

Response to Comment Letter I68

Sam Milham
February 13, 2014

I68-1

This comment is introductory in nature; the commenter's experience and contact information is acknowledged.

The commenter refers to “dirty electricity” and “dirty electricity units”. “Dirty electricity” and “dirty electricity units” are not terms used in electrical engineering or physical science. K-factor is usually used by transformer power engineers to derate transformers because of heating that occurs when there is a high level of non-sinusoidal current. The topic of power quality is of importance to power suppliers and customers. The growing complexity of modern computer, communications, appliances and other powered devices makes power quality a diverse and complicated technical specialty in power engineering.

Dirty electricity is claimed to be a cause or possible cause of various human diseases. Dirty electricity units appear to be a way to characterize harmonic content and noise on the voltage or current waveform of mains power. Sixty-Hz electricity entirely free of noise and harmonics would consist of only a current and voltage varying at 60 Hz – “pure sinusoidal 60-Hz.” In contrast to “dirty electricity units” (DEUs) and

Comment Letter I68

Hingtgen, Robert J

From: Sam Milham <smilham@dc.rr.com>
Sent: Thursday, February 13, 2014 2:21 PM
To: Hingtgen, Robert J
Subject: RE: PDS2012-3910-120005, Soitec Solar Development Draft PEIR -- Extension of Public Review Period to March 3, 2014
Attachments: The Dark Side of Green Energy 1.docx

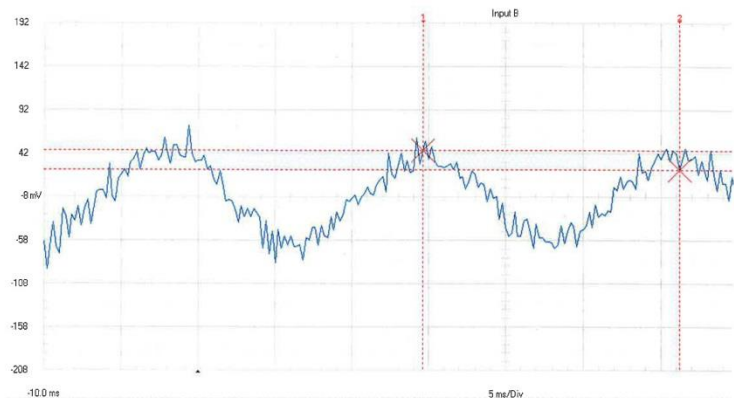
Dear Mr. Hingtgen,

I'm a physician/epidemiologist resident in Indio in the winter. I've measured a number of homes and businesses in southern California with photo voltaic systems. I have also been able to measure an inverter and the switchgear room at a 23 megawatt photovoltaic solar generating plant. All are seriously polluted with dirty electricity. In a typical house with roof top solar collectors, during the day the dirty electricity in the wiring will measure 600 dirty electricity units or above. When the inverter is turned off, the dirty electricity measures less than 50 units. The inverters which change the generated DC to AC seem to be the problem See Attachment

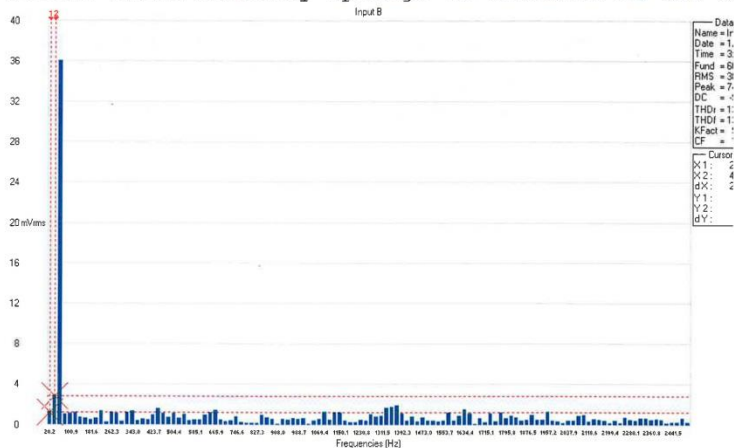
The four new concentrating solar facilities Soitec is planning, are clones of their Newberry Springs plant, which I studied in January 2014. It makes a lot of dirty electricity with high harmonic distortion and a high K factor (a measure of harmonic distortion). The new Desert Sunrise solar plant at Desert Center is even worse in terms of harmonic distortion, distorted sine waves and high K factor.

