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July 19, 2012

**City Of Malibu – Groundwater Sewage Injection Proposal
Malibu Civic Center Area
Comments of Hans Laetz, Malibu Resident,
On Sufficiency Of The City’s “Conceptual Groundwater Injection Plan”**

Dear gentlewomen and gentlemen,

This letter is from a Malibu resident and represents his own views, and I wish to thank the Regional Water Quality Control Board for this opportunity to express my opinions. While I support the Board’s goals of treating and removing effluent from the Malibu Canyon groundwater basin, I am extremely concerned with the Board’s decision to require the City of Malibu to inject highly treated effluent into the top of an active earthquake fault, with unexamined consequences.

I urge the Board to examine the wisdom of its new policy, and sustainability questions invoked by the proposed waste of up to 347,000 gallons per day of usable water in an area supplied by Sacramento Delta water imported at great expense and with a great greenhouse gas footprint.

At 8.35 pounds per gallon, the City proposes to inject up to 347,000 gallons (2,897,450 pounds or 1,448.73 tons) of water per day into the fault. At 365.25 days per year, and a 50-year life span, that is a maximum load of 26,457,340 tons of purified water to be injected into the aquifer bisected by the fault. As demonstrated here, the RWQCB, the City and its contractor have leaped headlong into injecting tons of water, at a moderate but not-insignificant pressure gradient, into the very top of this very-active earthquake fault. No study of any sort – not even a literature review -- has been done to gauge the effects of this. Nor has there been any study of alternate engineering possibilities to capture this valuable resource for beneficial use.

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There is no question that building a sewer, or some other sort of treatment and reclaimed water collection system, is an obvious need at the Malibu Creek watershed. This letter expresses grave concerns about both the process, and the safety, of the current proposed method delineated in the Memorandum of Understanding between the City and the Board.

1. The groundwater basin proposed for injection of up to 347,000 gallons per day is bisected by an active, dangerous fault that is given a 35 percent chance of creating a 6.5 magnitude quake within 30 years by the USGS.

The Malibu Coastal Fault is a 37 kilometer-long compression fault with a creep of .3 millimeters per year in an almost 90 degree, east-west orientation.¹ It is described by the U.S. Geological Survey as a “high-angle sinistral-oblique reverse fault that has accommodated 80° of clockwise rotation of the western Transverse Ranges and perhaps as much as 60 km of sinistral slip (with other elements of the east-west frontal fault system) since early Miocene (citations omitted); more recently compression has been dominant and strike-slip has diminished to a very low rate in the Holocene.”² This fault exists both on and off-shore and may serve as a west-east link between the Anacapa-Dune Fault complex in the ocean south of Port Hueneme to the blind thrust and strike-slip faults under Beverly Hills and Los Angeles, known as the Santa Monica and Whittier Hills Fault complexes.

The Malibu Coast and Anacapa Dune Fault systems have periodically been studied academically, and reported on by local newspapers as to be capable of creating earthquakes of magnitude 6.7 or even 7.5, according to a USGS study of the combined Malibu Coastal and Anacapa Dune faults and their splays.^{3 4}

This fault apparently crosses the Malibu Creek valley in an east-west direction just north of Pacific Coast Highway. It is identified in Cross Section D-D₁ at a location just north of Civic Center Way, north of the Ralphs market. It can reasonably be interpolated as to sit within a few feet of test well MCWP-MW01, a proposed injection site.

The Malibu Coastal Fault has also been examined in numerous State of California reports, including 1994’s “Areas Damaged by California Earthquakes, 1900-1949,” 1995’s “Special

¹ California Department of Conservation, “2002 Fault Parameters,” Appendix B, page 3. Sacramento, 2002. http://www.conservation.ca.gov/cgs/rghm/psha/fault_parameters/pdf/Documents/B_ft.pdf

² J. Jerome Treiman, compiler, 2000, “Fault Number 99, Malibu Coast Fault,” in Quaternary fault and fold database of the United States: U.S. Geological Survey website, http://geohazards.usgs.gov/cfusion/qfault/qf_web_disp.cfm?disp_cd=C&qfault_or=1862&ims_cf_cd=cf .

³ Jeffrey L. Rabin, “Geologists Warn of Big Quake on Coast -- Danger: The Malibu fault zone was previously thought to be inactive. A temblor could trigger serious landslides, experts say.” *Los Angeles Times*, May 10, 1990. http://articles.latimes.com/1990-05-10/local/me-1544_1_malibu-coast-fault .

⁴ Hans Laetz, “Survey cites chance of 6.5 Malibu quake -- Critics say the possibility of a 6.5 magnitude Malibu earthquake and another 7.5 quake offshore should negate any proposals of offshore liquefied natural gas terminals.” *Malibu Surfside News*, May 18, 2005. http://www.coastaladvocates.com/pdf/051805_article_Survey_cites_chance_of_6.5_Malibu_quake.pdf .

