

LONG VALLEY HYDROLOGIC ADVISORY COMMITTEE

DRAFT MEETING NOTES February 26, 2015

THERMAL SUBCOMMITTEE ATTENDEES

Ormat: Charlene Wardlow, Cheryl Eanes, Lara Owens, Janice Lopeman, Mike Sorey & Courtney Morrison;
USGS: Bill Evans & Jim Howle; **BLM:** Mike Lystad & Dale Johnson; **EGS:** Gene Suemnicht; **CA DOGGR:** Jack Truschel; **Mono County:** Nick Criss & C.D. Ritter

10:00 A.M. PUBLIC MEETING

ATTENDEES

Ormat: Charlene Wardlow, Cheryl Eanes, Lara Owens, Janice Lopenan, Mike Sorey; **USGS:** Bill Evans & Jim Howle; **BLM:** Mike Lystad; **EGS:** Gene Suemnicht; **MCWD:** Pat Hayes, John Pedersen & Irene Yamashita; **CA DOGGR:** Jack Truschel; **Mono County:** Nick Criss & C.D. Ritter

1. **Call to order:** Nick Criss called the public meeting to order at 10:07 a.m. in the Town/County Conference Room at Minaret Village Mall, Mammoth Lakes.

4. **Bylaws:** Hayes: Focus is on geothermal, not on MCWD water-supply wells, a change from historical perspective. MCWD does not think favorable outcome in monitoring/mitigation plan for proposed expansion should be put under responsibility of HAC. Resolution is between MCWD and Ormat.

Criss: HAC is advisory committee. Hayes: Tug to make HAC expand services, take on responsibility – not in the interest of MCWD. Criss: Isn't some of the data to be used later? Hayes: Records go back on all wells. MCWD engaged USGS to start water-quality monitoring program this week. Contract with two agencies. MCWD is protecting water supply concerns. Criss: Part of bylaws? Hayes: Not part of MCWD's issue. Wardlow disagreed: BLM has authority to make changes to project with potential effects. Criss: HAC acts as advisory, not approve any monitoring plan. Johnson: BLM has organizations established for advice, but not HAC – Southern California Resource Advisory Council only.

5. **New wells:** Wardlow: Permits were obtained from Mono County Health and USGS. Geothermal Resource Development was set up in late '70s: fund resource projects. Ormat applied for grant at 14-25 and junkyard, had baseline data. \$1.2 million grant, half to Ormat. Ormat's project was selected. Hearing was held at Energy Commission to approve grant, with money available April 1, 2015. However, project was not approved; she suggested MCWD explain.

Hayes: Reviewed at BLM by Truschel. MCWD was last to find out about it. Looking for good monitoring/mitigation plan. Grant application states MCWD agreed to sites. Groundwater wells only: 14-25, already drilled for CD-4; other at boneyard site. MCWD never agreed on site selection, he stated, and proposed better locations. Two hydrogeologists recommended sites, but not site 14-25. USGS recommends at least one deep well, and none was proposed. Legal team of MCWD thought Energy Commission had been asked to approve a plan still in negotiation; i.e., give credence to something not fully developed, thus premature. Ormat had discussions in January and in February. Asked to delay till agreement on site. Lack of deep well was a concern; MCWD requests two deep geothermal wells. Proposal incorrectly indicated agreement. USGS was cited as endorsing. Energy Commission thought maybe two parties ought to look it up?

Evans: Alternate site for 14-25? Hayes: Primarily Center Street in Mammoth, off Hwy. 203. Want pair of deep and shallow wells.

Wardlow: Intent was not a complete program, just initiation. Criss: Sherwin Creek back on line? Howle: Yes. BLM did not collect data, not shown in database. Cannot be represented as USGS data. Pedersen: Presented as MCWD data. Howle: Incorporating two data sets would be fine. Wardlow:

Ormat paying for two wells added back in.

Sorey: Shallow and deep well at each site? Hayes: Two holes, one into geothermal zone, other shallow. Nested pair might save cost of drilling third hole.

Criss: Where to go from here? Dale Johnson had not heard of locations other than 14-25 and boneyard. Steve Nelson said would be partial, not complete, monitoring/mitigation plan. NEPA did not include deep drilling.

Wardlow: 14-25 is 600', other either 1k' or 1k Fahrenheit, whichever came first. Criss: Ormat drill w/o grant? Wardlow: Energy Commission continued item to March meeting. Two sites on lease.

Hayes: Concern with monitoring plan is taking on life of its own, with incomplete picture. Thin veneer of validity on something not really needed. No access to well logs for 14-25 (Wardlow said in packet sent). Groundwater in logs to get there? No purpose to drill dry hole. More useful, prudent to put between two wells. Testing by extracting at 14-25, re-injected at 12-25 without deep monitoring wells, wells in groundwater. Difficult to see signal in short-sighted test. Need connectivity.

Criss: Where to go from here? Wardlow: When apply for grant, project must be CEQA permitted, and can't spend money prior to grant issuance. Worth a lot of money. Wait to see what happens March 11, go from there. Schedule next meeting sooner than six months. If Energy Commission approves, needs legislative approval with 30-day waiting period before money becomes available.

