

# LONG VALLEY HYDROLOGIC ADVISORY COMMITTEE

## DRAFT MEETING NOTES

June 9, 2015

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### THERMAL SUBCOMMITTEE ATTENDEES

**Ormat:** Charlene Wardlow, John Bernardy; **USGS:** Jim Howle, Bill Evans; **BLM:** Mike Lystad & Dale Johnson; **CA DOGGR:** Jack Truschel; **USFS/Inyo:** Jon Regelbrugge; **Mono County:** Nick Criss & C.D. Ritter

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### PUBLIC MEETING ATTENDEES

**Ormat:** Charlene Wardlow; **USFS/Inyo:** Jon Regelbrugge; **UCSB/SNARL:** Dan Dawson **USGS:** Bill Evans & Jim Howle; **BLM:** Mike Lystad, Dale Johnson; **MCWD:** John Pedersen, Forrest Cross & Irene Yamashita; **CA DOGGR:** Jack Truschel; former member Dan Lyster; **Mono County:** Nick Criss, Brent Calloway & C.D. Ritter

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1. **Call to order:** Nick Criss called the public meeting to order at 10:05 a.m. in the Town/County Conference Room at Minaret Village Mall, Mammoth Lakes.

2. **Public comment:** None

3. **Meeting notes:** Adopt meeting notes of February 26, 2015, as amended:

- 1) Item 5, second graph: Hayes: Reviewed ~~at BLM at CEC~~ by Truschel;
- 2) item 5, graph 7: Wardlow: 14-25 is 600', other either 1k' or ~~4k 100°~~ Fahrenheit, whichever came first;
- 3) item 5, graph 12: ~~\$303,000 from BLM for well 14-25, in contrast to 2x or 3x for deep well. The USGS cost to drill the two groundwater monitoring wells is \$303,000. The cost for a deep geothermal monitoring well is estimated at 2x to 3x that cost;~~
- 4) item 5, graph 17: Johnson: BLM hasn't seen ~~GDC CEC~~ grant; and
- 5) item 6, first graph: Greg ~~Vaughan~~ was used to NASA data.

4. **Subcommittee status reports:** Ormat: Wells down, techies will review all data. Pedersen: Delayed before startup?

4. **Bylaw adjustments:**

**MOTION:** Adopt revised bylaws as amended: 1) Item 5, graph seven: either 1k' or ~~4k 100°~~ Fahrenheit; 2) ~~\$303,000 from BLM for well 14-25, in contrast to 2x or 3x for deep well. The USGS cost to drill the two groundwater monitoring wells is \$303,000. The cost for a deep geothermal monitoring well is estimated at 2x to 3x that cost.~~ 3) Item 5, second graph from bottom of p.2: BLM hasn't seen ~~GDC CEC~~ grant. 4) Item 6, line 4: Greg ~~Vaughan~~... (Wardlow/Truschel. Ayes: All.)

6. **New monitoring wells:** Criss: Mono, Ormat, USFS, BLM visited sites two months ago, in process of Categorical Exemption permits, deadline July 12 (drilling rigs in NV, ready to send). Pedersen: CEQA for Mono, Categorical Exemption for BLM. Criss: Mono gives money to Ormat, on to USGS.

Dawson: Potential site visit, where? Criss: General area. Pedersen: Areas 1 and 2. Well 14-25 is 600' deep, other is dual 1,000 ft or 100° Fahrenheit. Wardlow: Agreement in place, BLM permits so July could still happen. ~~Truschel Howle:~~ Ready to mobilize July 12.

Pederson: Lahontan's Mike Cooney getting assistance on question of reclaimed water in

drilling. Don't use municipal well. Apply for Variance, water quality acceptable on either source.

Wardlow: Who hauls recycled water? Pedersen: Water truck procedure revamped, not potable. Permittee trucks water, responsible for use (Chuck Villar, White Rock Construction of Gardnerville). Water going out in new program. Wardlow: Will email pit requirements to Lahontan, cc Pedersen and Howle.

