

MEETING NOTES
CSRC Coordinating Council Annual (Spring) Meeting
May 14, 2004

Location: 77 Beale Street, San Francisco (PG&E facilities)
Time: 10:00 a.m. to 3:30 p.m.
Participants: 43 total, 18 Coordinating Council members (see attached lists)
Agenda: See attached
Meeting Chair: Greg Helmer, CSRC Coordinating Council Chairperson

1. **Opening:** Shortly after 10:00 a.m., Greg Helmer, CSRC Coordinating Council Chairperson, called the meeting to order and greeted the participants. He then introduced Fasha Eskandari, of PG&E, who reviewed various “housekeeping” items, including emergency evacuation instructions.
Following Eskandari, each meeting participant introduced his/her self.
No changes were made to the attached agenda.
A current Coordinating Council membership list was made available for the meeting participants.
2. **Chairperson’s Report:** Greg Helmer provided an overview on the status of CSRC and its activities. He stated that CSRC is now five years old and there is a need to be better organized and to improve CSRC’s record keeping (financial, administrative, etc.). **Action Item:** To assist this effort, he asked the group to review the current CSRC Coordinating Council Bylaws (available at CSRC’s website <http://csrc.uscd.edu>) and provide suggestions for revisions before the next general Council meeting. (*Next meeting is scheduled for October 22, 2004.*) This review should include an assessment of CSRC’s “mission statement” in the Bylaws. Helmer reminded the group that the Coordinating Council is recognized by UCSD and its Chancellor as an official “Support Group” for the Regents of the University of California.
Helmer explained the meaning of the word “system” in the term “California Spatial Reference System” (CSRS) as used at CSRC. He advised the participants that a reference system is much more than simply a geodetic control network. A “system” includes other components such as geodetic models, data distribution (data portal), metadata, public outreach, support services, etc. And the CSRS is a component of the national geodetic-reference systems and the National Spatial Data Infrastructure.
Helmer’s presentation concluded with a brief report on the major on-going efforts within CSRC – the San Joaquin Valley height modernization project and contract, CGPS contract leveling in southern California, planning for a large northern California height modernization project, coordination activities with the EarthScope/Plate Boundary Observatory efforts, analyses of NGS GEOID03, data distribution, and real-time GPS networks (Orange County, San Francisco Bay Area, San Diego, etc.).
For additional information, see Helmer’s PowerPoint presentation at CSRC’s website.
3. **Officers and Executive Committee Elections:** Elections were conducted for four positions (Secretary, Treasurer, and two Executive Committee openings). *Note: The officers also are members of the Executive Committee.* The terms for these positions begin on July 1, 2004 and end on June 30, 2006. Greg Helmer introduced the candidates (see list below) and called for a vote. The vote for approval was unanimous.

Secretary – Michael Duffy
Treasurer – Larry Fenske (incumbent)
Executive Committee – John Casey (incumbent) and Fasha Eskandari

P.S. A subsequent tally of the eligible voters revealed that a quorum was not available; thus, the elections must be validated by follow-up e-mail vote (to be conducted soon).

4. **Director's Report:** Dr. Yehuda Bock, CSRC Director, presented a detailed report on a wide range of subjects regarding CSRC. These included:
 - a. CSRC's mandates – provides necessary geodetic services, accounts for temporal changes in geodetic coordinates, and establishes/maintains the official geodetic control network for California.
 - b. Current CSRC personnel, including consultants.
 - c. Use (data retrieval) of SOPAC/CSRC data archives.
 - d. The FY 03/04 Work Plan – planned expenditures are: 32 percent staff, 11 percent consultants, and 57 percent contract.
 - e. Financial reports – tables and listings showing (i) spending by category (such as personnel, consultants, contracts, equipment, travel, etc.) and (ii) spending by work plan tasks (such as leveling to CGPS, San Joaquin Valley height modernization, education and outreach, etc.). The latter report covered the period from July 1, 2001 to June 30, 2004.
 - f. Other significant activities. These included (i) increased efforts in northern California, (ii) development of a document that defines the policies, procedures, and instructions for the "Implementation and Use of the California Spatial Reference System," (iii) an updated CSRC data portal, (iv) acceptance by NGS of CSRC's values at epoch 2004.00 for CGPS within California, (v) CSRC coordination with the Plate Boundary Observatory project, including efforts to develop real-time GPS networks.
 - g. The proposed FY 04/05 Work Plan – planned expenditures are: \$315k staff, \$240k consultants, \$374k contract, and \$71k travel, etc. The Plan presented was developed by the CSRC Work Plan Committee. The Plan will be prepared (formatted) for submittal to NGS and submitted for approval in the near future.

