

LIGHTNING DATA CENTER MINUTES
DECEMBER 9, 2011
ST. ANTHONY HOSPITAL WEST, LAKEWOOD, CO

Monthly Quote: "When you see lightning it has already missed you. When you hear thunder, relax; the show is over. The noise is just the audience rushing for the exits."

- Ira Wolfert, 1959

1. The meeting began at 11:45 PM and adjourned at 1:05 PM.
2. Members present: Clark, Yarnell, Wachtel, Gift, Cui-Gift, Elder, Claus, Langford and Stewart. Clark moderated the meeting.
3. Greg Stewart presented a number of lightning news items. The first portion of the presentation covered misinformation from archived news sources: A 1987 Denver Post article entitled "Nature's Fireworks—When Lightning Strikes Colorado," included an incident at a local farm: "...a bolt followed him into a barn and missed him, but killed 30 turkeys. Now he knows he should have walked instead of run; his movement created a vacuum that attracted the bolt, he says."
4. Another example of misleading reporting was cited in the 1987 article, "Lightning Can Surge as Death from the Sky." Don Kirkman: "Studies have determined lightning bolts are only a few inches wide and travel only one to three miles." Martin Uman, with the University of Florida's Lightning Research Group, notes the average lightning flash is about an inch wide and five miles long. The longest flash on record crossed 118 miles in the Dallas-Ft. Worth area. Link to Research Group: <http://www.lightning.ece.ufl.edu/>
For another source on flash diameter and length, visit the National Severe Storms Laboratory: http://www.nssl.noaa.gov/primer/lightning/ltg_basics.html
5. From a 1983 article, "Saturn's Belt of Lightning: 40,000 miles of Zap" planetary flash rates were discussed: "...about 100 per second at Earth and up to 80,000 at Jupiter, while Saturn shows only about one in five seconds."
6. Stewart presented article excerpts from lightning's "positive effects" file. In "Speculations on the Evolutionary Role of Lightning" (1966) Ed Komerek consulted forester's reports to find "...some 90% of all American woodland fires were set by lightning." "The effect of lightning strikes has been to free the forest of insects and disease. Bird and animal communities have thrived in the clearings left by the fire. By contrast, Nova Scotia alder thickets untouched by flame have biologically 'died'."
7. In another 1966 article, "Lightning as a Sculptor of Life," Komerek acknowledged lightning's role in ecology and evolution. He conducted lightning fire surveys and correlated fire data with the Weather Bureau's lightning observations. "The results confirmed his suspicion that vast sweeps of lightning

bolts sculpted the vegetation (and dependant animal life) of the countryside with fire...during the summer months.” Among his conclusions: “...the grasses that replaced the earlier trees evolved to survive fire, and their descendants are still resistant to fire today.” “We were able to predict the mammals that would increase or decrease in abundance due to differences in frequency of fires.” Furthermore, “...*by manipulating only one environmental factor*—fire—we could develop and maintain different small mammal and bird populations depending on the stage at which we held the vegetative growth.”

8. Another “positive effects” topic was presented from a 1959 article: “The Awesome Miracle of Lightning.” Under intense heat, “...nitrogen combines with oxygen in the air to form nitrogen oxides which are soluble in water. The rain dissolves the oxides and carries them down to earth as dilute nitric acid.” “...Reaching the earth the nitric acid reacts with minerals in the soil to become nitrates on which plants can feed.” “...It is estimated that thunderstorms deposit in the earth about 50,000 tons of nitrogen a day!” Alfred Lansing’s earlier (1955) article “Lightning” addressed the same topic: “It has been estimated that over all the earth’s surface, lightning annually produces up to 100,00,000 tons of nitrogen compounds. It’s even considered possible that without lightning, virtually all plant life on earth might actually wither and die.”
9. Stewart then shifted to a more recent selection of lightning-related news. A new high-voltage laboratory, the Morgan-Botti Lightning Laboratory at Wales’ Cardiff University, will focus on aviation safety. Research and technology, innovation and academia, with support from the Welsh government are combined to achieve their goals. Like Lightning Technologies (Pittsfield, MA), the lab can create electrical insults directed at composite materials featured in late-generation aircraft. Capable of generating up to 200,000 amps, testing is invaluable for the rigorous set of certification requirements aircraft must meet to verify the safety of their designs. For more information visit the link:
<http://www.eads.com/eads/int/en/our-innovation/latest-news/Morgan-Botti-Lightning-Laboratory.html>
For a video clip link: http://www.youtube.com/watch?v=sF2_qp_1X7Q
10. The Lightning On Demand (LOD) organization and their “Lightning Foundry” was re-introduced. “LOD was founded by Greg Leyh in the 1990’s as a group of technical enthusiasts exploring uses of high-energy devices outside of the traditional national laboratory [framework].” This group created the largest Tesla coil in the world: the 38-foot tall, 130,000-watt Electrum in 1977. An even more ambitious project is planned to build two, 10-story high coils. Their work suggests “...laboratory-scale electric arcs start to gain lightning-like abilities once they grow past about 200 feet in length.” Full output power of around 4 million watts are expected to “...fill an area the size of a football field with a continuous display of electrical discharges. By carefully adjusting the drive voltage [up to 14 million volts] and the spacing of the towers, we intend to explore this mysterious

