFJ member contributions (CA, ID, OR, UT, WA)***
- ***Follow-up phone calls***

Slide 8 of that presentation provided the design of the agricultural burning database, including database fields, units, and data sources to be used to populate the database fields. The sources for the residue loading (RL) field was given as "AP-42, ARB, other". Also, the approach to use "Average % burned by crop" to gap-fill the states where data were not available was described. When presenting this slide, I specifically stated that the RL factors were on a crop basis, and have been used by EPA, ARB, and other organizations (e.g., Idaho DEQ based on RL from the mint growers association) in similar inventory efforts. My notes and recollection from that meeting do not indicate any significant objections to these data sources, RLs, or method for database development. The main discussion I noted on the topic of the gapfilling was instigated by Tom Pace and pertained to 3 issues that need to be considered when applying gap-filling averages: (1) Incorporate the effect of burn bans on burning activity; (2) Consider the effect of regional similarities (e.g., burning practices in ND will be more similar to those in SD than those in CA); and (3) Incorporate seasonal fluctuations in burning. (These have all been addressed.)

At the Rapid City meeting, you did ask me to identify in writing specific data gaps in preparation for your upcoming meeting with the USDA Air Quality Task Force. I quote from the brief report that I wrote for you to illustrate our continual request for information to help us quantify agricultural burning activity:

> *"A significant challenge in developing the database of agricultural burning activity (i.e., residues burned by crop by county or sub-county) is the lack of information for many states. Some states, such as Colorado, that exempt agricultural burning from any regulatory program, do not keep records on the level of burning activity. However, there is some anecdotal information available that generally characterizes the extent of burning and types of crops burned for all 15 Western states. We are developing a technique for estimating burning activity at the crop and county level for those states where actual data do not exist. This technique will rely on a combination of anecdotal information and average percentage of residue burned by crop developed from data from the states that have actual agricultural burning statistics."*

I do not recall any comments from Pat Shaver objecting to these data sources, suggesting other sources, objecting to crop-specific RL factors, or objecting to the gap-filling techniques as described on Slide 8.

Finally, my last comment pertaining to the process we followed for collecting agricultural burning data: This is a first-time database—there was nothing to compare to when developing the methodology. The data sources that were identified in the SOW changed as our (ERG's and Karlyn's) knowledge of the available data changed. We adapted our process to take advantage of new data as we discovered it. We (ERG and FEJF, and Bryan) agreed on a gap-filling technique, and also that the peer review process would give feedback to make improvements. In my view, this entire process worked and resulted in the best possible database of agricultural burning activity data available within the time and budget allowed. We welcome input and comments and would be very happy to update the database with new information if the FEJF chooses to support that effort.

As a Joint forum of the WRAP we are charged with producing products that are technically correct and accurate using the current and correct science. I question whether that was accomplished in this part of the project. I have some serious data quality concerns.

- To use region wide means or modes (I am not sure which was used) in residue loading may be appropriate for some crops, but not for others. Some residue production within the same crop may vary by an order of magnitude, for example irrigated long stem varieties of wheat vs. dryland short stem varieties of wheat. The difference could be as great as <0.5 tons/ac to over 8 tons/ac. I am reasonably certain that the differences in residue production between these wheat varieties and cultural practices were not taken into account when developing the residue factor used for wheat. To assume the same residue production per crop throughout the WRAP region is a flawed assumption and the data exists to use better estimates.

In general, the RLs used in the database came from AP-42. It is my experience in 15 years of developing emission inventories that EPA supports the use of AP-42 information in lieu of locally-specific data. Based on comments received by Pat Shaver and other NRCS staff, we changed the RLs from the AP-42 values (i.e., 1.9 tons/acre for wheat and 3.2 tons/acres for weeds in lieu of ditches and ditch banks) to the values suggested to reflect local conditions for:

- ***CO, wheat RL=4.0 tons/acre per J.Sharkoff, NRCS;***
- ***NM, wheat RL=1.5 tons/acre per R.Shaw, NRCS; and***
- ***UT, ditches and ditchbanks RL=0.75 tons/acre per K.Goodrich, NRCS.***