I'll be in the desert until the end of April. My phone here is 760 775-5878. best, Sam Milham MD

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Soitec Solar Newberry Springs CA Waveform in air a



SOITEC solar Newberry Springs air

From: Hingtgen, Robert J [mailto:Robert.Hingtgen@sdcounty.ca.gov]

Sent: Tuesday, February 11, 2014 3:38 PM

To: Patrick Brown; Megan Lawson (mlawson@dudek.com); Asha Bleier (ableier@dudek.com)

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“Graham-Stetzer” units found in the dirty electricity papers and websites, an academic engineer or physicist would characterize noise content using measures such as total harmonic distortion (THD), which is most commonly used. Laboratory instrumentation to measure THD and other factors is available. As is true for any physical measurement, a given level of harmonic distortion, higher DEUs do not necessarily indicate a health hazard.

The commenter is also referred to the response to comment O10-68 and Appendix 9.0-1 of the DPEIR for further details.

The top panel of this figure shows a waveform identified as “Soitec Solar Newberry Springs CA Waveform in air a” measured in mV (millivolts) on the y-axis over a time period of 45 milliseconds (ms). Insufficient information is provided regarding the source of the data. However, it is assumed that these data were obtained with a “collapsible antenna” directly connected to an oscilloscope as is described later on in the comment letter as the commenter’s method to measure power quality. Although the description is vague, it is likely that the high impedance oscilloscope input would detect voltages from possible sources in the home where it is presumed measurements were made. A key factor in establishing identity of the source for inverters at the

Cc: Fogg, Mindy; Gungle, Ashley; Beddow, Donna; Real, Sami; Bennett, Jim; Sinsay, Edwin M
Subject: PDS2012-3910-120005, Soitec Solar Development Draft PEIR -- Extension of Public Review Period to March 3, 2014

Everyone,
 This email is also being sent to many email addresses on blind carbon copy. Many of you will also receive a hard copy of the following notice in the mail.
 The notice is also anticipated to be published in the Union Tribune on either Wednesday or Thursday this week.

Thank you,

Robert Hingtgen, Planner III
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SOITEC SOLAR DEVELOPMENT PROGRAM ENVIRONMENTAL IMPACT REPORT EXTENDED PUBLIC COMMENT PERIOD, LOG NO. PDS2012-3910-120005 (ER); 3800-12-010 (GPA); TIERRA DEL SOL, 3300-12-010 (MUP); 3600-12-005 (REZ); 3921-77-046-01 (AP); RUGGED SOLAR, 3300-12-007 (MUP); SCH NO. 2012121018.

On January 2, 2014 a Notice of Availability was issued for the Draft Program Environmental Impact Report (Draft PEIR) for the proposed Soitec Solar Development Project that set a 45-day public comment period that was to end on February 17, 2014. The County is extending the public comment period for the Draft PEIR by 14 days. Comments on the Draft PEIR will now be accepted through Monday, **March 3, 2014 until 4:00 P.M.** The Draft PEIR will continue to be available for review on the County's website at http://www.sdcounty.ca.gov/pds/ceqa_public_review.html, and at the Campo-Morena Village Library and Jacumba Library, located at 31356 Highway 94, Campo, CA 91906, and 44605 Old Hwy. 80, Jacumba, CA 91934, respectively. For additional information, please contact Robert Hingtgen at (858) 694-3712 or by e-mail at Robert.Hingtgen@sdcounty.ca.gov.



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Newberry Springs solar site is distance from the site, which is not indicated. The lower panel shows that almost all the signal (marked as mV rms) was at 60-Hz, which is assumed to be the frequency with the greatest signal strength.

These two panels illustrate a noisy waveform, but otherwise are not informative about currents introduced into an exposed person or with regard to potential biological or health effects. Potential biological and health effects are more closely related to currents in the body than to electric potentials or electric fields in the body. The two graphs do not provide sufficient information to inform potential technical concerns such as interference with electronic devices, including communications equipment.

