Comment Set G0014, cont.
California Botanical Habitat

Appendix D, High power lines and fire ignition: wind, smoke and grounding issues

G0014-25

1. Throughout Southern California on the night of October 21-22, 2007 winds were measured in excess of 110 miles per hour, accounting for a major portion of the 2000 homes burned by 3 of over 350 fires started each year by power lines in California, a clear and well documented engineering failure of overhead high power lines cited by county supervisors and requiring underground cable installation. This source has been only partially addressed by continuous and costly efforts involving trimming, cutting and removing trees under high power lines. SDG&E released a statement regarding the over $2 billion in fire damages and 5 deaths identified with recent power line fire ignitions: "In extreme weather conditions... power lines can serve as an ignition source.... No electric system can be completely protected from such severe weather." So far we don't know of any fires initiated by underground power lines buried under 5 feet of decomposed granite and covered by concrete, which is a simple engineering solution which has been successfully used in the U.S. since 1881. So why would overhead AC power line failures be called "An act of God", in order to avoid responsibilities, particularly when the engineering solutions cost less to implement?

http://www.ucan.org/energy/electricity/sunrise_powerlink/news_8_investigation_sdg_e_could_be_liable_for_power_line_wildfires

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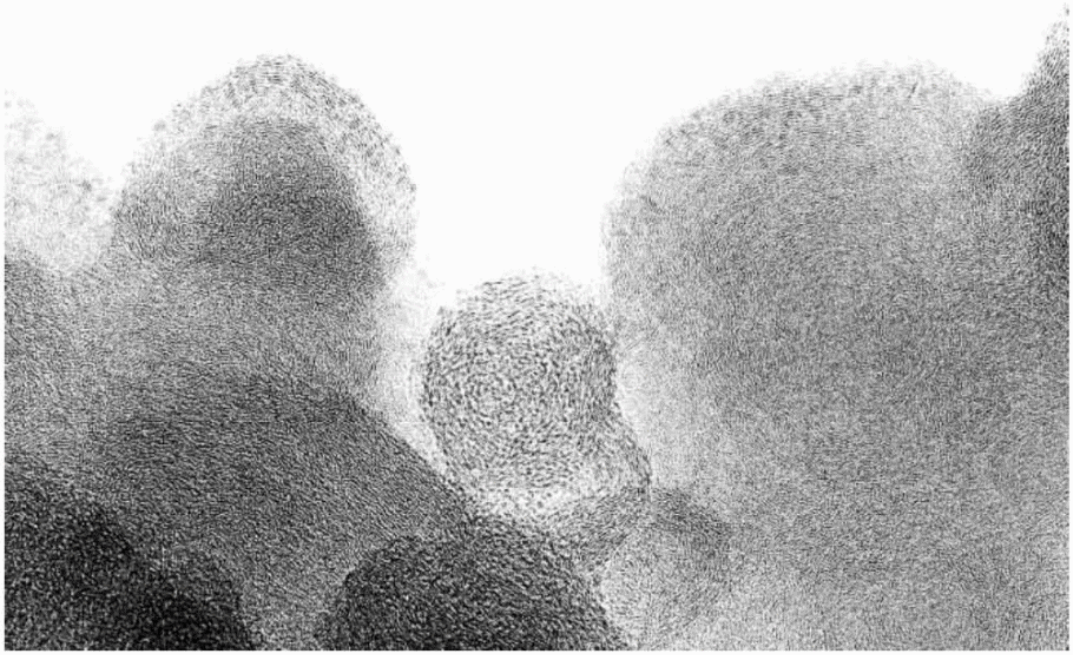
Comment Set G0014, cont.
California Botanical Habitat

2. Smoke and high voltage carbon arcing has been identified as accelerating wildfires when overhead power lines emit high voltage "lightning bolts" from hanging aluminum cables through smoke's carbon particulates, igniting the chaparral landscape below, creating new fire sources that cannot be safely extinguished thru air drops of water and fire retardant. This source of fire ignition requires that overhead power lines be shut-down during fires which can defeat water district pumps required to defend homes, as well as encouraging massive clearings of wilderness habitat that will not inhibit fires, since even the invasive grasses that grow after the habitat is destroyed, also rapidly spreads wildfires.
http://www.savebouquetcanyon.com/transguide.pdf

G0014-25 cont.