I should tell you that Pat gave me some other RLs for wheat and barley in UT that I did not use. These are based on residue (lbs/bu) and yield (bu/acre). I discussed the use of these with Bryan, and he suggested to do a comparison with the AP-42 RLs for the report. The wheat RLs are based on yields for spring and winter wheat, but Frances did not provide acres burned based on these 2 varieties (only for "wheat" total), so I couldn't use them without going back to Frances and Kerry. I simply ran out of time. Since I wasn't using the yield-based wheat RL, I chose not to use the barley RL as well. Note that the NRCS RLs for wheat were 0% to 63% higher than AP-42, and for barley

were 18% to 32% higher (depending on county). Overall, I was very nervous about changing the RLs for the final database without sending the new RLs through a review process. The few that I did change had a small impact in overall residues burned.

If Pat Shaver would provide other the existing data to make better estimates, then we might be able to use these in the database. It is not feasible to conduct a search of other RLs, which I suspect are in various forms, within the scope of the current project.

- The use of "gap" filled information on acreages burned per crop should not be done. That is also a very flawed assumption that farmers burn the same percentage of the same crops throughout the region based on some average, mean or mode. It does not happen that way. Cultural practices in crop production, while based in science are very "culturally" oriented and vary dramatically form region of the state to region of the state, let alone state to state or Washington to NM.

Again, we proposed this approach back in July in Rapid City with no major objections coming from the FEJF. I believe that this approach has proven very successful since in resulted in good comments and better data for such states as MT and AZ.

It appears that there was no attempt to separate the burning of dryland production acres from irrigated acres, another very flawed procedure. For example, the cropland in Curry Co. New Mexico is 65% non-irrigated. Non-irrigated wheat stubble in eastern NM is not burned. The acreage figures for Curry County do not reflect this difference. The data are available to separate these things.

First of all, this comment is only applicable to the states having gap-filled data. Acres burned in all other states are based on data provided by those states/counties for "wheat" and were recorded in the database as "wheat; all." For example, R. Shaw, the District Conservationist in Curry Co., NM, reported that 2,500 acres of wheat stubble were burned; we removed the gapfilled value of 11.6% of 16,000 acres harvested (which did include irrigated and non-irrigated land), or 1,856 acres burned, and replaced it with 2,500 acres burned per Mr. Shaw's comment. I would assume that the 2,500 acres reported by Mr. Shaw are "irrigated" if he's following Pat's assertion. Again, the issue of whether or not the 1,856 acres (or the 2,500 acres) were irrigated or not is irrelevant since those are the acres "burned" as reported by the source. We received specific comments regarding the burning of irrigated crops (and no burning of non-irrigated crops) via Pat's letter for the following states: NM, CO, and MT; changes were made to address all comments. Please note that the ONLY states remaining in the database that would be affected by this issue are those for which the gapfilling averages are still applied: ND, NM (10 other counties not including Curry). These could be changed (i.e., separate our irrigated acres, re-apply gap-filling average) will a little effort.

- Even using the "best" data base several errors in data quality were found. ERG has corrected at least two (burning of corn harvested for silage and cotton stubble). The

corn example was an obvious error caused by assuming if corn is burned all corn is burned regardless of the production and harvesting method. An error similar to the use of one residue figure/crop.

First, the use of "one residue figure/crop" is not an "error"—it is the use of a methodology and factor supported by the U.S. EPA, albeit not preferred when locally-specific data are available, but certainly not an error.

Second, this comment is only applicable to the states having gap-filled data (as was the case with irrigated acres, above). Acres burned in all other states are based on data provided by those states/counties for "corn" and were recorded in the database as either/and "corn; for grain" and/or "corn; for silage." I recognize that we made an error to assign any activity to acres of corn harvested for silage. We have corrected this in every case. I should mention that the only state results impacted by this error was CO where the gap-filling average was incorrectly applied to acres harvested of corn for silage. Based on comments provided by NRCS for CO, all corn stubble burning was removed from the database.