- region where normal electric arcs transform into lightning.” For additional information visit: <http://lod.org/>
13. Langford verified via the Internet the Tesla Museum near Colorado Springs has closed. The museum declared bankruptcy and several of the artifacts in the museum were sold at auction to a fellow in New Jersey. For an article about Tesla, his ideas, and the former Colorado Springs museum visit: <http://www.csindy.com/colorado/the-tesla-files/Content?oid=1109270>. At present, the only known museum dedicated to Tesla is in Belgrade, Serbia. Here’s the link: http://www.tesla-museum.org/meni_en/nt.php?link=kontakt/k&opc=sub10
 14. Stewart also presented some material from the U.S. Forest Service on “Lessons Learned” from the Ozena lightning strike incident. On September 10, 2011, two California ranger districts had reports of several lightning-started fires and enacted their Lightning Operations Guide. An observation/fire crew was dispatched and positioned themselves to monitor flash activity. Active thunder cells were observed. After about 15 minutes, with light precipitation, the engine operator recalls witnessing a bright flash near the engine. The engine captain, a fire fighter and crew boss suffered exposure effects. They were not fully inside the vehicles in a very exposed location. Fortunately, an EMT, protected by his location *inside a vehicle*, was able to respond immediately. “Evaluation by medical personnel found the chief complaints were: tingling in the arms, dizziness, disorientation, burned hair on arms, headache, and “feeling strange.” The report includes: “What went well,” “Suggestions to consider for improvement” and “Lessons learned by review team.” One suggestion was the placement of automated external defibrillators (AEDs) at remote stations. Another was the monitoring of lightning strike survivors for long-term conditions associated with lightning exposure. Under a final heading, “Lessons Learned By Employees,” was the re-evaluation of the need to exit vehicles to observe down strikes. Staying in a vehicle is a “valid option” according to the review. Link to the detailed report: http://www.fs.fed.us/r3/swasafety/investigations-reviews/0909_LL-Ozena-lightning-strike_LosPadresNF.pdf
 15. Stewart mentioned a follow-up article on the 2010 Teton lightning incident, highlighting Wyoming fatality rates and hazard discussion. Link to article: http://trib.com/news/state-and-regional/article_b1ca5efa-3d6d-5dc8-822a-e712229323fe.html
 16. Phil Yarnell reported meeting with a professor from the Colorado School of Mines who is a ham radio operator. The ham says transmission problems sometimes occur when there are ionized particles in the air – even in the absence of a thunderstorm. The only cause we could think of is increased sunspot activity, which would then increase the ionization of the earth’s atmosphere. The only reason lightning would be a problem is if the flash was sufficiently close to the antenna to momentarily distort the RF field produced during transmission.

This also raised the question of naturally occurring atmospheric noise that can be heard on a radio, also known as sferics. We then thought about how Rich Keen is able to detect lightning at his station without a lot of static in the background. Clark thought Keen had installed some minimal electronic circuitry to help attenuate the background noise. Ken found a link about sferics:

http://www.backyardastronomy.net/vlf_receiver.html

This led to a discussion of whether lightning would interfere with VoIP telephone services such as Skype and Vonage. Langford felt any impact from lightning would be most likely from direct physical influence, i.e.: your computer being ruined. Conversely, if lightning were to strike a node on the Internet, traffic would simply be re-routed around the damaged node. "Cul-de-sac" users attached to the damaged node would be out of luck until the node was repaired.

17. Ken Langford advised us of the upcoming International Lightning Detection Conference and International Lightning Meteorology Conference on April 2 –6, 2012 at the Renaissance Boulder Flatiron, 500 Flatiron, Broomfield, Colorado 80021, USA. Ken wanted to know if the LDC should have an open house on the 6th, or perhaps on the 5th at the end of the session. Conference information can be found at the following link:

<http://www.vaisala.com/en/events/ildcilmc/Pages/default.aspx>

18. The 16th Asian Conference on Electrical Discharge will be held on December 10-12, 2012 at The ZON, Johor Bahru, Malaysia. The conference is organized by the Institute of High Voltage and High Current, Faculty of Electrical Engineering, Universiti Teknologi Malaysia (UTM). A Call For Papers can be found here: <http://xa.yimg.com/kq/groups/167509/1367942579/name/ACED%202012.pdf>.

19. LDC Disclaimer: These minutes do not represent official positions of LDC or its members. They simply reflect the comments made at the meeting. Furthermore, the LDC does not explicitly or implicitly recommend or endorse *any* product or service. Any service or product presented in these minutes is done so for the purpose of discussion and analysis. The merit (or lack thereof) is open for consideration and review by the entire membership.

20. Next meeting: Friday, January 13, 2012 at 11:45 AM at St. Anthony Hospital West, Conference Room E. Subject: TBA.

Respectfully Submitted,

Steven E. Clark, Consulting Meteorologist

In Case You Missed It...Lightning in the News

This is a monthly listing of news and videos about lightning and allied areas as reported in the media. A headline is listed, followed by a link to the article. Please note that some of the links are perishable, which means you'll need to go to the source for the article. Enjoy!

From the Bio.com Cable-TV channel: A condensed video about two brothers Jim and Glen struck by lightning while in a hut on Mt. Whitney, AK

<http://www.biography.com/tv/i-survived/videos/jim-glen-struck-by-lightning-2165250609>