High Resolution Transmission Electron Micrograph of Carbon Black prior to graphitization

Carbon black called acetylene black is commonly used as an electrically conductive additive in batteries. Active carbons are typically granular carbons that are produced by carbonizing materials such as wood or charcoal. http://electrochem.cwru.edu/ed/encycl/art-c01-carbon.htm

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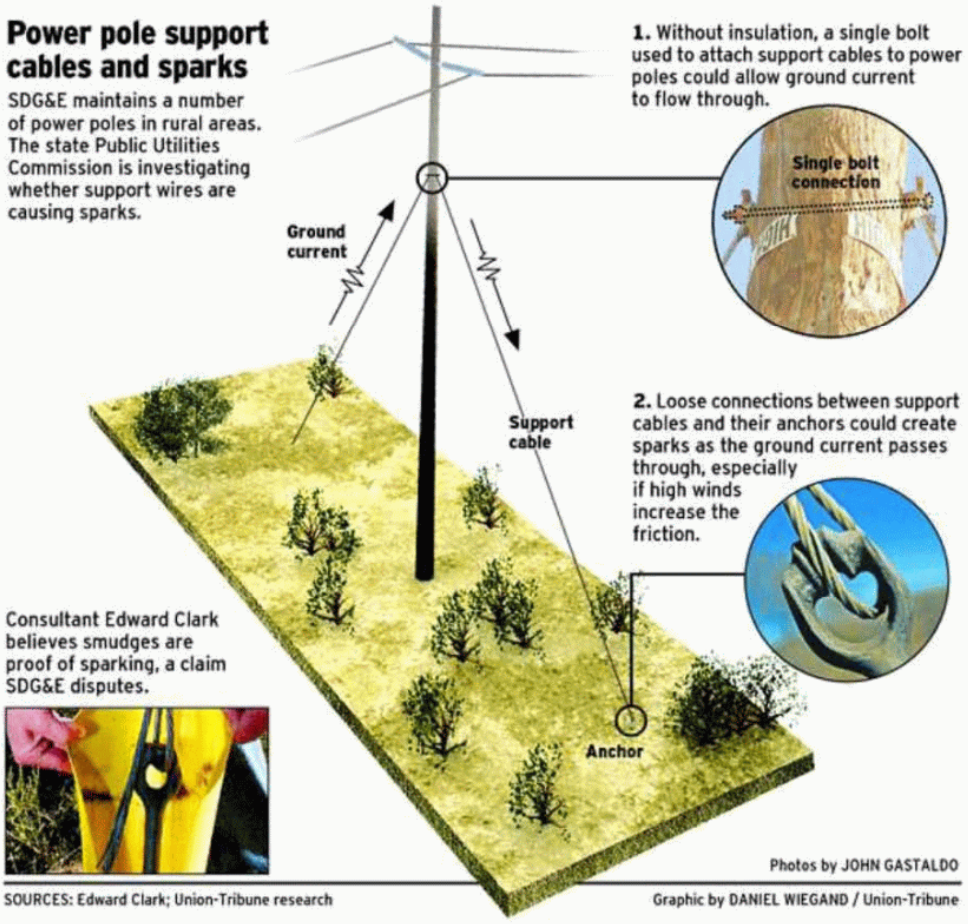
Comment Set G0014, cont.
California Botanical Habitat

3. Grounding cables that help support power poles can conduct electricity, and when the cable attachment loops loosen or shift under windy conditions sparks can be emitted. These conditions were identified when electrical engineers examined blackened cable to ground anchor rods and blackened patches on two transmission lines (#637 outside Ramona CA and #682 on the La Jolla Reservation) after the October-November 2007 fires in San Diego County.
http://www.signonsandiego.com/news/metro/20080210-9999-1n10sdge.html#

