LIGHTNING COSTS AND LOSSES FROM ATTRIBUTED SOURCES

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Compiled by the National Lightning Safety Institute, *www.lightningsafety.com*

NLSI research suggests realistic USA lightning costs and losses may exceed $8-10 billion per year. (Accurate information is elusive or in error: US Dept Commerce reports lightning property damage at $48 million!) Verified sources which describe lightning's economic consequences include:

1. FIRES.

1.1 Forest Fires. In 2010 there were 7164 lightning-caused fires destroying 2,119275 acres. ***National Interagency Fire Center, 2010.***

1.2 Fires To Structures. 18% of all lumberyard fires and 30% of all church fires are lightning-related. ***Ohio Insurance Institute, Columbus OH.*** **From 2007 to 2011, 58% of all residential lightning fires happened during the months of July and August.** ***National Fire Protection Association, 2012.***

2. INSURANCE INDUSTRY REPORTS.

2.1 State Farm homeowners (residential only) insured losses were $969,000,000 per year; average cost per claim was $6,400 (not including deductibles). There were 151,000 claims. Alabama, Tennessee and Texas were the top three claims states. ***State Farm Insurance and Insurance Information Institute, NY Claims Journal, July 26, 2013***

2.2 Lightning is responsible for more than $5 billion in total insurance industry losses annually, according to Hartford Ins. Group. *www.tmcnet.com on the web Sept 14, 2006*

2.3 On annual average, we pay out about 3-4% of our claims as a result of lightning. ***Factory Mutual Companies.***

3. STORAGE AND PROCESSING ACTIVITIES.

3.1 Looking specifically at storage and processing activities lightning accounts for 61% of the accidents initiated by natural events…in North American 16 out of 20 accidents involving petroleum products storage tanks were due to lightning strikes. ***Journal of Hazardous Materials 40 (1995) 43-54***

3.2 In a study of 242 accidents to industrial storage tanks over 40 years, 74% occurred in petrochemical facilities. 80 accidents (33%) had been caused by lightning. *Jrnl of Loss Prevntn in Process Ind., 01/06*

3.3 Thirty percent of US businesses suffer damage from lightning storms. *Carnegie Mellon Report, 02/06*

4. ELECTRICAL UPSETS TO INFRASTRUCTURE.

4.1 Some thirty percent of all power outages are lightning-related on annual average, with total costs approaching one billion dollars. *Ralph Bernstein, EPRI ; Diels, et al.*

4.2 Utility company nuclear power plant digital and I&C equipment safety feature activations were initiated by lightning in 19% of the cases. ***US Nuclear Regulatory Commission, NUREG/CR-6579.***

4.3 Collision of trains on the High Speed Rail Network, Wenzhou China, 27 July 2011. Signal switching equipment failed due to lightning strike. 40 killed, 192 injured. ***New York Times 27/07/2011***

5. PETROCHEMICAL INDUSTRY, Downstream Costs Due to Lightning/Fire/Explosion. ***Willis Energy Market Review, 12/13.***

5.1 USA : Texas Refinery $95,000,000; Louisiana Refinery $104,000,000.

5.2 Non-USA: Rhineland-Palatinate Petroleum $68,800,000; Alberta Oil Sands $1,070,000,000; Singapore Refinery $153,000,000.

6. MINING INDUSTRY, ***(miscellaneous examples cited from Google searches.)***

6.1 South African South Deep JV mine lost 1 month production due to lightning & flooding (2005).

6.2 Porgera JV mine in Papua New Guinea had a severe lightning strike shutting down 50% of electrical power for more than 3 months at a production loss of $750,000/day (2006).

6.3 A Tennessee smelter pot line is "frozen" by a lightning-induced electrical outage. 164 pots have to be dug out by hand. Production is shut down for 7 weeks (2007).

6.4 Twelve miners killed by lightning-caused methane gas explosion. (West Virginia, 2005)

7. EFFECTS OF LIGHTNING IN FUTURE YEARS?

7.1 If the theory of global warming is correct, "we could see double or triple, even more, in the number of lightning strikes by mid-century." *Dr. Martin Uman, Univ. Florida Lightning Research Center,* ***from New York Times 9/9/01.***

7.2 Chinese scientists have warned that global warming is likely to intensify extreme weather patterns, and severe storms in recent years may be a prelude to this. ***China Meteorological Administration, 07/07***

7.3 Each degree of global temperature increase results in 10%-20% higher incidence of lightning. ***Osmar Pinto Junior, ELAT, National Institute for Space Research (INPE), Brazil, 12/02/10***