For additional information, see Bock's PowerPoint presentation at CSRC's website.
5. **Treasurer's Report:** Greg Helmer and Larry Fenske, CSRC Treasurer, briefly mentioned the Coordinating Council's "Treasurer's Report." The complete report was available as a handout. It was emphasized that this Report covered only the monies earned and expended by the Council (the "Support Group"). The current balance of the Council's funds was reported to be \$5,922.89; however, additional expenses have not been received for the exhibit that was displayed at the recent CLSA/NALS conference.
6. **Discussion:** At this point, a short discussion occurred.
 - a. Gilbert Mitchell, NGS – NGS encourages contracting out.
 - b. Bruce Joffe, GIS Consultant – Joffe was impressed by the number of data retrievals from the SOPAC/CSRC archives. Joffe asked whether any of the archived data that is stored at a one-second epoch would be reduced. Yehuda Bock said storage is relatively inexpensive and he did not anticipate any reductions.
 - c. Mark Turner, Caltrans – Turner questioned whether or not the timetable and cost estimates for initial implementation in the "Master Plan" have been re-evaluated, considering the amount of "in kind" efforts that are being generated. Don D'Onofrio responded, no they have not been re-evaluated because the contract costs are "running" higher than originally estimated.
 - d. Greg Helmer, CSRC – Helmer stated that he is committed to conducting a real-time GPS network symposium this fall.
7. **EarthScope and PBO (Plate Boundary Observatory):** Greg Helmer opened the meeting to a general discussion of CSRC activities with the EarthScope/PBO efforts.

The meeting participants agreed that one of the most difficult CGPS-installation activities is locating and permitting sites.

Bob Packard, CSRC, reported that next week he will begin the field effort for the PBO CGPS sites in Imperial County.

Brian Coyle, UNAVCO/PBO, requested that the meeting attendees identify large land owners and provide contacts for such owners.

Greg Helmer, CSRC, said that PBO has been cooperating with CSRC and others regarding access to real-time data from PBO CGPS.

Cecilia Whitaker, CSRC, reported that Metropolitan Water District has four PBO CGPS sites identified. Ultimately, this is expected to increase to five.

Jim Swanson, CSRC, stated that East Bay Regional Parks (Contra Costa and Alameda Counties) has tentatively located 10 of the 11 PBO CGPS sites slated for the two counties. The Regional Parks are working on permitting issues. If approved, these sites should be sufficient for PBO within this area.

Dick Davis, Caltrans, advised the group that his unit is seeking a statewide master agreement between PBO and Caltrans for PBO CGPS sites.

The participants had a brief discussion regarding the costs to operate the CGPS equipment and for communications.

Yehuda Bock, CSRC, encouraged the group to negotiate your needs at the time of permitting. After the permit is executed, it will be more difficult to negotiate.

It was noted that EarthScope/PBO is not required to provide real-time GPS data.

8. **Northern California Densification Network:** Jim Brainard, Chief of Caltrans North Region Office of Surveyors, provided an overview of the planned height modernization project in northern California. It is a large project, consisting of approximately 900 stations. The project is being developed to a large extent by the Caltrans North Region, Office of Surveyors. Marti Ikehara (NGS), Don D'Onofrio (CSRC), and Dick Davis (Caltrans) are providing assistance. Coordination for the project is being performed by Don Campbell of the Caltrans North Region.

The project is being justified, in part, based on traffic safety and the need for a common datum for GIS and related efforts.

The Caltrans North Region is accelerating the project to ensure the results are included in the planned NGS horizontal readjustment that is expected to occur in the near future. Brainard outlined the schedule which allocates six to eight weeks for observations and 12 weeks for required leveling. The completed project data is scheduled to be submitted to CSRC/NGS in June 2005.

NGS standards, specifications, and procedures will be employed for all surveys. The project datums will be NAD83 and NAVD88.

