

LONG VALLEY HYDROLOGIC ADVISORY COMMITTEE

DRAFT MEETING NOTES

February 7, 2018

PUBLIC MEETING ATTENDEES

Ormat: Janice Lopeman, Steve Henricksen, Mark Hanneman, Cheryl Eanes

USGS: Jim Howle, Bill Evans, Wes Hildreth

BLM: Mark Spendel, Dale Johnson, Mike Lystad, Steve Nelson

DOGGR: Charlene Wardlow, Carolyn Cantwell, Amar Rao

USFS: Margie DeRose

MCWD: Pat Hayes, John Pedersen & Irene Yamashita

Mono County: Nick Criss & CD Ritter

Other: Dan Lyster & Mickey Brown, citizens; John Wentworth & Sandra Moberly, Town of Mammoth Lakes; Malcolm Clark, Sierra Club; Dave Harvey, Southern Mono Historical Society

1. **Call to order & introductions:** Nick Criss called the meeting to order at 10:10 a.m. in Town/County Conference Room at Minaret Village Mall, Mammoth Lakes. Attendees introduced themselves and their agencies.

2. **Public comment:** None

3. **Meeting notes:** Approve meeting notes of August 2, 2017, as submitted.

4. **Subcommittee status reports:** August flow tests for Ormat, available data, review of well 2825, how well was drilled

5. **USGS monitoring data (Basalt Canyon temperature logs):** Howle showed recovery on par with other winter recharge events. System overall response to big winter. East of airport, peaking late August, early September. Record high for continuous. Higher level in 1986 by about a foot. Not up to long-term historic levels. Sherwin Creek shallow had 50' water level rise, quick response from surface water connection. Deep nearby SC1 and SC2 wells recovered about 15'. Showed longer-term plots. 1990 data even higher. Not even dent in 2006-07. Well 14A-25 recovery 1.5'. Well 28A-25 data. Recovered ~4.5' in response to big winter. 2017 temp profiles north of Shady Rest Park, 14A-25. Stable water column. Greatest spread in data 0.3 C degrees. 28A-25 temp profiles. Largest variation 0.4 C degrees. Cooling due to breakthrough of drilling of nearby wells 28-25 in Oct. 2017. Logs started at 340, linear continuation. Data collected within water table.

Lopeman: Described high permeability in rhyolite tuffs and flows. As drill, fluids start to go into reservoir. During time period depending on drilling method, lost circulation might not get back to surface. Transitioned to smaller core. Drill goes into rock, can collect rock. Fluids still go into formation. Once circulation returns, just know lost it at some depth. Once get to casing point, 1,322' at core, cemented core rods to isolate upper from deeper sections. Fluids returned to surface. At 350' main lost circulation ~440'. Impermeable. Bishop tuff at 1578 permeable zone isolated from 28A-25 monitoring well.

Evans: Impermeable between 600' and 1322? *14A and 14-25 potential for communication between, but data not show it.*

Howle deferred to Evans for chemistry. USFS samples MCWD wells quarterly, analyzes for ~20 different chemical species. Not much change in any. Graphs showed chloride vs. time. No trend in new data. Random variations over time. Good to constrain range of wells. 14A and 28A

have more chloride. Production well P17 showed steady decline in chloride. Well drilled in early 1990s. Plot showed chloride and sulfate conductance decline. Concentration changes in response to number of factors, such as extremely dry winter in 2015, very wet in 2017. Recharge does influence chemistry of well. Historically, April 1 is maximum snow. Mixture of geothermal and groundwater. Chloride to boron ratio plot along 45-degree upward line. High recharge provided fresh groundwater to well, geothermal water declined.

Hayes: Influence of geothermal water in P17?

Evans: No recognizable thermal component in other wells. Chloride data back to 1990s, not boron.

Howle: Two wells in Basalt Canyon, no data to compare.

Evans: Early chemistry data shows sulfate data into 1990s.

Lopeman: Mixing lines useful to have.

Evans: Showed many different plots. Lot less boron and chloride in P17. 10k micrograms chloride. Geothermal wells would plot off chart.

Lopeman: Increase chloride more?

Evans: P17 big span of water to cover. Hard to tease out of data plotted close to origin.

Wardlow: Water data from Alpine 1 well?

Pedersen: Talked of possibility of sampler, didn't seem opposed. No chemistry data now.

Evans: Warm water under town, finding chemistry data on water is difficult. Worth having representative sample.

Pedersen: Waiting for EPA?

Wardlow: Yes, for three years.

Hayes: Well 26?

Evans: Not changed much. Wet and dry winters have effect.

Hanneman: Wells came up higher.

Hayes: Collect water quality samples.

Evans: National water quality lab in Denver, protocol involved. Menlo Park gets unofficial data. Rare to get conflict between.

Lopeman: Missing data from April to Nov 2017 on 28A and 14A? Ormat missing one or two quarters of data.

Evans: Concentrations of chloride not vary much. Variables involved.

Lopeman: Cited Ormat's data. May sample not posted for 14A.

6. Water chemistry of MCWD wells & new Basalt Canyon monitoring wells: Above...

7. RV Park monitoring well: Spendel: BLM 1 finished early December down to 600'.

Howle: Water encountered perch zone about 310'. Acoustic waves sent into formation, fracture zone indicated.

Wardlow: Town well nearby M8.

Spendel: No rhyolite...

Howle: Not plot of temp log for BLM 1. Top 32 C, similar to M26, warmer than P17.

Hayes: BLM 2 deep monitoring, how far away from BLM 1?

Spendel: Depends on what drill rig shows up.

Hayes: Potential influence so site farther way might be better?

Hanneman: Temperature will recover.

Spendel: 203 and RV park has environmental document.

Hayes: Will BLM 2 find geothermal fluids? *Will know after drilling!*

Hilbreth: Diagrams based on gravity, refraction profiles, post-caldera lavas. Rim fault zone kilometer wide. Guidebook for volcanology tour last year.

8. Update on CD IV Groundwater Monitoring and Response Plan (GMRP): Spendel noted 2017 revision of plan, will distribute copies at afternoon meeting. Still need to meet with some others. Consulted with parties involved.

Wardlow: Chevron tanks pulled for leaks?

Hayes: Owner is board member, nothing to do with. CA has aggressive rules on containment of volatiles into atmosphere.

9. Adjourn at 11:25 a.m. to Aug. 1, 2018

Prepared by CD Ritter, LVHAC secretary