The Dark Side of Green Energy Sept. 2013

By Sam Milham MD, MPH 360 866-0256 760 775-5878 (winter)
smilham@dc.rr.com

Years ago when photovoltaic solar and wind turbines came on the scene, I thought, as did many others, that this would be the salvation of the planet, and the fossil fuel, green house gas, planet warming scenario, was on its way to being solved. As I have worked with and studied the so called renewable energies, I believe that we have opened a Pandora's box of unimaginable problems, including a severe threat to human health.

I have spent winters in Indio CA since 2004, retiring in 1992 from a Washington State Department of Health job as a medical epidemiologist. Beginning in the 1980s I showed that working in jobs with an intuitive exposure to electricity, was associated with increased cancer mortality. The prevailing wisdom then was that the culprit was exposure to power-frequency (60 Hz) magnetic fields. The move to Indio was serendipitous, in that soon after arrival, helping teachers at La Quinta Middle school study a perceived cancer cluster in their group, lead to the finding that high frequency voltage transients and harmonics, called dirty electricity by the utilities, was the active etiologic agent, not the magnetic fields. I followed this study by examining Vista del Monte elementary school in N Palm Springs, again at the request of the teachers. They too reported a cancer cluster in their school and problems with hyperactive students. Again, dirty electricity was identified as being the problem. A cell tower on campus was the source of the dirty electricity. The problem arises when the grid alternating current (AC) is converted to direct current (DC) to charge backup batteries and to power the cell tower transmitter. The device which changes the AC to DC is an inverter which interrupts current flow and creates dirty electricity which flows back into the electric grid. Photovoltaic solar generates DC which is changed to AC by a grid intertie inverter, which generates dirty electricity which again flows back into the grid. Wind turbines are a little more complicated in that the newer ones generate variable frequency current which is changed to DC and then to AC. Again, the DC to AC conversion is done by a grid intertie inverter which generates

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This comment does not raise specific issues related to the project or adequacy of the environmental analysis in the DPEIR. However, the County would like to note that in recognizing that there is a great deal of public interest and concern regarding potential health effects and hazards from exposure to electric and magnetic fields (EMFs); which are created, respectively, by electric voltage and electric current; the DPEIR provides information regarding these potential issues; see Section 3.1.4.5 of the DPEIR. However, the DPEIR does not consider EMFs in the context of the CEQA for determination of environmental impact because there is no agreement among scientists that EMFs create a health risk and because there are no defined or adopted CEQA standards for defining health risks from EMFs. As a result, the EMF information is presented for the benefit of the public and decision makers. Furthermore, in response to this comment and other comments regarding EMF, a memorandum was prepared by Asher R. Sheppard, PhD to support the information provided in the DPEIR and provide more detail; see Appendix 9.0-1 of the DPEIR. The memorandum concludes that EMF from the Proposed Project are highly localized and pose no known concern for human health.

The commenter relies primarily on anecdotal observation for his conclusions regarding the effects of “dirty electricity” and its relation with cancer clusters.

high frequency voltage transients and harmonics. Interestingly, a web search of solar inverters admitted that they all cause AM radio interference. This is an admission that they all generate dirty electricity.

The equipment I use to study wind and solar facilities is fairly simple. I use a 2 channel Fluke oscilloscope with probes connected to an outlet plug to look at the 60 Hz wave form and a high pass line filter to examine the dirty electricity or electrical pollution riding along on the 60 Hz sine wave. I can attach a collapsible antenna to the scope to measure the dirty electricity in the air. It is easy to show that the dirty electricity in the wires radiates into the air and capacitively couples to the human body. I have a plug-in Microsurge meter sold by Stetzer Electric which measures the rate of change of the high frequency voltage transients in the outlet electricity, giving a numerical measure of dirty electricity in the wires. I carry 40 feet of wire to connect to two screw drivers for ground probes to measure the electricity flowing in the earth. Finally, I have a Radio Shack AM portable radio. Tuned off station, it is a sensitive detector of dirty electricity.

