**Following are notes that resulted from an interactive panel discussion between Biomass Burning and Air Quality experts and the audience at the EPA's 2012 International Emissions Inventory Conference.**

**Initial Requirements for the National Fire Emissions Inventory (NFEI):**

- ❖ Peer-reviewed publications and reports that clearly articulate methodologies that are transparent to avoid the appearance of "black-box" modeling and results.
    - Who will take responsibility for this task? (not resolved)
- ❖ Open-source shared SMARTFIRE II software.
- ❖ High level of completeness required.
    - The EPA needs ALL fire activity data (public and private lands, pile burning, croplands, rangelands and agricultural lands), not just larger areas burned.
    - Sufficient temporal and space scale to meet the needs of the Air Quality Decision Makers at the EPA (regional or federal), state and locality (counties) levels. This requirements are often driven by State Implementation Plans (SIP), National Ambient Air Quality Standards (NAAQS) and Exceptional Events.
- ❖ Clearly define data source [Rx database, ICS 209, MTBS, satellite (MODIS (Moderate Resolution Imaging Spectroradiometer), AVHRR (Advanced Very High Resolution Radiometer), GOES (Geostationary Operational Environmental Satellites)].
    - Recognition of multiple users of the data, so source identification can be critical.
    - Work towards an approach that considers multiple-agency use.
- ❖ Clearly define resources used and the history of the NFEI and build on this: Call for responsibility.
    - The EPA, states and regions are interested in accuracy and trends (time series).
    - Keep track of and clearly identify our capabilities and limitations.
- ❖ Improve working relationships, intra- and inter-agency (FS, states, regions, EPA, NASA, NOAA, localities).
    - Share data
        – What are the best available data sources or multiple sources?
    - Improve interaction (i.e. state, federal, localities) by making it easier to communicate.
        - Include the capability to extract data, as well as have responsibility for the input.
        - Complete data sharing.
    - Exploit public and private records and share these data.
    - Note - For the 2008 NEI, only ~ 40% of states participated in submitting data to the NFEI.
- ❖ Largest focus should be on 3-year inventories (2008, 2011).

**Important next steps**

- ❖ Verification, validation and accuracy assessments are needed at both large (12- and 30- $km^2$) and small scales (i.e. cropland and rangelands).

- Use Chemical Transport or Receptor Models, as well as ambient monitors to evaluate the NFEI.
- Ground-based verification and validation of area burned data (ICS 209, satellite, etc.); fuels (experiments, databases and models - update fuels); consumption (consider weather, severity and climate, field experiments); and Emissions Factors (field experiments and laboratory).

❖ Spatially improve fuel loading accuracy
❖ From an Air Quality (AQ) management, rules and regulations perspective, define the priorities:
  - What are the largest quantities missed?
  - AQ planning and strategy relies on the best-available information and trends

**Critical Suggestions and Notes**

❖ Critical work defined while recognizing that states and federal organizations have limited resources.
  - Recognition that individual states and regions are unique in their fire regimes and AQ issues (i.e. $O_3$ or $PM^{10, 2.5}$).
  - Consensus building.
❖ Small and surface fires are critical issues in terms of: (1) defining fuels consumed; (2) burned area from both satellite and public reporting perspectives; and (3) identifying unique Emissions Factors.
❖ Update satellite fire detection algorithm for prescribed fires, like those in the southeast.
❖ Desire future representative estimates of fire regimes

**Critical Problems**

❖ No agency or person currently has the responsibility to provide consistent satellite-based products (area burned or fire occurrence)
  - The only way to highlight the importance of your needs is to request a seat at the table and make your needs known.
    - There needs to be interaction with the Applications and Science managers (applied science workshops, applied science peer and proposal review panels) at NASA and NOAA.
❖ Satellite platforms and sensors continually change affecting availability, reliability and consistency (spatial resolution, temporal and diurnal sampling, radiometric and spectral characteristics, and algorithm definition).
❖ The HMS model is problematic [statements here are in comparison to MODIS products – recognizing the two MODIS instruments (Terra and Aqua) have only 1 night and 1 day nadir view each (overlap at edges), plus there are MODIS post-fire area burned products]. (http://modis.gsfc.nasa.gov/data/)

- Use of human analysts results in inconsistent products; there is no standard for generation of some detection products (i.e. AVHRR data); legitimate fires are erroneously deleted; algorithm and sensor changes are not fully documented; and the region processed by analyst ("analysis area") varies seasonally and with operator availability.  All of these render the product inconsistent over the long term (Schroeder et al., 2008a; Schroeder et al., 2008b).

Schroeder, W., Prins, E., Giglio, L., Csiszar, I., Schimdt, C., Morisette, J. and Morton, D., 2008a, Validation of GOES and MODIS active fire detection products using ASTER and ETM+ data. *Remote Sensing of Environment*, 112**: 2711–2726.
Schroeder, W., Ruminski, M., Csiszar, I., Giglio, L., Prins, E., Schimdt, C. and Morisette, J., 2008b, Validation analyses of an operational fire monitoring product: The Hazard Mapping System. *Int. J. of Rem. Sens*, 29**: 6059-6066.