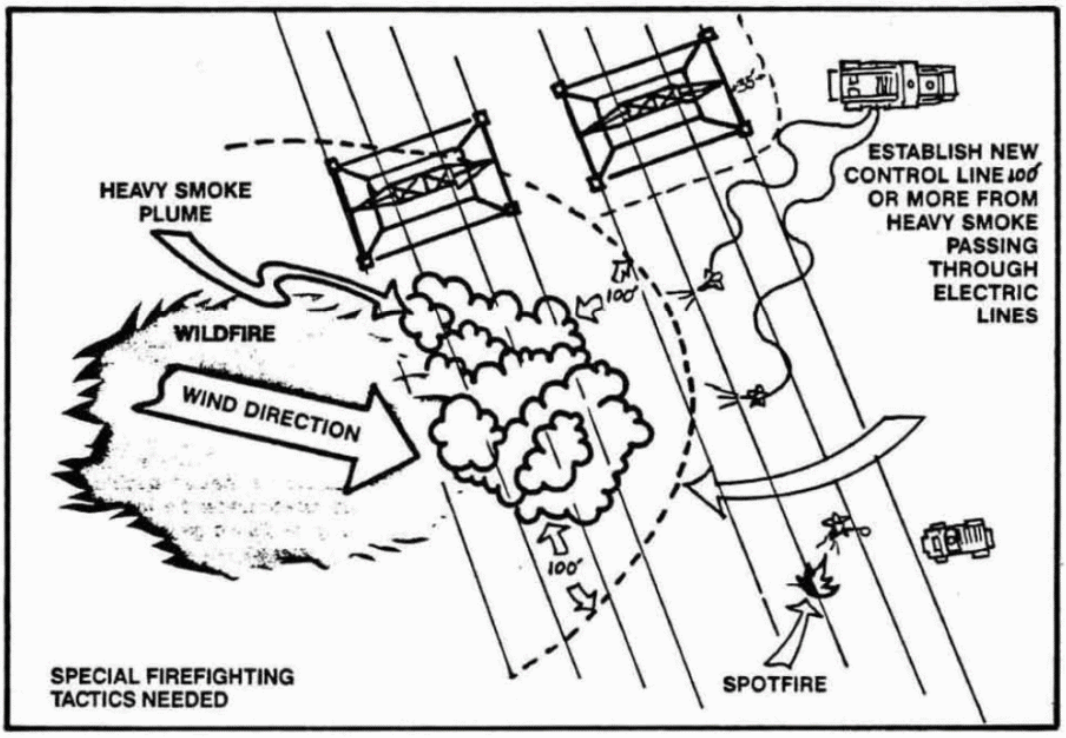
G0014-25 cont.



Comment Set G0014, cont.
California Botanical Habitat

4. Short circuits: The Electric Power Research Institute, an industry think tank, hasn't fully examined the problem of fires sparked by transmission and distribution lines. "We don't look at fires per se," said Richard Lordan, an EPRI director. Instead, the institute seeks to improve reliability and avoid short-circuits, which can also cause fires.
http://www.ucan.org/energy/electricity/there_was_a_plan_to_prevent_the_fires_ca used_by_power_lines_but_it_wasnt_used

G0014-25 cont.



Wildfire Fighting Near High Voltage Electric Transmission Lines

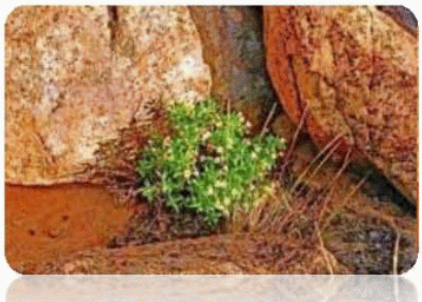
(Addressing smoke or carbon as a high voltage conductor and risks to firefighters)

http://www.savebouquetcanyon.com/transguide.pdf

Comment Set G0014, cont.
California Botanical Habitat

Appendix E, Damage and loss agreement

G0014-26



SDGE Access Agreement

Provision for access to the specified CBH parcels is herein provided to SDGE as requested during any month between March and September 2008, with a representative of CBH being present, without conflicting with schedules of either party and without causing any unnecessary damages, destruction of plants or geological structures, bulldozing, road building, nor allowing for off-road access, while reimbursing all labor, damages and expenses to CBH.

If damages, work, expenses or losses occur as a result of planning, engineering, work on or uses of any power line, designed, built, maintained or used by or for San Diego Gas and Electric, Sempra Energy, related or descendant firms, then said firm or companies (all herein identified as SDGE) agree to pay for all damages, labor, expenses and losses sustained by California Botanical Habitat, its participants and descendants on any of its parcels (all herein identified as CBH), including all labor, materials, legal, injury, medical, rental, travel and other expenses enumerated and provided, including equivalent site replacement costs, the full restoration of habitat, geology and facilities, with labor at rates submitted at not less than typically paid for commercial engineering and attorney legal services for tasks performed from the time they were initiated or provided.