When the grid was built, all the electricity delivered to your house returned to the utility substation in the neutral return wires on the power poles. As new electronic equipment (like computers) moved into our homes, most had switching power supplies which made high frequency dirty electricity which doesn't travel as easily in wires as the low frequency utility 60 Hz AC. House and building fires resulted in changing the building codes to require thicker neutral return wires. Instead of beefing up the return wires on the poles, the utilities now dump about 80% of return currents into the earth for return to the substation. There still are California PUC rules stating that the earth shall not be used as a primary neutral return.

If you look up at a pole-mounted transformer, the center of the three terminals on the side has a wire running down the pole connected to a grounding rod. The ground in your house outlet is connected to the ground in your breaker box, to the utility neutral return wire and to the earth. This means that dirty electricity gets into your body by contact with the earth or from the dirty

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The County does not agree that anecdotal observation is reliable in epidemiology for the analysis of clusters. One reason that cluster analysis often does not lead to a conclusive result is suggested by the fact that it is inherent in the nature of random distributions to have clusters. This can be demonstrated readily by looking at clustering among grains of salt dropped from a salt shaker. A demonstration that one factor, here “dirty electricity,” is the cause of disease among a number of people is a challenging task that would require more than one or a few observations.

Ecologic studies, of which the commenter’s cluster study is a variant, have a considerable methodological literature directed at obtaining information free of “ecologic bias” and other problems (Morgenstern 1995). A National Cancer Institute fact sheet on cancer clusters (National Cancer Institute 2014) provides a useful definition of a cancer cluster, methods of investigation, and indicates the problems that make it difficult and rare to show a causal relationship between a suspected cause and a cluster of cases. This fact sheet identifies the particular difficulty of investigating a disease or condition with high prevalence such as lung and breast cancer. This difficulty also applies to the hyperactive children investigated by Dr. Milham. The CDC developed specific guidelines (Centers for Disease Control and Prevention 2013) to address the challenges of cancer

electricity that gets into your house through the ground rod, wires or conductive pipes. Your neighbor's dirty electricity can make you just as sick as your own.

Dirty electricity was identified by Prof. Martin Graham and Dave Stetzer while studying "stray voltage" in the earth and its effect on dairy cattle. Their work shows that as little as 10 mV peak to peak of dirty electricity effects cow milk production and health.

As I drove around the Coachella California valley towns listening to an AM radio station, I noted serious interference driving through the I-10 wind farm and along 50th street in La Quinta between Jefferson Street and Washington. This is where the La Quinta Middle school is located. I measured the dirty electricity in the air and in 40 feet of wire between two screw drivers stuck into the sand near the substation fence at the I- 10 wind farm. I've measured two other wind farms in San Diego county California. One is at Ocotillo, and the other is the Campo wind farm near Boulevard on interstate 8. I visited the Ocotillo wind farm on a still day, so I'll go back when it's blowing,

The Campo turbines are adjacent to the Manzanita reservation which I studied. The entire reservation is heavily polluted with dirty electricity in the air in the ground and in the wiring. Many of the residents are ill. Wind turbine blades also generate low frequency sound which makes people ill. Dr. Nina Pierpont has written a book about it called "Wind Turbine Syndrome".

Dave Stetzer in Wisconsin and Dave Colling in Ontario Canada, have done a lot of work with dairy farmers whose cows get sick because of wind turbines or solar collectors many miles away, injecting enough dirty electricity into the grid and the earth to make cows sick. I have personally interviewed a woman whose family was forced to leave their Canadian home to escape illnesses caused by wind turbines.

I've measured a number of homes and businesses in southern California with photo voltaic systems. I have also been able to measure an inverter and the switchgear room at a 23 megawatt photovoltaic solar generating plant. All are seriously polluted with dirty electricity. In a typical house with roof top solar