Pedersen: Disposal of drilling fluids? Howle: Has to be tested. Pedersen: Common Lahontan permit. Wardlow: Problems in Imperial Valley, unable to replace people who leave.

Howle: Excavated pit, with lining. Pedersen: Not in quite a while. Cross: Not producing quite as much. Wardlow: Not much cutting. Howle: Not coring. Rock chips, reverse circulation below that. Pedersen: Used bin with liner on one job. Wardlow: Usually have requirements on water. Drilling out of existing well.

Criss: How much material expected? Howle: Can't give volume. Wardlow: Has size of pit been proposed? Submitted permit for NEPA at boneyard. Pedersen: Include proposed site 3? Wardlow: No, USFS, not BLM. Not needed for groundwater wells permit.

**7. USGS monitoring data:** Howle: Typically produce February and August meeting data report. Evans provided handout. Monitoring soil temp at 20 cm depth at Shady Rest SRF. Area of bare ground, scrub vegetation. Color bar gives soil temp in five upper plots; not apply to TIR image. Soil temperature measurement grid. Measures temperature when measuring flux. Minor changes in pattern of anomalies, but consistent hot ground in northern area, scattering of hot points in southern third of area. Good agreement from TIR imagery and hot spots. Aerial thermal collects surface temps at night. Can't directly compare data. Make sure not missing any hot ground in imagery.

Steady over past five years at site. Steaming stump = tree killed, fell over, became fumarole. CO<sub>2</sub> flux measured, color scheme is log scale. Flux 2006-10 published already. Some ups and downs, but average flux values show no trend. Anomalous area broadened. Take few points out of interior, maybe more dense, expand. Established flux/temperature grid. Maybe just present raw data files, but keep trying with data. Could go back in next iteration to write contract to get finished product from vendors. Nighttime TIR monitoring plan, but how improve. Continuous temperature lots for seasonal variation.

Issue: Funded by USGS in research program, as part of prescribed monitoring program, not keep funding out of internal funds. Involved new people doing new budgets, come up with cost to maintain. Retired so not part of budget anymore. BLM provided funding for another year of TIR. Image in fall or wait till 2016 closer to actual startup? Input via email next few weeks.

Criss: Any benefit to October? Evans: Two trials on Basalt Canyon. Wardlow: Start drilling next year, but two years away with no pipeline. Maybe revisit next spring? Evans: Waiting a year might be closer to startup. Long drought, so how much do flux and temperature measurements not show? Hope to have TIR in a normal, wet year.

Dawson: TIR image surface temp for every point? Evans: Problem is getting display of temperature range. If plot is broad, program invariably starts and then crashes. Proprietary software. Still working on it. What works in days is cutoff temp, say hotter than 16.

Dawson: Three graphs with range? Evans: Yes, discrete steps. Could be done. Learned how to write contract to pilot. Monitor temps in swimming pools. Ground-truthing possible. Better resolution than first time. See pipelines from geothermal wells. Geo-electrifying could be better.

Dawson: Talk to NASA and JPL folks producing map of water on ground in watershed. Color-coded map, massive data files. Evans: Vaughan works with NASA. Provide suggestions.

Wardlow: Colin put agreement into fiscal 2019 for BLM funding. Use for wells?!

Howle: Existing agreement on subsidence monitoring. Equipment budget about \$20,000. Also plan repeat subsidence survey this year, pushing back till next year, coincide with surveys at Basalt Canyon. BLM and USGS have contract extending to SR 203, GPS line from post office to US 395/SR 203 junction. Baseline survey in 2014 goes up to 12-25.

8. **Next meeting:** Aug. 5, 2015, with 12-1 thermal subcommittee, 1-3 public.
9. **Adjourn** at 10:55 a.m.

*Prepared by C.D. Ritter, Long Valley HAC secretary*