If power lines, excavation or pylons are installed across or impact CBH property which interferes with or impedes the continuation and development of the reserve, physically, visually or environmentally, or provide EMF levels greater than 2 mG, then SDGE shall provide for the full replacement of the anthropological reserve, based on and including the research, values and purposes of CBH, including the provision and payment of the full and complete replacement of the paleoanthropological reserve. Essential values of the CBH Anthropological Reserve include the site's natural monuments and its geology, the native plant and animal species, its paleontology and research resources, its recreational and camping capabilities, highway and urban access, its viewshed, the absence of physical impediments or medical risks including overhead high voltage power lines, sustainable energy resources and its wilderness setting adjacent to large scale protected lands, in addition to existing and planned facilities.

Comment Set G0014, cont.
California Botanical Habitat

Regarding damages and loss of life of a CBH participant, SDGE agrees to not inflict any health or life threatening acts through its work or energized power lines and pay CBH for all losses and damages impacting the uses of the conservancy, including all parcels, at not less then $50 per square foot, including losses of life at the equivalent of not less than eighty thousands hours of labor, at not less than four hundred dollars per hour plus all related expenses, all adjusted for inflation, with interest on any unpaid balances starting at the time of expenditure or loss and continuing without any further notification or legal action until paid in full with interest compounded, and accumulating from year to year, at one percent per month above the rate of inflation, all secured by real property, facilities and assets of SDGE.

G0014-26 cont.

The initiation of any work or damages, including survey, excavation, construction, operation or maintenance shall also constitute the full acknowledgement and acceptance of the terms of these requirements contained herein, by SDGE, with or without this signed and notarized document, provided by certified or registered mail. Further, SDGE shall provide for the presence of a CBH representative and notification to CBH 31 days prior to any site or work visit, as well as allow CBH to provide open and public disclosure of all power and project related findings and work in standard reproducible digital form, not excluding pictures or video documentation and public presentations of all related activities. Complete copies of this document will include and reference the full contents of this letter, including photographs reproduced in color, with the notarized document provided to CBH prior to site work or entry. Each person or entity entering the property is required to fully provide for their own safety, liability and medical insurance.

Dated: _____ SDGE signature:

_____

State of California | s.s.

County of San Diego

On _____ before me, _____
(name and title of the officer), personally appeared: _____,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct. WITNESS my hand and official seal.

Signature of Notary: _____

(Notary Seal:)

Comment Set G0014, cont.
California Botanical Habitat

Sunrise Powerlink A.06-08-010 Comments on environmental draft EIR/EIS of Jan. 3, 2008, by C.B.H., February 26, 2008

G0014-26 cont.

Protecting San Diego County Wilderness through Underground Power Lines (Part 2)

