**Notes from the "CONOPS" session on 11/29/06**

- Must add quality control attribute to CONOPS.
- Need to support blending of QPE ensembles with long-range forecasts. In the long-term, this problem will be resolved by using the Global Ensembles System.
- Need to support comparisons of different methods for generating ensembles.
- Need to allow analysis of uncertainty in river forecasts beyond the period in which precipitation forecasts are uncertain (i.e. to capture the time-lagged/integrated response of stream/river flow to precipitation).
- Slide 10 "Sources" should make explicit reference to NCEP models also.
- Must allow for basin boundary changes in recomputing MAP etc.
- Must allow comparison of best estimates from ensemble forecasting systems (e.g. expected value) with deterministic forecast.
- Slide 16 on "Replacing deterministic forecasts" is probably not the goal, at least in the short-term. This should be re-written to reflect the need for both deterministic and ensemble forecasts (in the short-term).
- Over-forecasting of extreme events is common; need to demonstrate that best estimates from ensemble forecasts perform better than deterministic forecasts in this respect.
- Need to add a sub-bullet on verification in slide 16.
- Need to consider uncertainties in observations as these may be the dominant source of uncertainty in many cases (this has implications for data assimilation also).
- In future, need to allow models other than Sacramento (i.e. plug-and-play with different hydrological models). CHIPS will be important in facilitating this.
- Need for training on verification should be made explicit in CONOPS.
- Slide 25 on "Products" might make explicit reference to gridded products such as the soil moisture grids. The additional workload in managing spatial data, including the technical network considerations, is a major concern for some RFCs.
- Ultimately need seamless forecasting and verification, including both short and long-term forecasts. Plans for interface between short and long-term forecasts should be made more explicit in CONOPS.

**Notes from the "Short-term Ensemble R&D" session on 11/29/06**

- Slide 10: multi-model ensembles needed from SREF and other ensemble systems.
- Slide 15: should distinguish between downstream and upstream conditions, particularly in relation to data assimilation.
- Slide 19: must reference transition from operations to research as well as research to operations.
- Slide 22: need to include uncertainties in forcing alongside those in model parameters.

**Notes from the "Action Items" session on 11/29/06**

- Extending EVS to support verification of long-term forecasts is a top priority.
- Need post-processor and other HEP software running for long-term forecasts also.
- In relation to verification, it is critical for the RFCs to know: 1) what data they need to save; 2) what file formats to save it in.
- HEP team need to become familiar with ArchiveDatabase, possibly with a view to accessing this database rather than using files for verification. Julie Myers of MBRFC is probably the best contact.
- Estimation of uncertainties is currently based on lumping historical information. We need conditional distributions specific to the environmental conditions encountered at any given time (i.e. flow-dependent uncertainties). Initially, this may involve partitioning data into particular classes of event.
- RFCs mentioned that there may be an issue with HPC confidence intervals not matching up correctly; need to use and evaluate them.
- Need to provide RFCs with GFS subsystem as soon as possible to allow forecasting with a combination of systems and for comparison with EPPII. It is envisaged that GFS will improve forecasts beyond lead day 2 where climatology is often used.
- Should also allow comparison between SREF ensembles and EPPII. For example, this may involve graphical overlay of the ensembles or a derivative measure.
- Need a cap on 6-hr precipitation in EPP.
- Need to support comparison between NCEP/HPC confidence interval approach and confidence intervals derived from ensemble systems.
- Need to explore more advanced methods for combining forecasting systems, including possible weighting of systems (e.g. by Bayesian model averaging).

**Notes from the "Experimental Ensemble Forecast System" session on 11/29/06**

Components of baseline system:

- EPPII should be able to deal with multi-model ensembles.
- Need to move beyond segment-specific running of ESP (same applies for verification also). This may imply re-thinking of current approach specified for baseline system. A key reason is that multiple segments are typically closely related in terms of hydrological behavior and management.
- Need to allow users to determine what products they want and how to display them. This implies tools that support extraction of useful information from the ensembles (including both simple and more complex information) and education and training on how to interpret this information. One RFC mentioned that ESPADP was not the way to proceed.
- How does this fit into WFOs in terms of resource requirements and IT infrastructure? Need to avoid the recent VTEC scenario where IT systems were overloaded.
- Must have a services member on the baseline team.
- Must have at least one software engineer on the baseline team.
- Need a list of priorities in the next 2-3 months that reflect the concerns of the RFCs as a whole and not the personal concerns of individual scientists and RFCs.
- User interfaces are, by definition, the key area where RFCs must contribute.