

ABWAC Requested Clarifications of Pacific Gas & Electric's "Responses to Questions Regarding Cloud Seeding in the Lake Almanor Basin"

08/24/2011

The Almanor Basin Watershed Advisory Committee is grateful for PG&E's commitment to helping us better understand their cloud seeding program in the Almanor Basin. There are a number of aspects of the *Responses to Questions Regarding Cloud Seeding in the Lake Almanor Basin* provided to the public and ABWAC by Pacific Gas & Electric which has raised additional questions for which we request clarification. In order to fulfill our duty to provide the Plumas County Board of Supervisors with a well vetted recommendation we respectfully request PG&E address the following:

- Page 7 & 11: On page 7 it is stated that particles formed by the flaming operation are 0.05 to 0.10 microns in size (50 – 100 nanometers). On page 11 it is states that the particles are approximately 100 nanometers in size. Nanoparticles are generally defined as less than 100 nanometers. Is data available on the actual sizes generated by the flaming process that PG&E uses at Lake Almanor?
- Page 8: As stated, EPA sets a secondary standard (maximum contaminant level, MCL) for silver in drinking water at 100ug/L (100 parts per billion, ppb); however this has not been established for silver in nanoparticle form. Has PG&E evaluated the potential concentrations of silver in nanoparticle form? Or are you aware of any studies or standards for nanoparticle silver?
- Page 9 and Tables E-2 and E-3. There are inconsistencies in reporting silver concentrations measured in Lake Almanor. Tables E-2 and E-3 list detected values as parts per million. The text on page 9 indicates values are in parts per billion. Footnotes on the tables indicate that parts per million is equivalent to ug/L. This is not correct. Concentrations in ug/L are parts per billion. Both the method detection limit and reporting limit are not consistent on Table E-2 or Table E-3. Can you please clarify the correct units and detection limits?
- Tables E-2 and E-3: There is no indication of how these measurements were made, whether the method or laboratory was the same, or whether these measurements are of total silver or silver in nanoparticle form. Could PG&E provide the original reports with methods to clarify if samples were collected in the same manner and tested by the same laboratory?
- Section 7.3 first paragraph on page 13 appears to be inaccurate. PM 10 refers to particles ≤ 10 microns (10,000 nanometers, nm) in size and is regulated by EPA. PM2.5 refers to particles ≤ 2.5 microns (2,500 nm) in size, and is also regulated by EPA and used as a criteria pollutant. PM2.5 particles are defined as fine particles, not ultrafine particles. Nanoparticles are defined as particles 1 to 100 nm and termed ultrafine

particles. Regulations concerning their use appear minimal. A re-evaluation of the regulations or lack thereof surrounding nanoparticle size air pollutants appears warranted.

- Page 3 states: “The studies all conclude that silver iodide used in cloud seeding does not have environmental effects because it is practically insoluble, does not tend to dissociate to its component ions of silver and iodine, and is not bioavailable in the aquatic environment but instead remains in soils and sediments.” Can you please provide us with the “numerous studies of environmental effects of cloud seeding” that show cloud seeding has no environmental effects?
- Data in Table E-2 indicates that there is silver in the water in the upper North Fork including Lake Almanor and Mountain Meadows Reservoir/Hamilton Branch. Does PG&E believe these are natural background levels of soluble silver in the water or the result of cloud seeding?
- One of the arguments to support a lack of risk for AgI₂ is that it “is not bioavailable in the aquatic environment but instead remains in soils and sediments.” Has PG&E tested the soils and sediments around Lake Almanor to demonstrate that this is in fact the case? The studies of other cloud seeding areas cited in the *Response* indicate silver was not present at elevated levels in soils in those areas. So where is the AgI₂ that has been released from the burners if it is not in the soil? The data in Tables E-2 and E-3 suggest at least some of it may be in the water in Lake Almanor. Please clarify what you believe to be the source of this silver in Lake Almanor.
- Was the PG&E sampling for silver intended to detect cloud seeding products? And if so is there reason to sample more during the cloud seeding months (it appears only 1 sample in April 2003 was during the cloud seeding season)? Are there additional water sampling studies that could be made available to the committee?
- Page 10 refers to “comprehensive monitoring studies of the effects of cloud seeding” in the Almanor Basin as part of the FERC relicensing process. Could PG&E make those studies available to the committee? Are they different from the data presented in the *Response*?
- The *Response* does not address the impact of nanoparticles in general and the fact that their interactions with fluids and with living systems, regardless of their chemical composition, are very different from that of the same chemical in non-nanoparticle form. Even if, as PG&E suggests, AgI₂ in nanoparticle form does not dissociate in water, available data we have reviewed suggests it is still likely act as a nanoparticle in its association with living cells. The *Response* provides no evidence that AgI₂ in nanoparticle form does not dissociate in water or does not interact with living cells. The range of these activities is outlined well in the recent review for OEHHA by UCSF, in

numerous other reviews and on the EPA website. Can PG&E more thoroughly address this concern?

- Are there studies which have identified and measured the chemicals released from their cloud seeding operations that were used to develop the information in Table D-1? For example how was it determined that all of the p-dichlorobenzene is totally consumed in the burning process?

In addition Pacific Gas & Electric has the opportunity to directly address public concern for the risks to the health of the Almanor Basin and environmental safety by providing the following to amplify the *Response* and assuage public concern.

1. Records and other documents, from which the amounts of AgI/Cl used during cloud seeding, as presented in Table 1, were determined and how the calculations were made.
2. Documents from which the operational information (days, total hours) in Table 1 were derived.
3. Information for the 1999-2000 cloud seeding season added to Table 1 (data the year of the 2000 sampling).
4. Documents to substantiate the chemical composition of the cloud seeding particles and the chemicals loaded into the cloud seeding burners used in the Almanor Basin. Who manufactures it, how does PG&E determine the quality and purity of the solution, etc.