The Caltrans North Region has estimated that the entire project will require 9,600 person hours to complete. The Region anticipates that the bulk of the survey work will be performed internally; however, at this time, the extent and who performs the leveling work is uncertain. CSRC might be requested to fund the leveling effort and perform such work through a CSRC contract.

The availability of sufficient, reliable NAVD88 control and the need for additional geodetic leveling is currently being evaluated. The North Region is working closely with CSRC and NGS to ensure sufficient, valid NAVD88 data is included in the project for height modernization.

A critical need now is for monumentation material. Since funds are unavailable through Caltrans, Brainard requested that CSRC provide \$33k for additional monumentation materials. Greg Helmer stated that if NGS and CSRC can agree that the project is expected to achieve height modernization publication, the check can be written today. **Decision:** After some discussion, the consensus was that the project is expected to satisfy height modernization requirements, although the extent of the required leveling is uncertain and possibly some portions of the project might be excluded from height modernization.

A handout that describes the project was available for the meeting participants.

9. **Lunch:** An “eat in” catered lunch was served.

10. **CGPS Leveling Project:** Cecilia Whitaker, CSRC Consultant, provided a PowerPoint presentation on the recent CSRC CGPS leveling contract. The primary objective of the contract was to establish NAVD88 elevations on selected CGPS in southern California.

The work was performed with electronic digital/bar code levels (Leica NA3003) and invar rods to Second Order, Class II FGCS standards and specifications. The FGCS specifications were slightly modified to require only two valid check connections. The modification was accepted by NGS because the project specifications limited the level runs to 10 kilometers. Umbrellas and rod support struts also were used but not required by the contract.

Whitaker explained and illustrated that a somewhat difficult and delicate task was making the required hand measurements at the CGPS. The turning point for the digital leveling was a punch mark on the CGPS monument leg. Hand measurements were required to determine the vertical distance from the punch mark to the GRM (Geodetic Reference Mark) within the CGPS adaptor. This work required removal of the CGPS radome. Before the survey crews performed this work, Whitaker trained the crews on the proper procedures and instructions to observe.

The specifications required verification of each NAVD88 benchmark utilized. This was accomplished by running single-run levels to an adjacent benchmark. If the benches did not check, the levels were continued to the next benchmark. This was the case in about 20 percent of the benches. Double-run levels were required from the “verified” NAVD88 benchmark to the CGPS.

Whitaker described an issue with the FGCS specifications. These specifications require the standard deviation of the readings to be less than 0.1 millimeter for an observation. However, it is unclear whether this is a single reading or the mean of all readings (the NA3003 can report either). Whitaker stated that after considerable research and discussion it was determined that the correct interpretation is the mean of all readings. NGS is now working with FGCS to clarify the specifications.

Although the specification permitted sight distances up to 70 meters, the practical limit was 30 to 50 meters in order to achieve satisfactory results.

The leveling results were compared to results obtained with the CGPS and GEOID03 with some varying and interesting comparisons. Recently, the project’s scope was expanded to include five-hour GPS sessions on each NAVD88 benchmark used. This work is currently in progress and will be analyzed when completed. Possibly, this work might explain the varying comparisons between the leveling and GEOID03.

11. **San Joaquin Valley Project:** Don D’Onofrio, CSRC Consultant, presented an overview of the San Joaquin Valley height modernization project and contract. A map of the project was available as a handout.

D’Onofrio briefly described the project which consists of 105 stations, including control stations. The Request for Proposals generated 11 acceptable proposals. Three firms were interviewed. Ultimately, Condor Earth Technologies, Inc. of Sonora was selected and, subsequently, a contract was successfully negotiated. QBS (Qualifications Based Selection) procedures were utilized throughout the entire contractor selection process.

Portions of the project are being performed by Caltrans, District 6, including all required leveling efforts. Throughout the project, there is a severe lack of reliable NAVD88 control; thus, considerable leveling was required. Even with the added leveling, the amount of NAVD88 control is marginal for height modernization, but it is the best that can be economically established.

Because of the sparseness of vertical control (especially to the east), approval to exceed the 25-kilometer limit for electronic digital/bar code leveling was requested from NGS. NGS approved, providing the sight distances were kept to an average of about 30 meters. Also, the sight length

imbalance was not to exceed about one meter. With these restrictions, District 6 achieved about two miles of leveling progress per day.

The entire project (Caltrans work, plus CSRC's contract work) will be adjusted as one project – a total of approximately 140 stations. D'Onofrio remarked that the real challenge will come in the data processing and adjustment efforts.