Evans: Just learning if cold groundwater at 14-25 would be valuable. Possibly neither well would be good monitoring well. USGS likes information, not profit/loss. Wardlow: Shouldn't matter where Ormat gets money for wells. 50% of royalties return to state of origin, 40% of 50% back to county to use money for geothermal development. When 25% was returned directly to county, NV built a library. Fighting to keep 25% back to county. BLM did cleanup leasing. Sen. Thompson introduced legislation to get money back to county. Money is available, applied for it; if not get it, Ormat would pay out of pocket.

Evans: Drilling reports are confusing. Sorey: Locations might be dry holes, but not have alternative system. Evans: Where to drill out there? Uncertain. Sorey: Edge of Basalt Canyon? Suemnicht: Old Shady Rest campground?

Pedersen: Not enough water for supply well. Well log is confusing. Cold groundwater system and warm at well 6. Howle: Initial groundwater at 300' or so is indicative of cold-water system. Suemnicht: Purpose not to make decisions on confusing info. If deep well eventually is required, base on better knowledge. Do things in stages, learn as go. \$303,000 from BLM for 14-25 well, in contrast to 2x or 3x for deep well. Wardlow: Energy Commission does not have solicitation this year. If MCWD went in, could be 80/20 not 50/50.

Yamashita: No agreement on moving forward. MCWD was not made aware of goings-on. MCWD/BLM had communications, but Ormat/BLM communication is needed. Two shallow wells are all Ormat has proposed, which is unsatisfactory to MCWD.

Wardlow: Send out June 2014 minutes. Yamashita: Communications on what agencies think is appropriate monitoring. Just learned of grant last week. Wardlow: Doesn't matter where Ormat acquires money. Yamashita: Point is MCWD hasn't approved plan that includes two shallow monitoring wells, and State was told MCWD approved. Hayes: MCWD is public agency, not in profit/loss business, but has potential for significant loss.

Yamashita took umbrage with the way plans were put forth in covert way without explicit MCWD approval. Leaky aquifer could bleed its guts out. Need plan that addresses that potential. A few shallow wells will not address that.

Evans: Two shallow wells could greatly inform evolving plan for monitoring. Hayes: Nothing in documents suggests deep geothermal wells; therefore, impasse exists. MCWD can't attend thermal subcommittee. See where create sense of mistrust? All need to understand what's going on, true needs, risk. MCWD shouldn't bear risk of Ormat proposal. Get in deep wells.

Criss: MCWD unaware of grant or wells? Hayes: Not aware of grant. MCWD heard proposals before, but never agreed that's the plan; not comprehensive. Johnson: BLM did not view it as "the plan." Yamashita: Implication of approval by agencies. Johnson: BLM hasn't seen CDC grant.

Hayes: Reading from application: 1) Drill two wells suggested by USGS, agreed to by agencies, MCWD and Ormat. Johnson: Working on NEPA doc. Owens: Would still apply for grant application to understand resource. Getting more info for MCWD at same time. Never thought of grant solely to mitigate effects on groundwater. Every little bit of money contributes toward resource test. If read that

way, it was not intended to obfuscate or be duplicitous. Sorey: Referred to monitoring wells, information on groundwater system.

Hayes: Item 3: Determine if immediate connectivity. Owens: Needed on resource level. Hayes: Trying to understand what's stated. Criss: Change wording of application? Hayes: Applied to moving wells to other locations. Wardlow: Money went back into pot. Criss: MCWD's locations not boxed out, just getting information. Hayes: "How many times do I need to say it? It was put forth as connectivity plan, but it's incomplete." Owens: Could it be reworded?

Criss: Solution? Wardlow: Can't change grant application at this time. Ormat is in confidential negotiations with MCWD, not to be spelled out at this meeting. Hayes: Spoke with project manager Cheryl Closson. Grant as written has to be exactly as proposed. If it had flexibility, all would be happier. Sorey: Boneyard on MCWD list? Hayes: Yes.

6. USGS monitoring data: Bill Evans recalled nighttime thermal imagery over larger Casa Diablo area plus lower-altitude where geothermal manifestations were most prominent, where well field expansion was proposed. Worked with vendor to acquire imagery, but backed out at last minute. Switched to an unknown vendor. Distortions in imagery of eight flights mosaicked into one. Greg was used to NASA data, influenced criticisms of \$18,000 effort. Trees are much warmer than grass or bare ground. Product doesn't work statistics and recognize thermal anomalies. Picked 16° C as low temp. No super high temps. Smallest of thermal areas show up in imagery. Thermals in water at golf course, inflows of warmer water.

Pedersen: Wastewater plant has reclaimed water that's pumped to golf course pond. Imagery helps guide exploration of thermal areas. Sorey: Highest anomaly at Shady Rest area? Evans: Main thermal areas show up clearly. Pixels 5 cm². Aerial Thermal Imaging produced imagery. Raw data publicly available later. Huge files, need more time to work with them. Google Earth would be most useful.

Howle: With lack of precipitation last several years, only seven months above monthly mean. Clearly severe drought. Monthly mean decreased about 4%. Fukushima earthquake in 2011. Historic low pressure in thermal system, likely due to lack of water into system. Vent tube on transducer plugged after July 2014 visit, so data deleted. Fish Hatchery Springs water was observed. Daily discharge at Hot Creek flume discharge is lowest ever. Concentrations of boron and chloride vary.

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