Summary of Meeting Proceedings

Prepared by the INFORM Core Office, HRC-GWRI

SECOND OVERSIGHT AND IMPLEMENTATION COMMITTEE MEETING

14 April 2004, Sacramento, California

PRESENT:

Agency Representatives

Marchia Bond,	Sacramento District, U.S. Corps of Engineers
Robert Collins,	Sacramento District, U.S. Corps of Engineers
Rebecca Fris,	CALFED (*through a conference call*)
Paul Fujitani,	Central Valley Operations, U.S. Bureau of Reclamation
Robert Hartman,	California Nevada River Forecast Center, National Weather Service, NOAA
Gary Hester,	California Department of Water Resources
Mona Ismail,	GCAP Inc./CALFED (*through a conference call*)
Juniper Neill,	Office of Global Programs, NOAA
Joe O'Hagan,	PIER, California Energy Commission (*through a conference call)*
Eric Stremm,	California Nevada River Forecast Center, National Weather Service, NOAA

INFORM Co-Pis and INFORM Project Scientists

Aris Georgakakos,	Georgia Water Resources Institute
Kosta Georgakakos,	Hydrologic Research Center
Nick Graham,	Hydrologic Research Center
Huaming Yao,	Georgia Water Resources Institute

The meeting was held at the National Weather Service California Nevada River Forecast Center (CNRFC) Conference Room in the Joint Operations Center (3310 El Camino Ave.), started at 11:30AM and ended at 1:30PM. The meeting served as the first critical review meeting for INFORM, mandated by the California Energy Commission and CALFED funding agencies. Summary documents were submitted to the participants prior to the meeting by the INFORM Core Office Staff.

The meeting presentations were made in two parts. Part I consisted of a summary of the INFORM goals, and the work accomplished, as well as for highlighting strategic planning issues, while Part II focused on a demonstration by the Georgia Water Resources Institute (GWRI) Staff of the first version of the reservoir decision support software for Folsom and Oroville. The presentation material for Part I is attached to become part of this Summary of Meeting Proceedings. Table 1 presents the issues

discussed in this Part, followed by a summary of the main comments made. This is followed by short summary of the capabilities of the software demonstrated in Part II and of the pertinent comments and suggestions made.

Table 1: PART I, INFORM STRATEGIC PLANNING

AGENDA FOR SECOND OIC MEETING

- Part I – Project Status Review
  (Climate – Hydrology – Decision)
- Part II – Demonstration of Reservoir Decision Support Software
  (Folsom and Oroville)

VISION STATEMENT

- Increase efficiency of water use in Northern California using climate, hydrologic and decision science

GOAL AND OBJECTIVES

- Demonstrate the utility of climate and hydrologic forecasts for water resources management in Northern California
- Implement integrated forecast-management systems for the Northern California reservoirs
- Perform tests with actual data and with management input

APPLICATION AREA

INTEGRATED SYSTEM DESIGN

DEMONSTRATION CONCEPT

WORK ACCOMPLISHED

- Coordination and Initial Design of the Weather and Climate Ingest Component
- Design, Implementation and Validation of Precipitation Downscaling Component
- Validation of Operational CNRFC Snow and Hydrology Models for American and Feather Rivers
- Design and Implementation of Stand Alone Ensemble Flow Forecast System for Folsom and (in progress) for Oroville
- Design and Implementation of Decision Support System for Folsom and Oroville Reservoirs

FOLSOM SYSTEM REFERENCE

TIME LINE OF DELIVERABLES

FOLLOW-ON TO 2ND OIC MEETING

- Meeting Report
- Development of any necessary modifications to INFORM Project tasks and timeline, and submission to Funding Agencies for approval
- Continued Agency and Co-PI collaboration by implementation task

CLIMATE COMPONENT

- Reliable probabilistic estimates of observed rainfall categories
- Snowmelt forecasts on the basis of NCEP forecast winds and temperature
- Collaborative activities between HRC, CNRFC and NCEP
- Initial plan of stand-alone climate-downscaling operations
- Validation of orographic downscaling precipitation component for Folsom