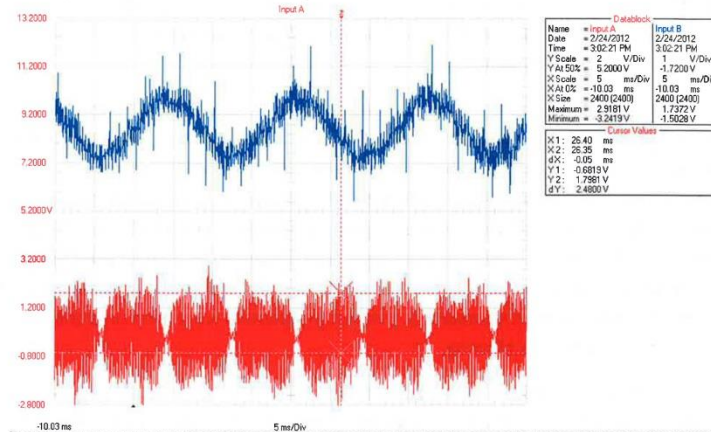
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cluster investigation, thereby emphasizing reasons for a large degree of skepticism about an succeeding with an eventual proof of causation when considering a suspected cancer cluster .

The commenter provides a brief synopsis of the methods he used to obtain evidence for poor power quality. Measurements obtained from a length of wire coupling to the electric field and connected to the high impedance input of an oscillograph can provide a different picture from what would be seen with an instrument-grade antenna that would obtain calibrated data. Second, currents within body tissues have a complex relationship to external EMFs that depend on frequency and tissue properties. Use of a simple antenna and oscilloscope can, as described here, identify the existence of electrical noise, but the technique used could not determine field strengths in units useful to others. Moreover, the magnitude of currents within a human body cannot be determined from measurements with simple uncalibrated instruments.

In contrast to electric field measurements with an antenna, an instrument-grade current transformer, such as frequently used in the power industry, would be needed to measure power quality of the current waveform. Power quality of the current waveform data is preferable to electric field data with an antenna as they give more readily repeatable measurements that can be attributed to a source. Similarly, determinations of

collectors, during the day the dirty electricity in the wiring will measure 600 dirty electricity units or above. When the inverter is turned off, the dirty electricity measures less than 50 units. Here is what is in house wiring in a house with rooftop solar as seen in oscilloscope wave forms.:



Solar array 49-810 Rancho Santa Fe La Quinta CA Blue = antenna in air
Red = high pass filter, dirty electricity no filter DE = 620 G/S units
20 KHz

The top line is a corrupted sine wave, and the bottom line is the signature of solar arrays in the dirty electricity which passes through a high pass filter. If this wave form is enlarged, it allows measurement of the distance between peaks, for

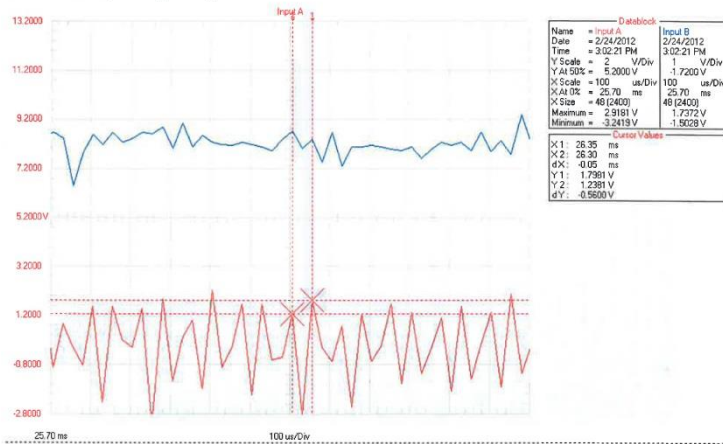
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ground current using screwdrivers as probes and long leads that apparently are unshielded could be indicative of non-sinusoidal components of the ground current, but are of little or no usefulness as a measure power quality in absolute or relative terms. As for the other methods, an AM radio can readily detect weak signals in a range around 1 MHz, but doesn't give information interpretable for a potential risk assessment.

The figures for "Solar array 49-810 Rancho Santa Fe La Quinta CA" illustrate the presence of electrical noise on the mains power, but as in other data shown here, do not give adequate quantitative information to assess field strengths and exposures to human beings.