The cotton example is a little different type of error. The data base from San Joaquin Valley APCD showed permits were issued to burn cotton fields. In talking to the field person it was discovered that what was actually burned was ditch banks. Very different in terms of residues and acreage. This kind of error, using the "best" data base, makes the quality of all the data questionable in my mind. I am reasonably sure that the cotton example would also hold for most of the corn harvested for grain as well.

As you know, the data provided by San Joaquin Valley APCD showed that permits were issued for "cotton" residue burning. Based on Pat's comment , I called Evan Shipp, who in turn talked to one of their inspectors. The inspector said that the burning was probably for ditches or fencelines associated with cotton fields; subsequently, we changed the crop and appropriate RL to ditches/ditch banks. This kind of "error" is inherent in the database due to the different data sources and types used to compile the database. Again, I believe that the peer review process worked and resulted in an improvement. I would strongly disagree that this kind of error "makes the quality of all the data" questionable. However, even if the quality is questionable, this is still the best available data and the first time it has ever been compiled for the 15 Western states using actual burn statistics augmented with estimates and, in a few cases, gap-filling techniques.

I also have major issues with the quantity of data gather in the inventory. The issues with the North Dakota and Colorado data are examples of this. I have talked to Paula Fields, Dave Randall and you about that.

Regarding ND, I talked to Chuck McDonald of the MT DEQ. He estimated "1,000,000" acres are probably burned. I told him about the NRCS District Conservationist comment that about "1/3 of the acres on the spreadsheet" (i.e., for 3

counties) are burned. In further discussions, Pat and I agreed that there could be 1,000,000 acres burned, but not in just the 3 counties shown (which were the only counties noted previously in the anecdotal information). Using Mr. McDonald's and the NRCS comments, we revised the data for ND.

Regarding CO, I talked to 3 NRCS people which Pat referred me to. The results of these comments are that only 500 acres of spring wheat were burned in any year in CO (no other crops, except ditch banks for which no one will provide an estimate of acres) are burned according to these NRCS representatives. I have changed the CO data accordingly.

I suppose that these estimates for ND and CO could be refined further, but I cannot imagine Pat still having "major" issues with them since I have changed the estimates per his/NRCS's comments.

Because of the vast differences in residue production, cultural practices and habits throughout the WRAP region, I am very opposed to "gap" filling data without good anecdotal information to support the estimates (I understand most of the gap filled data has been replaced with anecdotal data). I do not think there is much reliable anecdotal data in the current draft of the report.

I have replaced or supplemented the gap-filled data with NRCS information (anecdotal?) provided by Pat and others. This will be reflected in the final report.

There are good methods to collect this kind of data, a great example is what occurred in Utah. Frances Bernards, a FEJF member, sat down with Kerry Goodrich, USDA/NRCS State Agronomist and went through the draft report for Utah and developed an activities data base for Utah that is supportable at least by good reasonable antidotal data from experts in the science of agronomy and crop production methods in the state of Utah. This also included information from producers and producer organizations. (I assume that the contractor will re-compute the average percent burned for wheat, barley and corn based on the new figures, it will make a big difference, especially in corn for gap filling other states).

I agree—hooray for Utah! We have recalculated the averages; however, corn gap-filling is no longer relevant (it was only applicable to CO anyway).

I have voiced concern that professionals involved in production agriculture were not contacted to provide input into the activities database. I was told that the State Extension officials were contacted. After looking at the "List of Informal Survey Participants and Contact Information" appendix C it appears that only the Deans or Directors of Extension were contacted, not the State Extension Agronomist and that they were asked only about "alternatives" not about burning activities. The group of professional represented by the USDA Natural Resources Conservation Service Field Offices and the County Extension Offices are not included and these are the individuals I would expect to have the best anecdotal data concerning burning activity on croplands.

