

Scientists Capturing Moisture From Sutro Tower's Fog

As anyone who lives here knows, it's often very foggy around Sutro Tower. Now a non-profit is experimenting to see how efficiently that fog can be converted to usable water.

FogQuest (www.fogquest.org), a charity dedicated to planning and implementing water projects for rural communities in developing countries, is testing its innovative fog collectors at Sutro as it seeks to maximize the collection of natural atmospheric sources of water.

"We want to see how viable this is, both for regions of developing countries such as Ethiopia, and for drought conditions in California," said a spokesperson for FogQuest's San Francisco experiment. "We wanted to be at Sutro Tower because it's one of the foggiest places in the city and is on a hill with regular cloud movement."

Fog is composed of tiny liquid water droplets from 1 to 40 micrometers in diameter. A typical droplet diameter is 10 micrometers; typically there is from 0.05 to 0.5 grams of liquid water in a cubic meter of fog. The heart of a fog collector is specially calibrated polyethylene or polypropylene mesh, chosen to be very efficient at capturing the wind-blown fog droplets. The collector also includes a trough to gather the water that drips from the mesh, and a tube that carries the water from the trough to a water bottle. Fog collection is an impaction process, not a condensation process. The collectors work when there is fog and light wind, not merely high humidity, and they capture rainwater as well as fog.

FOG CONTINUED ON PAGE 4



FogQuest volunteer Chris Fogliatti stabilizing an experimental fog catcher at Sutro Tower

IN THIS ISSUE

- Scientists Capturing Moisture From Sutro Tower's Fog **1**
- Neighbors to Measure RF Emissions **2**
- Sutro Tower Submits New Landscaping Plan **2**
- City Reviewing New Landscaping at Sutro Tower **3**

Neighbors to Measure RF Emissions

Some residents near Sutro Tower have asked about emissions from the tower's antennas. Radio frequency radiation exposure limits are set by the Federal Communications Commission to be 50 times lower than any level found by numerous scientific studies to have any negative effect on health; the radiation from Sutro Tower is just 7.0% of the of the most restrictive FCC public exposure limit at the point of maximum exposure under normal conditions.

There are regular readings of the Sutro Tower emissions, performed by independent experts from the engineering firm of Hammett & Edison, at 200 points in the neighborhood up to 1000 feet from the tower. These are submitted to the City and posted online at www.sutrotower.com/safety-and-maintenance/safety-reports/. Hammett & Edison's 2015 emission measurement report is on the website.

In addition, Sutro Tower Inc. has provided residents with their own new, state-of-the-art field meter so residents can measure radio frequency emissions in the neighborhoods surrounding the Tower at any time. Golan Yona, a Stanford scientist and PhD who lives in Midtown Terrace, and Siu Ling Chen, the Midtown Terrace neighborhood liaison to Sutro Tower, received the equipment in October. They were trained on how to use the meter and probe, how to perform the necessary calculations, and where to send the equipment for regular re-calibration to maintain adherence to the manufacturer's specifications. Members of the Forest Knolls Neighborhood Organization, the Twin Peaks Improvement Association or the Midtown Terrace Home Owners



Golan Yona was trained to use a new radio emission meter by independent expert Bill Hammett

Association can request emission readings inside and outside their homes, either from Sutro Tower Inc. or from the Midtown Terrace Home Owners Association.

When broadcasters use their auxiliary antennas, which are located lower on the tower than their primary antennas, the maximum radiation level can rise. Sutro Tower emails or calls any resident in the Twin Peaks, Forest Knolls or Midtown Terrace neighborhoods who has asked to be notified when auxiliary antennas are in use.

In the Community

Sutro Tower Inc. is a major sponsor of neighborhood activities such as the Midtown Terrace Block Party and the Forest Knolls Christmas Party. Sutro had a booth (left) at the September block party, where local artist Miles Epstein, with a little help from 8-year-old Lukas Waschbuesch, made a wooden model of the tower at the GreenArt Project's craft booth (center). At the holiday party, where Sutro's Eric Dausman and Forest Knolls residents Kristine Zaback and Walter Caplan visited Santa (right), everyone got Sutro Tower cookies and tree ornaments.





An artist's rendition of how vegetation and screening will look when the new plants mature, and the same perspective last summer (inset).

Sutro Tower Submits New Landscaping Plan

As part of last year's agreement with the three neighborhood associations near Sutro Tower, Sutro Tower Inc. has submitted to City agencies the landscaping and design plan for a project to make its facility look more attractive to people walking at the adjacent Summit Reservoir.