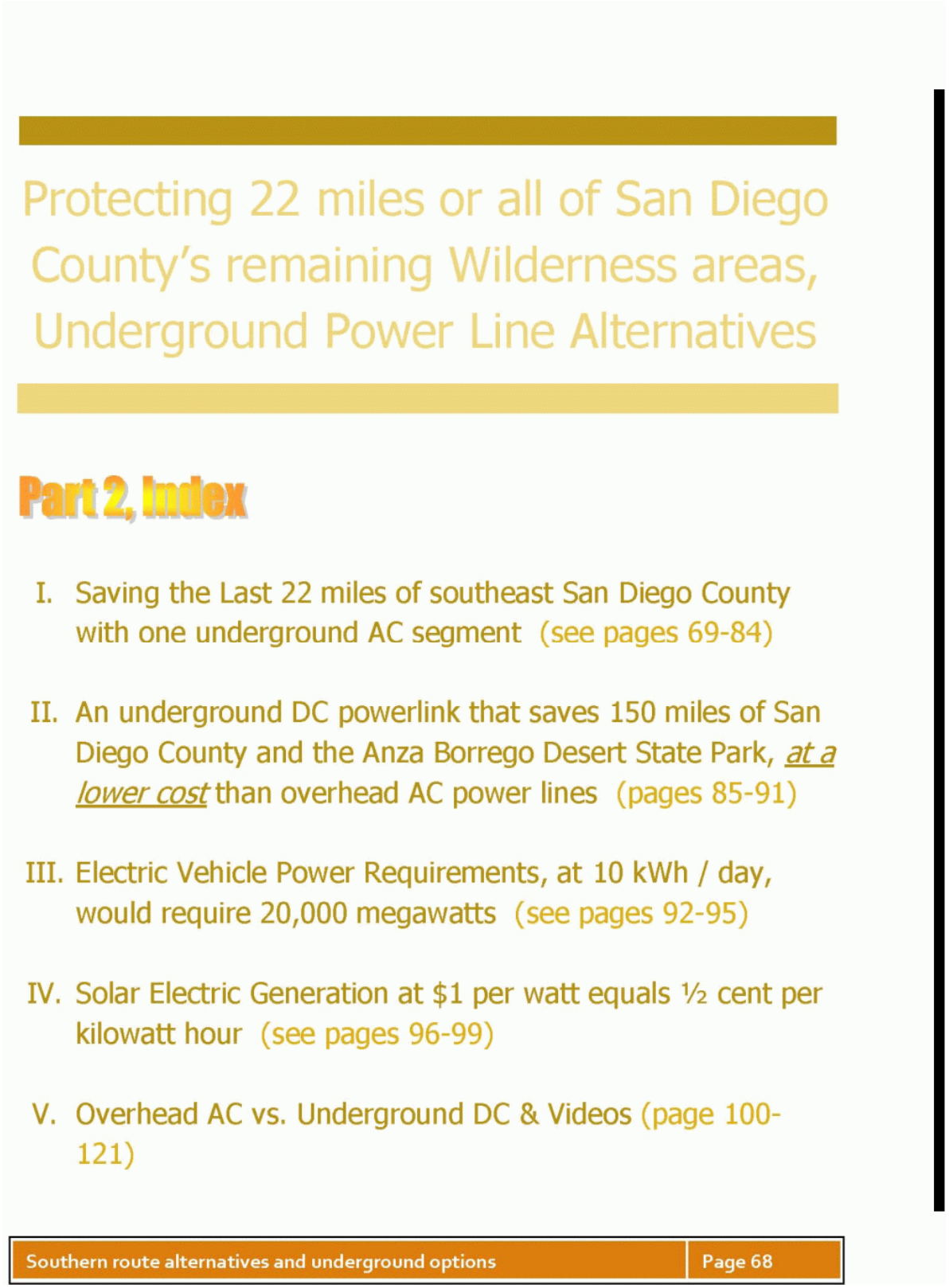
Bankhead Springs California, 3220 feet elevation, overlooking Interstate 8 west

Anthropological Nature Reserve, Research Center and Campgrounds. Proposed location for 160 foot high pylons to carry 500,000 volt power lines, in spite of the fact that underground power line alternatives are available that cost less to install than the high-impact, environmentally destructive overhead high-power lines being proposed, and the over 700 roads and clearings that would be bulldozed through this wilderness along the entire 150 mile route to establish maintenance routes. The damages to this exceptional wilderness could never be restored.

Southern route alternatives and underground options | Page 67

Comment Set G0014, cont.
California Botanical Habitat

G0014-26 cont.



Comment Set G0014, cont.
California Botanical Habitat

I. Saving the Last 22 miles of southeast San Diego County with one underground AC segment

While an underground DC power line for the entire 150 mile length of Sunrise Powerlink could provide extraordinarily lower environmental impacts at a considerably lower overall cost, as well as allow for triple the capacity of the Powerlink, nevertheless if the southern route, which apparently has not been environmentally reviewed, is an option then just one underground AC segment spanning the last 22 miles of San Diego County could protect the towns of Jacumba, Bankhead Springs, Boulevard, Manzanita, Tierra Del Sol, Live Oak Springs and Campo, in addition to the Campo and La Posta Reservations, the BLM's McCain Valley, the Anza Borrego Desert State Park, Cleveland National Forest, and the Anthropological Reserve; all of which would be otherwise seriously damaged, made uninhabitable, bisected and permanently degraded by huge pylons supporting an array of hot sagging 500,000 volt overhead power lines.