According to our SOW, the NRCS is identified specifically as a tier 2 source related to nonburning alternatives. They were never identified as a source of agricultural burning data. I agree that they are a good source of crop production information; however, as mentioned above, the approach was designed to collect data from the sources identified and request input via the peer review process. The only problem with this process, as you noted recently, is managing comments received too late in the process to affect the results. The good news is that we've addressed most of Pat's/NRCS' comments. The ones that could not be addressed are either (1) too extensive to address within the scope/budget and/or (2) would need to undergo FEJF review prior to incorporation into the database (i.e., developing locally-specific RL factors).

My main concerns deals with the "kind" of errors made more that the accuracy of the numbers. The kind of errors made indicate to me that the developers did not understand the appropriate data entry fields or the appropriate data entry values for such a data base. This causes me to question the validity of the entire data base.

Since Pat did not read the draft report (i.e., he noted this in his letter to me dated March 7, 2002) I think that we may have a misunderstanding as to the meaning of the "data entry fields." For example, the issue of corn/silage – this field (i.e., crop_name) is used to correlate the crop database to the burn data and is not used (except in one case CO) to calculate residues burned.

Again it is not the errors in numbers, that can be fixed, it is the kind of errors. To include burning of corn harvested for silage, to not question a data entry that shows cotton stubble being burned, to show crop residue being burned in only three counties in ND and all counties of SD and Montana, not separating or discussing the difference in irrigated vs. non-irrigated cultural practices and that effect on burning activity and residue, not contacting and discussing activities and residue loadings with agricultural production professionals, and the great difference in the data base for Utah before and after including such professionals in the discussion all lead me to question the validity of the entire data base.

- ***Corn harvested for silage: This was an error on our part that has been corrected. It was minor (affected only CO) in the overall scheme of things;***
- ***Cotton stubble: This was provided by the air district and has been changed based on peer review;***
- ***Three counties in ND: This was an artifact of the methodology (i.e., combination of gap-filling and anecdotal information) that was changed based on peer review;***
- ***Irrigated vs. non-irrigated cultural practices: This is an excellent comment which we addressed for most states. This remains an issue for ND and NM (10 counties). Again, another useful comment as a result of peer review.***
- ***Not contacting NRCS regarding burning activity and RLs: NRCS was not identified as a primary (tier 1 source), but could have been if Pat had commented on the SOW and earlier deliverables. We had data on RLs and burning activity as provided by***

U.s. EPA, WRAP/FEJF/EET and member states. Where data were missing, gapfilling data were developed and distributed to the FEJF and other stakeholders. The process was not perfect, but it was responsive to the SOW. ERG staff were stretched to the max to keep this project within budget.

- ***Utah: I do not understand this comment in the context of it casting doubt on the "validity of the entire database." This is exactly how the process was designed to perform.***

The data are available to create a good accurate inventory of agricultural burning activities, although not a precise one. I have a real concern that the data as presented will be accepted as both accurate and precise "enough" by the user. After a short discussion with Mike George concerning the need for accuracy and completeness of the data base, I cannot agree that the report, as I have seen it, meets the need of the FEJF and cannot at this time agree to accept it. Any acceptance would be predicated on reviewing changes made and clearly stating in the report all deficiencies that would affect the accuracy and completeness for the data for use in modeling and prediction.

The report that Pat refers to is the "draft final report." It is my understanding based on his March 7, 2002, letter to me that he has not read it (although he may have read it by now). In fact, on March 25, 2002, Pat sent me comments from Jerry Lemonyon and Dave Schertz pertaining to the report. I have reviewed these in detail, and in my opinion they are not significant and can easily be addressed within the context of the final report. I have a hard time understanding why Pat cannot "accept" the report based on these comments. I think he is referring to the database, only. Also, I do not understand the significance of accepting a draft final report when we know that comments are being addressed that will change the content of the final report.

Also, as you and I have discussed, ERG will provide a detailed explanation of the process used, data collected, peer review comments, and the accuracy and completeness of the resulting database, within the final report.

I am aware that Paula is working extremely hard and long on several of my concerns. I am hopeful that she can solve the problems that I perceive in the data base.

As I stated above, most of the comments were addressed.

I would appreciate and welcome comments and feed back for the FEJF members and others.