12. **San Simeon Earthquake Resurvey:** Don D'Onofrio continued with a short presentation on the status of the San Simeon earthquake resurvey. D'Onofrio stated that the resurvey planning is in its early stages. Generally, earthquake resurveys are delayed until six months after the event to provide ample time for the post-seismic motions to subside to normal.

Three handouts showing the displacement contours resulting from the earthquake were available to the group. D'Onofrio advised that the handouts (displacement maps) were created by Dr. Duncan Agnew of UCSD. The maps are being used to determine the extent of the resurvey effort.

D'Onofrio remarked that there is good availability of CGPS and NAVD88 control within the area. This will significantly aid the resurvey effort. Caltrans has indicated initial support for assistance with the project. *P.S. In a subsequent meeting with Caltrans held in San Luis Obispo on May 20, Caltrans agreed to provide all necessary personnel and equipment for the GPS portion of the project. It is unlikely they will have the resources to perform any leveling operations.*

D'Onofrio closed by explaining to the group that the San Simeon earthquake was the fifth earthquake in 12 years in California to cause significant permanent deformation. This demonstrates the need for CSRC, epochs, resurveys, readjustment, etc.

13. **CSRC Height Modernization Processing Procedures:** Mike Potterfield, CSRC Consultant, briefed the meeting participants on various height modernization processing techniques. His discussion is summarized below. For additional information, refer to his PowerPoint presentation by downloading the file, "Present.ppt" from <ftp://ftp.geodeticsolutions.com/pub/download/csrc>.

a. Tuolumne County Adjustment – Potterfield reviewed the network adjustment results for the Tuolumne County geodetic control project. The agreement between CSRC's network adjustment and NGS's adjustment was excellent (incredible). The mean difference in the adjusted horizontal coordinates was less than one millimeter, and the mean difference in adjusted orthometric heights was less than two millimeters.

b. South San Francisco Project – The horizontal and vertical bluebooked projects for the South San Francisco height modernization project have been submitted to NGS and accepted for their data processing. Thus, the major "bluebooking" hurdle has been passed for this project.

c. Standard Error of Unit Weight – Potterfield discussed the value of the "standard error of unit weight" as a measure of the corrections computed for observations as part of the network adjustment. He stated that the "standard error of unit weight," from minimally-constrained GPS adjustments, should not be inflated by errors in the analytical model, such as by errors in constraints, velocity models, or geoid models.

d. Relaxed Constraints – An explanation of the concept and application of "relaxed constraints" in data processing was provided.

e. Multi-Baseline Solutions – Additionally, an explanation and demonstration of the advantages of "multi-baseline solutions" in data processing was presented.

f. San Joaquin Valley Project – Potterfield briefly reviewed the upcoming San Joaquin Valley height modernization project. *Note: It is anticipated that Potterfield will be responsible for performing the data processing and NGS submittal for this project.* A potential issue with the San Joaquin project is that some of the observations will be performed at significantly different times.

g. GEOID03 – Potterfield remarked that NGS's GEOID03 "looked very good" in the various analyses that he has performed to date.