The commenter also states that "dirty electricity gets into your body by contact with the earth or from 'dirty electricity' that gets into your house through the ground rod, wires or conductive pipes. Your neighbor's 'dirty electricity' can make you just as sick as your own." The assertion about illness has no basis in established biomedical science and public health. They are at this time idiosyncratic beliefs held by a few. The overwhelming majority of the scientific literature on EMF health effects does not concern or support a role for poor power quality as a cause of adverse health (see Appendix 9.0-1 of the DPEIR).

calculation of frequency :



Solar array 49-810 Rancho Santa Fe La Quinta CA Blue = antenna in air
Red = high pass filter, dirty electricity no filter DE = 620 G/S units
20 KHz

Notice that the distance between the peaks is the same in the wiring as in air, and is 0.05 microseconds between peaks in the cursor values data block. This calculates to 20,000 Hz or 20 KHz. Here is what a solar harmonic spectrum looks

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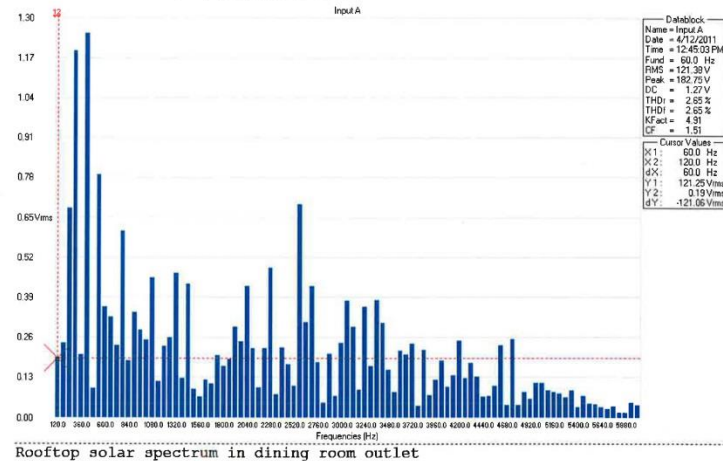
References

Centers for Disease Control and Prevention (CDC). 2013. *Investigation Suspected Cancer Clusters and Responding to Community Concerns: Guidelines from CDC and the Council of State and Territorial Epidemiologists*. September 27, 2013.

Morgenstern, Hal. 1995. *Ecological Studies in Epidemiology: Concepts, Principles, and Methods*. Annual Review of Public Health, Volume 16 (pp. 61-81). Publication date May 1995.

National Cancer Institute. 2014. Cancer Clusters Fact Sheet. <http://www.cancer.gov/cancertopics/factsheet/Risk/clusters>. Accessed December 5, 2014.

like. There should only be a bar at 60 Hz.



At a new solar generating plant in Borrego Springs, I've been able to find the solar dirty electricity signal in the air at the plant and in the ground wire from a pole-mounted transformer miles away. I've been able to identify a characteristic photovoltaic solar wave form on the oscilloscope, and most of the pollution in these many different places has a frequency of 20 KHz.

An important unrecognized problem with these systems is that they accelerate metallic corrosion. The dirty electricity in the ground takes the path of least electrical resistance to the substation. Pipelines in power corridors are at high risk of accelerated corrosion. My colleague Dave Stetzer diagnosed a serious corrosion problem at a Wisconsin Trane factory. The company solved this problem by having the utility build a new dedicated substation for the factory. Dave has also solved this type of problem by putting a non-conductive spacer in the conductive pipes so the dirty ground currents can't get into the building. Hardly a week goes by without an E-mail about a solar or wind related illness.

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Unfortunately the California desert is being paved over with solar generators and the mountains are being sprinkled with wind turbines. The Bureau of Indian Affairs (BIA) and the Bureau of Land Management are selling large swaths of reservation and public lands to out-of-state and foreign groups using US American Recovery and Reinvestment Act money. Once the things are built, there are few long- term jobs, The land is ruined, the locals are being made ill, and the electricity generated is very dirty. The Manzanita tribe I worked with has so much illness being caused by the Campo wind farm that they are considering giving up their ancestral homeland. The only good news is that there is a new thermal tower solar technology which melts salt to store the heat for night-time use. A plant near Blythe will go on line soon. Very recently it has been reported that this technology burns birds in flight. I've written a book called <i>Dirty Electricity</i> available from Barnes and Noble and Amazon which tells the story in greater detail. My website: www.sammilham.com , chronicles my work.	↑ 168-3 Cont. ↓
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