Fortunately, there is an alternative to the more costly overhead AC power lines which provides for greater efficiency and safety, lower maintenance and installation costs, along with inflicting negligible environmental damages and no permanent losses to any businesses, communities or property along the entire 150 mile route, all of which can save well over $20 billion dollars in damages for short term losses. The underground DC power line alternative has been proven in over 50 major projects worldwide, and with economic savings that can provide for considerably lower cost installations, by placing 2 six-inch diameter cables underground in one continuously excavated trench that is 1 foot wide and 5 feet in depth. Underground DC offers extraordinary environmental, medical and property protection advantages, all at a lower cost than overhead AC power lines. (See underground DC details in section II, pages 81-86.)

Southern route alternatives and underground options | Page 69

G0014-26 cont.

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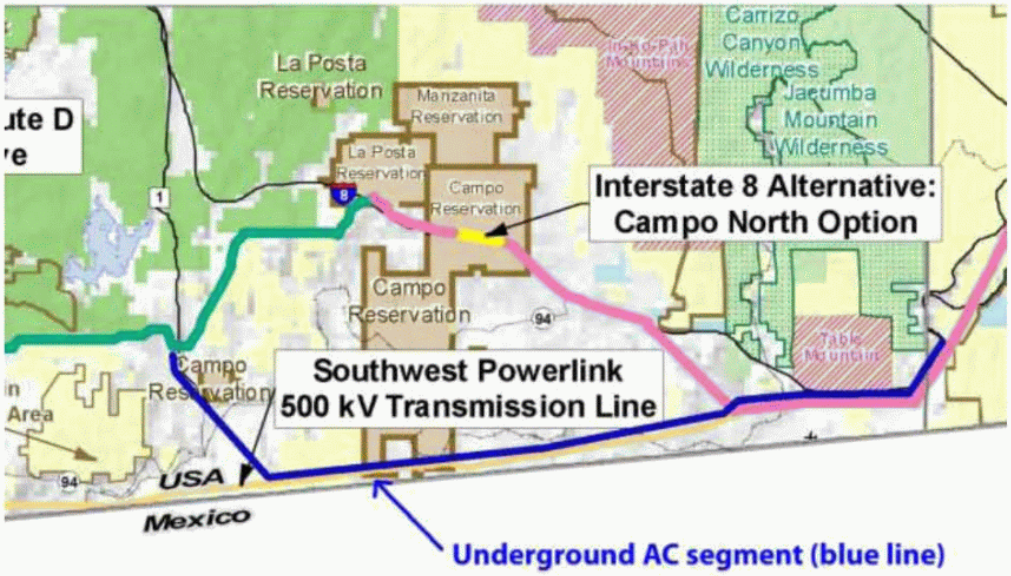
California Botanical Habitat



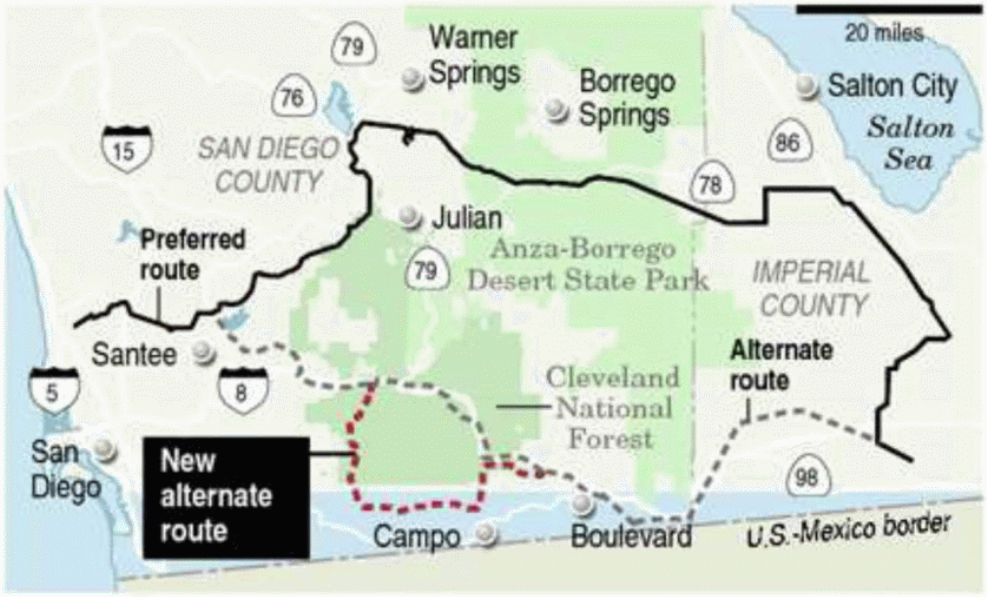
A) Southeast San Diego County 22 mile Underground AC power line Route

