

# Numerical Simulations of Snowpack Augmentation for Drought Mitigation Studies in the Colorado Rocky Mountains

Summary of 5<sup>th</sup> Project Meeting (conference call)

Hosted by the CWCB

April 14, 2004 @ 09:30 AM MST

## List of attendees:

<u>Name</u>	<u>Agency</u>	<u>phone</u>	<u>email</u>
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This summary follows the agenda for the conference call with discussion items entered in red.

## Status of four “To do” items listed in the Summary for the Colorado WDMP Midterm, Project Review Meeting held February 19, 2004.

**To do item:** Larry stated that he had a few digital pictures of seeding generator sites that he would make available for inclusions in project reports. (Related to operational cloud seeding operations.)

During the conference call, **Larry** stated that he would select 8-10 pictures, identify them, and email them out to the team for review and use in reports.

**To do item:** Greg Bryant said that he would email the EXCEL spreadsheet containing the final list of generator sites to the project team and Reclamation. (Related to renaming of ice nuclei generator sites.)

After the conference call on April 14<sup>th</sup>, **Greg** re-sent the EXCEL spreadsheet with the generator data and the discussion/resolution of the problem points (his original email was dated February 23, 2004). However, it appears that the longitude problem with generator site D3 still has not been corrected on the CSU project web site (<http://rams.atmos.colostate.edu/clseeding/generators.htm>).

**To do item:** Larry will put the seeding reports for November and December 2003 into the new format so that all of the WWC’s 2003-2004 operational seeding reports will be in the new Excel spreadsheet format. (Related to using the generator site Excel spreadsheet for seeding reports.)

## **New Action Items:**

**Larry** – Finalize the seeding reports for the entire 2003-2004 winter operational period and email to Greg at Denver Water. WWC should check for any inconsistencies in the format of their seeding reports for Nov-Dec 2003 and Jan-Mar 2004.

**Greg** – Will have the final seeding report spreadsheet run through Access in an attempt to identify all changes between WWC's initial seeding reports and their final report. If the comparison is successful, Greg will send out the final report to the CSU team and the rest of the project team.

**Option** – If Greg has a problem with the comparison, he should contact Larry and **Larry** will ask his son, Mike, to identify all changes to the original seeding reports for the 30 selected days. (This is all right for the research project, but perhaps that all changes should be identified for all Denver Water Project seeding days.)

Greg sent an email on April 23 stating that he was having problems doing the comparison at Denver Water. If Greg and Larry cannot work out the problems, it will be necessary to use the Option stated above.

**To do item:** Ray and Gustavo will complete the test case before doing the model seeding runs for this season. (Related to CSU Deliverable 2.)

This test case still had not been completed as of the conference call, but **Ray and Gustavo** said they still planned to complete this task before the end of April 2004.

### **Status of CSU Deliverables scheduled for completion during the 2<sup>nd</sup> quarter of the Colorado WDMP Research Project**

**Deliverable 3.2** – List of selected meteorological regimes (due March 31, 2004)

**Ray McAnelly (with input from Larry Hjermstad)**

The selection of various meteorological regimes are needed for transport and diffusion case studies to determine if seeding nuclei are getting into the clouds.

Ray stated that the list of 30 cases should include various regimes. **Larry** said that he would identify and group the selected cases by regime. In an email dated April 19, Larry did provide the list of 30 selected days, and identified the regimes for 20 of these cases. Larry selected 5 different regimes as follows:

- SSW wind – 3 days
- WSW wind – 5 days
- WNW wind – 4 days
- NNW wind – 4 days
- Tropa – 4 days

**Larry** – how about trying to assign a meteorological regime to the other 10 days?

**Deliverable 4.3** – Report on manually updated archive on RAMS website containing data from first and second model runs (due February 29, 2004)

## **Ray McAnelly**

The new PC cluster was to be used for the seeding runs as soon as the operational seeding information became available. Have all problems identified in the RAMS Real-time Forecast Model been resolved? Have the seeding runs been completed?

This continues to be a work in progress, **Ray** said that he would email Curt text on the status of this deliverable for inclusion in the 2<sup>nd</sup> Technical Progress Report.

**Deliverable 4.4** – Quality controlled final archive on RAMS web site containing lists of seeding operations and data from first and second model runs – these data need to be included in the Final Project Report (**due April 30, 2004**)

## **Ray McAnelly**

This also continues to be a work in progress. The due date for this deliverable needs to slip. **Ray** said that he would email Curt text on the status of this deliverable, including a new target date, for inclusion in the 2<sup>nd</sup> Technical Progress Report.

The Project Team needs to stress the CSU web site (<http://rams.atmos.colostate.edu/clseeding/>) and add more project-related information to this site for viewing by others. The First Technical Progress Report is already posted. Other possibilities for posting include: the summary report of the mid-project meeting with Reclamation, summaries of project conference calls, presentations on the project given at meetings, samples of GIS graphics developed by Ross, and the list of 30 days (including meteorological regimes) for RAMS Seed/No-seed evaluation by CSU.

**Deliverable 5.1** – Copy of updated MRBP analysis code with documentation for users and selection of the 30 days from the 2003-2004 operational winter season to be used in analysis (**due March 31, 2004**)

**Gustavo Carrio** – MRBP analysis code - **done**

**Ray McAnelly** – selection of the 30 days - **done**

**Deliverable 6.2** – Draft technical progress report - Second Quarter (**due April 30, 2004**)

## **Curt Hartzell**

Curt will draft the Second Quarter Technical Progress Report; however, project team members should email summaries of work completed during the 2<sup>nd</sup> quarter to Curt for inclusion in this report.

**Curt** said that he would develop the draft of this progress report, with input from Ray, Larry and Ross, and email it out for review by the Project Team by the end of April. Because of the WMA Annual meeting being held April 28-30, the schedule for this report could slip a couple of days.

## **References**

Interagency Agreement between the CWCB and CSU, December 9, 2003

First Quarter Technical Progress Report, January 31, 2004

Summary for the Colorado WDMP Midterm Project Review Meeting, February 19, 2004

Financial Assistance Agreement for research project, October 2, 2003

### **CSU Invoices**

To date, there have been two invoices submitted by CSU. The 2<sup>nd</sup> invoice was dated January 14, 2004. It is suggested that CSU submit their 3<sup>rd</sup> invoice early in May 2004, after the 2<sup>nd</sup> Technical Progress Report has been completed.

### **Other topics for discussion?**

Joe asked about work for Ross. **Ross and Ray** agreed to communicate on graphics that Ross could work on. Since then they have had great email correspondence on “Seeding dispersion graphics.” Curt probably has enough text from these emails to summarize this work in the 2<sup>nd</sup> Technical Progress Report; however, if **Ross** would email him some summary text, it would be appreciated.

Larry stated that he had been making hand-written notes on his daily use of the CSU-RAMS model output since mid-January 2004. Larry said that he would mail copies of these notes to Joe and Curt for review. These notes contain much useful information on Larry’s attempt to incorporate a new data concept into a daily routine of identifying operational seeding days for WWC’s programs. **Joe** – if you agree that Larry’s daily notes should be provided to others and summarized in the research project’s Final Report, could you find someone at CWCB to type the notes into Microsoft Word?

Joe received a PowerPoint presentation from Arlen Huggins on “Cloud Seeding in the Walker River Basin.” It is a good presentation that includes information on wintertime cloud seeding. Perhaps a similar PowerPoint presentation needs to be developed for our research project.