Studies Zones, State of California, Malibu Beach Quadrangle,” 1994’s “Fault-Rupture Hazard Zones in California, Special Publication 42,” 1995’s “The Northridge, California, Earthquake of 17 January 1994, Special Publication 116,” 1997’s “Probabilistic Seismic Hazard Assessment for the State of California, DMG Open-file Report 96-08,” 2001’s “Guidelines for Evaluating and Mitigating Seismic Hazards in California,” 2001’s “Seismic Hazard Zone Map, Malibu Beach 7.5-minute Quadrangle, Los Angeles County, California,” 2007’s “Earthquake Fault Zone Map, Malibu Beach Quadrangle,” and 2008’s “Guidelines for Evaluating and Mitigating Seismic Hazards in California.”⁵

None of these studies are mentioned in any Water Board or City of Malibu geotechnical study of the MOU’s proposed injection scheme. The City’s Conceptual Plan has not addressed any of these local geological features.

2. The City has not examined the effect of injecting 347,000 gallons per day of water, with a cumulative weight of 226.5 million tons, into the top of an active compression/strike-slip fault.

The City of Malibu has not examined if there is any aquitard preventing some or all of this massive flood of water from entering the fault itself. The draw-down tests performed by the City contractor do not examine how or where the groundwater shifts – it assumes it is all transported in the alluvium horizontally.

USGS scientists believe injections have triggered moderate earthquakes recently in Ohio, Oklahoma and other areas not commonly associated with faulting or earthquakes.⁶ Although the proposed City of Malibu injection wells are not nearly as deep as injection wells known to have caused earthquakes those other states, it must be noted that those other earthquake faults lay deep below alluvium, whereas the Malibu Coastal Fault has surface traces. It is not necessary to use high pressure or deep wells to reach the top of the Malibu Coastal Fault, such as in the Midwest.

⁵ California Department of Conservation, Division of Mines and Geology, 1996, “Areas Damaged by California Earthquakes, 1900-1949;” California Department of Conservation Division of Mines and Geology, DMG Open File Report 82-17; California Department of Conservation, Division of Mines and Geology, 1996, “Special Studies Zones, State of California, Malibu Beach Quadrangle, official map, effective June 1, 1995;” California Department of Conservation, Division of Mines and Geology, 1994, “Fault-Rupture Hazard Zones in California, Special Publication 42;” California Department of Conservation, Division of Mines and Geology, 1994, “Malibu Coast Fault, Los Angeles County, California, Fault Evaluation Report FER-229,” October 3, 1994; California Department of Conservation, Division of Mines and Geology, 1995, “The Northridge, California, Earthquake of 17 January 1994, Special Publication 116;” California Department of Conservation, Division of Mines and Geology, 1996, “Probabilistic Seismic Hazard Assessment for the State of California, DMG Open-file Report 96-08;” California Department of Conservation, Division of Mines and Geology, 1997, “Guidelines for Evaluating and Mitigating Seismic Hazards in California;” California Department of Conservation, Division of Mines and Geology, 2001, “Seismic Hazard Zone Map, Malibu Beach 7.5-minute Quadrangle, Los Angeles County, California;” California Department of Conservation, California Geological Survey, 2007, “Earthquake Fault Zone Map, Malibu Beach Quadrangle, August 16, 2007;” and California Department of Conservation, California Geological Survey, 2008, “Guidelines for Evaluating and Mitigating Seismic Hazards in California.”

⁶ Ellsworth, J.J., and others, U.S. Geological Survey, 2012, “Is the Recent Increase in Felt Earthquakes in the Central US Natural or Manmade?” abstract before the Seismological Society of America annual convention, 2012.

3. The City has not examined whether localized liquefaction dangers will be exacerbated by the injection of 226.5 million tons of water into the aquifer.

The State of California has determined that large areas of the Civic Center area susceptible to liquefaction in earthquakes of the magnitude that are predicted to strike the Malibu region. In a 2008 study, the State found that liquefaction dangers were most pronounced in “the prominent coastal embayment filled with floodplain deposits, upon which is situated the City of Malibu Civic Center. This floodplain appears to have received most of its detritus from flooding along Malibu Creek. The canyon of Malibu Creek is, for the most part, occupied by mappable active channel and floodplain deposits, or undifferentiated alluvium.”⁷

Neither the Water Board, the City, nor the consultants have considered whatsoever what the effect of introducing up to 347,000 gallons per day of water into this geologically-active structure. There is no analysis whatsoever on whether existing downward water migration from sources like the Legacy Park sump will be hindered by upward water movement (“mounding”) flowing from the injection of massive amounts of water in the basin.