The plan is consistent with the site landscape plan approved by the city in 1974. Since then, many trees and shrubs on the San Francisco Public Utilities Commission's property near the reservoir were removed over the years to simplify maintenance, and some foliage was removed on the Sutro Tower property under approved permits -- in particular to accommodate backup generators for the city's broadcasters. The new landscape plan calls for new vegetation both on Sutro Tower's property and on SFPUC's property, with all planting and maintenance provided by Sutro Tower Inc.

The landscape plan maximizes the use of native plants, including new native trees to replace dead or dying

eucalyptus trees as part of erosion control on the south side of the Sutro building. In all, the plan calls for planting 35-45 large coast live oak trees, and 50-70 smaller trees and shrubs of the species toyon, silk tassel, wax myrtle, and ceanothus. Exact numbers will be determined as field conditions dictate once planting begins.

In addition to new vegetation, a separate screening plan calls for translucent glass on some ledges of the Sutro Tower building to shield some roof antennas from the sightlines of people walking around the reservoir. Also, conduit and exposed equipment on the Sutro Tower facility, and certain antennas and dishes, were repainted last summer to blend better with the surrounding environment.

The new plan was developed by the landscaping contractor Stephen Wheeler Landscape Architects, with significant input from Dr. Joe McBride, an urban forest expert from University of California at Berkeley. In September, before the plan was submitted to the City Planning Department and the SFPUC, it was reviewed by the neighborhood liaisons from Midtown Terrace, Forest Knolls and Twin Peaks neighborhood associations. Following that review, the plan was adjusted so more and larger trees could be planted and to accommodate better screening of the roof antennas.

While the landscaping is anticipated to be finished this year, there is still much work to be completed to make the preliminary screening concept a reality, including formal reviews by both the Department of Building Inspection and the Planning Department. The Building Inspection and Planning departments are also considering proposals to add a low-power antenna for the Chinese FM radio station KQEA, as well as to replace three dish antennas with like units for the wireless company Clearwire. The submitted plans can be viewed online at <http://sutrotower.com/about-the-tower>.



DID YOU KNOW?

The Sutro Tower™ is named for the hill next to its base, Mount Sutro, which is named for Adolph Sutro, a Prussia-born Gold Rush engineer and real estate investor who was elected mayor of San Francisco in 1894.



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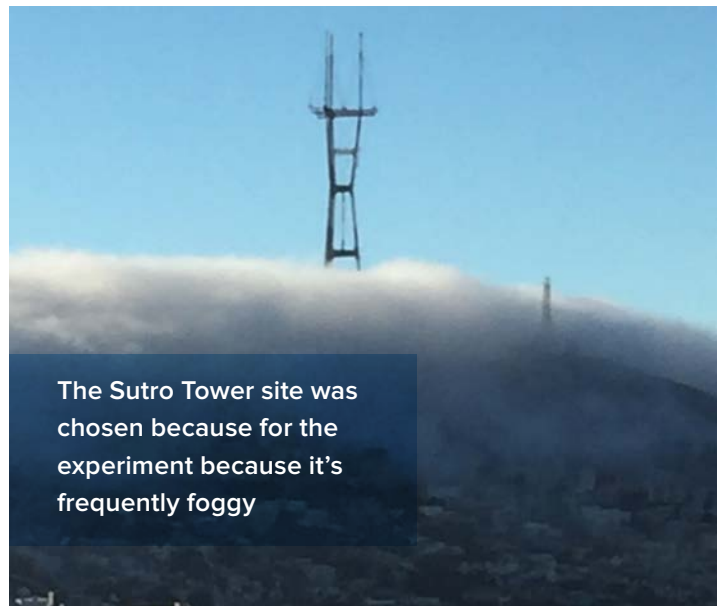
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FOG CONTINUED FROM PAGE 1

Chris Fogliatti, a volunteer for FogQuest, set up two experimental fog catchers at Sutro to compare the efficiency of different meshes in capturing San Francisco's fog 830 feet above sea level. One experimental fog catcher is 1 meter square, the other collector is 1 meter high by 3 meters long; FogQuest's implementation projects use fog catchers 40 times bigger or more.

Almost every morning Fogliatti measures how much water has been captured in the past 24 hours from the fog at Sutro Tower. Since the test project began in October, more than 150 gallons have been collected.

"It's very exciting to be able to test the fog collectors in the Bay Area, so close to the scientists who are developing the systems," said Fogliatti, who noted that most of the implementations are overseas in places such as Guatemala, Ethiopia, Chile and Nepal. "We are learning a lot here." Academics studying the harvesting of fog include scientists at University of the Pacific, Lawrence Berkeley National Laboratory and Cal State-Monterey Bay.



The Sutro Tower site was chosen because for the experiment because it's frequently foggy

"We're thrilled to provide the setting for this important experiment," said Sutro Tower chief operations officer Eric Dausman. "If fog can play a role in helping us deal with water shortages, or in aiding rural residents in other countries, then we're proud to help."