14. **Public Outreach Efforts:** Greg Helmer led the participants in a general discussion, primarily involving public outreach efforts.
- a. State Spatial Reference Centers – Greg Helmer reported that a number of other states have, or are initiating, Spatial Reference Centers. These include North Carolina, Louisiana, Wisconsin, Washington State, , and others.
 - b. NGS Input and Liaison Efforts – Renee Shields, NGS Coordinator for CSRC, briefly remarked that the monthly meetings (telephone conferences) between NGS and CSRC were being conducted on a regular schedule and are functioning well. Overall, Shields believed that CSRC is making “good progress.”
 - c. Vertical Legislation Proposal – Dick Davis, Chairperson for the CSRC Vertical Legislation Committee, stated that the Committee met in February 2004. Following this meeting, it was decided that additional time was required to develop and review the proposed legislation; thus, the submittal of a proposal has been delayed until September 2004. The Committee met again by telephone conference in May and reviewed the intent and objectives of the legislation. (*The minutes of this meeting were distributed to the meeting participants.*) The Committee is now in the process of reviewing various drafts regarding the California Spatial Reference Network, Orthometric Heights, Geodetic Coordinates, and California Coordinate System (revisions to existing statutes for the latter). Davis reported that the Committee plans to complete their efforts prior to the September deadline.
 - d. Caltrans Input and Liaison – Mark Turner, Chief of Caltrans Office of Geometronics, stated that he received support from the Director’s Office to represent Caltrans at the January 12, 2004 meeting with Congressman Jerry Lewis on continued federal funding for geodetic control in California. Turner felt that the results of previous CSRC public outreach efforts were demonstrated today with the number of completed and on-going projects involving the public and private sector. He thanked CSRC for involving Caltrans.
 - e. Seminars and Conferences – Helmer reiterated that CSRC will hold a real-time GPS network symposium this fall.
15. **Closing:**
- a. Next Meeting Date – The next general meeting of the CSRC Coordinating Council is scheduled for October 22, 2004, in La Jolla.
 - b. Chairperson Closing Remarks – Greg Helmer thanked Fasha Eskandari and PG&E for hosting this CSRC meeting. Helmer also expressed his, and the participants, appreciation to Maria Turingan, CSRC Coordinator, for her excellent work in arranging and coordinating the meeting. And finally, Helmer thanked the meeting participants for their attendance.
 - c. The meeting adjourned at approximately 3:30 p.m.

Respectfully submitted,

Larry Fenske for Dave Stone, CSRC Secretary

AGENDA
COORDINATING COUNCIL SPRING MEETING
California Spatial Reference Center
 Friday, May 14, 2004 — 10:00 a.m. to 4:00 p.m.
 PG&E Headquarters
 77 Beal St., Room 308, San Francisco, CA



Time	Topic	Primary Lead
9:30	Greetings and Orientation	
10:00	Opening & Chairman's Report a. Self Introductions b. Review of Agenda c. CSRC Activities/Progress	Greg Helmer
10:30	Officers & Executive Committee Election	
10:45	Director's Report a. Review Work Plan & Expenditures FY 03/04 & FY04/05 b. Treasurer's Report	Yehuda Bock Maria Turingan Larry Fenske
11:30	Earthscope & PBO Status & Joint Coordination Efforts	
12:00	Lunch Break	
1:00	Northern California Densification Network a. Plan Overview & Progress	Dick Davis Jim Brainard
1:30	CORS Leveling Project a. Results b. Data Publication	Cecilia Whitaker
2:00	San Joaquin Valley Network	Don D'Onofrio
2:20	San Simeon Earthquake Resurvey	Don D'Onofrio
2:40	CSRC Height Modernization Processing Procedures	Mike Potterfield
3:10	Public Outreach Efforts a. State Spatial Reference Centers b. Vertical Legislation Proposal c. NGS Input & Liaison Efforts (Renee Shields) d. Caltrans Input and Liaison Efforts (Mark Turner) e. Seminars & Conferences	Greg Helmer Dick Davis
3:50	Closing a. Chairperson Closing Remarks b. Next Meeting Date	Greg Helmer
4:00	Adjourn	

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MEETING PARTICIPANTS

CSRC Coordinating Council Meeting
 May 14, 2004

	Council Members	Non-Council Members
1	Besenty, Chris	Asher, John
2	Bock, Dr. Yehuda	Bain, Darrell G.
3	Davis, Dick	Brainard, Jim
4	D'Onofrio, Don	Coyle, Brian
5	Eskandari, Fasha	Darling, Gary
6	Fenske, Larry	Fields, Bob
7	Garcia, Jose Javier Gonzalez	Fredericks, Stephen
8	Helmer, Greg	Genrich, Jeff
9	Ikehara, Marti	Gnipp, Jack
10	Joffe, Bruce	Hanson, Russ
11	Kelly, Kevin M.	Hulick, Steve
12	McGee, Michael	Lamoreaux, Paul
13	Murray, Dr. Mark H.	Little, Jeff
14	Packard, Bob	Martin, John R.
15	Penland, Reid	Merriam, Martha
16	Turner, Mark	Mitchell, Gilbert
17	Van Coops, Jonathan	Potterfield, Mike
18	Young, William H.	Pugh, Nathan
19		Pulley, Michael
20		Pursell, Dale
21		Shields, Renee
22		Swanson, Jim
23		Toutges, Wayne
24		Turingan, Maria
25		Whitaker, Cecilia
Total	18	25
		43