There is insufficient data as to whether groundwater mounding could be contained by purported “aquitards” that exist at the proposed injection well. Nor is there any evidence that a continual shield exists to prevent the water from being forced by gravity and injection pressure, plus the weight of additional mounded water, into the underlying fault.

There is no evidence that these aquitards exist in a continuous fashion in all directions from the test wells, no evidence that they would prevent vertical water travel. In fact, the presence of Holocene movement in the Malibu Coastal Fault would suggest that rifts have been torn in the aquitards. There is no data to suggest that these aquitards are not ripped apart by the Malibu Coastal Fault, other undiscovered faults, or other subsurface structures in the alluvium and chaotic geostructures of the basin. There is no evidence from the City study that these aquitards, frankly, hold water.

4. No analysis of exact fault location has been undertaken, or what the effect of the fault will be.

The City’s Conceptual Groundwater Injection Plan mentions the Malibu Coastal Fault in precisely one place: a map of “Cross-Section D-D₁” on page 18. There, the Malibu Coastal Fault is spotted at the north edge of Civic Center Way as it climbs the hill towards Winter Canyon, about 700 feet west of well MCWP-MW01, as designated on page 10 of the Study.

Nowhere in the Study’s maps or cross-sections is the fault delineated or even mentioned. It is very possible that MCWP-MW01 is actually directly over the fault. It is amazing that any geotechnical study of a groundwater basin would ignore such a basic landform, and it makes it impossible to take seriously any conclusion or argument made by such a deficient study.

⁷ California Department of Conservation, California Geological Survey, 2008, http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps/LosAngeles/Documents/Tsunami_Inundation_Malibu_Quad_LosAngeles.pdf

5. No study of alternative disposal areas or potential water reuse or storage has been undertaken.

The City has been instructed by the MOU to consider only one disposal method: injection at the Civic Center site. No other alternatives are on the table: transporting the highly-treated water to other local groundwater basins, disposing of it at sea as is done in every other city, or local storage of it for use on parks, greenbelts, fire breaks or landscaping are not examined.

It is not clear who at either the City or the Board conceived of this project as the sole disposal alternative. No examination of these issues was conducted prior to the solemnizing of the MOU. The city is now \$3 million invested into this path, both the Water Board and the City of Malibu are apparently content to postpone the safety issues raised by the undersigned until an Environmental Impact Report. Given the obvious (yet unexamined) dangers and expense of the injection scheme, and the compelling need for quick action to treat and dispose of effluent at the Malibu Civic Center, it is incredible that other alternatives are not being studied at this time.

6. No independent study on the wisdom of the sole chosen alternative has been undertaken.

It is unclear where the genesis of the injection scheme is. It appears that the contractor, RMC, may have been involved in the early stages of the formulation of this scheme. RMC is now assuring city officials that the preferred injection scheme is perfectly safe, and RMC scientists are conducting the studies. There is an inherent conflict of interest in this process. RMC now has a vested interest in finding an outcome that matches its original recommendations and preliminary findings, which the City of Malibu has relied on to the tune of \$3 million or so.

This is not to infer that RMC scientists have violated any fiduciary duty or been dishonest or unprofessional. But the lack of independent review and oversight here is alarming.

7. Conclusion: this is a rushed, foolish path.

The Water Board's action in forcing construction of a permanent solution to replace the septic tank and advanced OWTS patchwork at the Malibu Civic Center is overdue and worthy. But the City and the Water Board are rushing headlong into a potentially-dangerous and wasteful water disposal scheme.

The very concept of disposing of 347,000 gallons per day of highly-treated effluent into the ocean, via this injection scheme, is offensive in this era of water shortages and concern about the huge amounts of greenhouse gases generated by importing water to Southern California from sensitive distant wetlands.

Alternative disposal methods should be considered immediately. Such alternates include:
-- using solar energy to pump the highly-treated effluent to adjacent, uninhabited watersheds (such as Latigo, Corral or Solstice canyons) for either groundwater recharge

- or for creation of running creeks that could sustain endangered fish, such as steelhead salmon.
- using the reclaimed water for “purple pipe” uses all along the Malibu coast, to replace State Water Project water that is imported at great expense and great energy consumption from Stockton.
 - building a reservoir above Malibu to store surplus water for firefighting needs or other local emergencies.
 - recharge of the highly-treated water into aquifers for recycling into domestic use, to replace State Water Project water.
 - piping highly-treated effluent (along with Tapia reclaimed water) to the San Fernando Valley for groundwater recharge there.

The MOU should be held in abeyance while the Water Board and City work together to rectify these egregious mistakes, faulty assumptions, and rushes to judgment.

Thank you for your consideration,

Hans Laetz