HYDROLOGY COMPONENT

- INFORM data inventory status
- Validation of NWS operational hydrologic simulations for Folsom drainage and sub-catchments (climatology, distributional characteristics, event simulations, snowpack)
- Validation of NWS operational hydrologic simulations for Oroville drainage and sub-catchments (climatology, distributional characteristics, event simulations, snowpack)
- On-going hydrologic activities for Folsom and Oroville

DECISION COMPONENT

- Outline of Tasks planned for the Decision Component of INFORM
- Reservoir data for decision support system models
- Description of short- and mid-range decision models
- Examples of short- and mid-range decision models for Folsom and Oroville
- Policy assessment model for Folsom and Oroville and examples
- Graphical user-model DSS interface overview
- Technical workshop for stakeholder agencies and users

Important points made during Part I of the meeting by OIC Members in response to the issues identified by the Co-PIs are:

1. Stakeholder input significant for the final design of the decision component; Rebecca Fris provides input to the GWRI team for the upcoming stakeholder workshop of May 2004.
2. Upstream reservoirs (e.g., French Meadows and Union Valley within the Folsom watershed, and Lake Almanor in the Oroville watershed) are being modeled as part of the CNRFC operations, and the USA Corps of Engineers has inflow and outflow historical data for such modeling efforts. INFORM PIs should consider incorporating this modeling effort even though it was not part of the original INFORM plan. Historical inflow and outflow data from these upstream reservoirs, when existing, can help define an "average management strategy" to be incorporated in the long-range hydrologic forecasts of the downstream larger reservoirs. Alternatively, full decision modeling of these upstream reservoirs may be done incorporating the uncertainty in the management strategy for long-range forecasts.
3. CNRFC Staff and the HRC modeling team should coordinate the request to NCEP for Global Forecast System (GFS) data.
4. DSS component should be released to agencies after the first version is finalized for gaining hands-on experience and for providing feedback to developers regarding the functions and graphical user interface.

The current version of the decision support system for Folsom and Oroville includes a suite of interlinked models that is capable for inflow forecasting and reservoir management at hourly, daily, and seasonal time scales. Hourly, daily, and seasonal reservoir management is addressed through three coupled models: turbine load dispatching, hourly release management within one day, and daily release management within a user specified time seasonal horizon (e.g., 3 months). The purpose of these models is to optimize the efficiency of energy generation while conserving water and meeting all relevant water resources requirements including flood protection, water supply, drought management, and environmental protection. The DSS is embedded within a user-friendly, graphical interface that links models with data and helps visualize and manage results. A policy assessment model has also been developed and incorporated within the DSS to assess the value and implications of various forecasting schemes, reservoir management policies, and demand scenarios. The demonstration of

the decision support system software developed by GWRI showed the following software capabilities:

1. User-data-model interface for data visualization and data management using Excel spreadsheets and MS Access and with user-friendly graphical menus based on visual basic
2. It is designed to run individual reservoirs or system wide.
3. Provides reservoir managers with a variety of quantitative measures that show the effect of various decision policies.
4. Incorporates a baseline ensemble forecasting component and provision for links to the INFORM climate-hydrology ensemble forecasts.
5. Allows the consideration of decisions on different time scales in an objective, consistent and quantitative manner.
6. Allows adaptive operation with decisions updated as frequently as desired.

The discussion that followed the presentation brought up the following comments made by participant agencies:

1. The current version of the decision support system shows promise as a very good tool for exploring the effects of decisions by several stakeholder groups and over different time scales (short term versus long term decisions).
2. A decision must be made to resolve the design trade-off issue of modeling a few large reservoirs in the region in great detail versus focusing on large scale interactions in decision making among all the INFORM reservoirs but with simplifying assumptions as to the decision parameters for each of these reservoirs. A solution to this trade-off issue that could be accommodated within the present funding and performance-time scope of the present INFORM project was considered: to proceed with the integration of all the INFORM reservoirs as originally planned with simplifying assumptions agreed upon by the forecast and management agencies (e.g., what downstream requirements to incorporate, etc.), and at the same time to focus in greater detail in one of these reservoirs for detailed modeling in collaboration with the management agencies of that reservoir. Further discussions will be held between the INFORM team and the participating staff of forecast and management agencies to find a mutually agreeable system configuration and level of modeling detail.