This direct underground AC route could protect 7 towns, 2 reservations and 5 wilderness preserves, along with approximately 20,000 acres of homes, business and wilderness recreation areas within the last 22 miles of San Diego County. This underground segment would begin east of San Diego County's eastern border, then extend west 22 miles and connect to the Modified Route D (shown in green at the left side of the map) and continue to extend westerly on overhead AC lines. This route could minimize EMF exposures to regular highway traffic by avoiding excavation under or along any highways, as well as provide a completely fireproof underground route that eliminates wildfire threats, along with minimizing all categories of threat, and almost all security requirements over a significant portion of eastern San Diego County. Further, underground high power lines have been both encouraged and financially supported by Homeland Security funds, that apparently have not been requested by SDG&E.

Southern route alternatives and underground options | Page 70

G0014-26 cont.

Comment Set G0014, cont.
California Botanical Habitat



SOURCE: California Public Utilities Commission UNION-TRIBUNE

The 22 miles between the Imperial County line to a connection northwest of Campo, or the New Modified Route D Route, could be maintained as underground AC, protecting communities and habitat between Jacumba and Campo, including Bankhead Springs and Boulevard, as well as wilderness and paleontological sites. However underground DC could protect the entire 150 miles of the route, as well as provide 3 to 5 times the capacity, all at a far lower cost, without the massive environmental and property damages that would otherwise occur with overhead AC power lines.

http://www.signonsandiego.com/news/metro/20070522-9999-1m22route.html#name

The image on the following page is an aerial photo (rotated 90 degrees, north is left). The proposed underground AC power line route is shown in red, which extends from a point east of the San Diego County line, westerly past Campo California to connect to the Modified Route D overhead AC power lines, naturally allowing for route variants to avoid private property and keep excavation primarily under existing unpaved roadways and within existing utility right of ways.

G0014-26 cont.

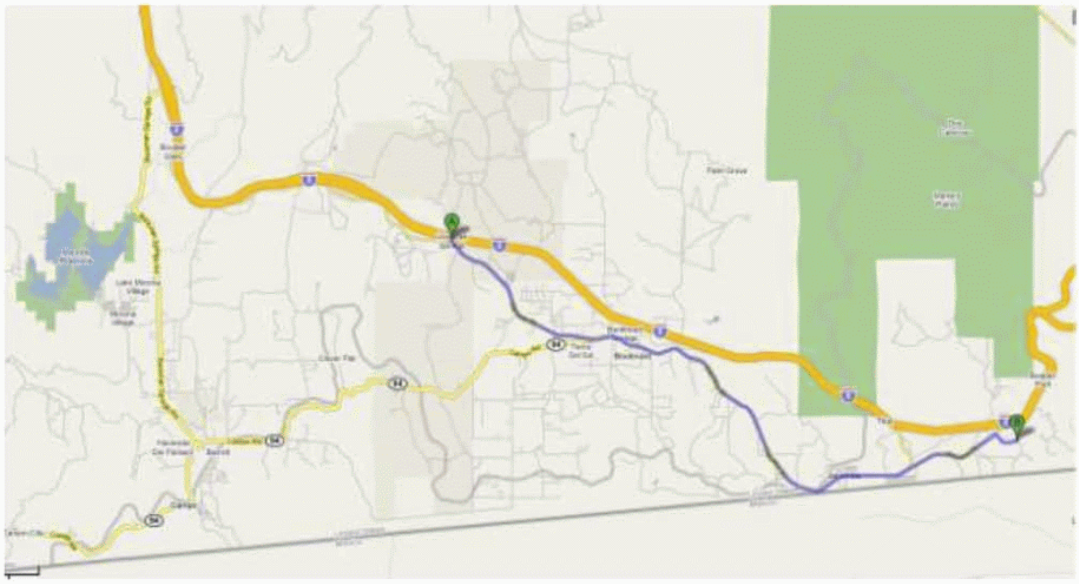
Southern route alternatives and underground options	Page 71

Comment Set G0014, cont.
California Botanical Habitat

G0014-26 cont.

Southern route alternatives and underground options | Page 72

Comment Set G0014, cont.
California Botanical Habitat



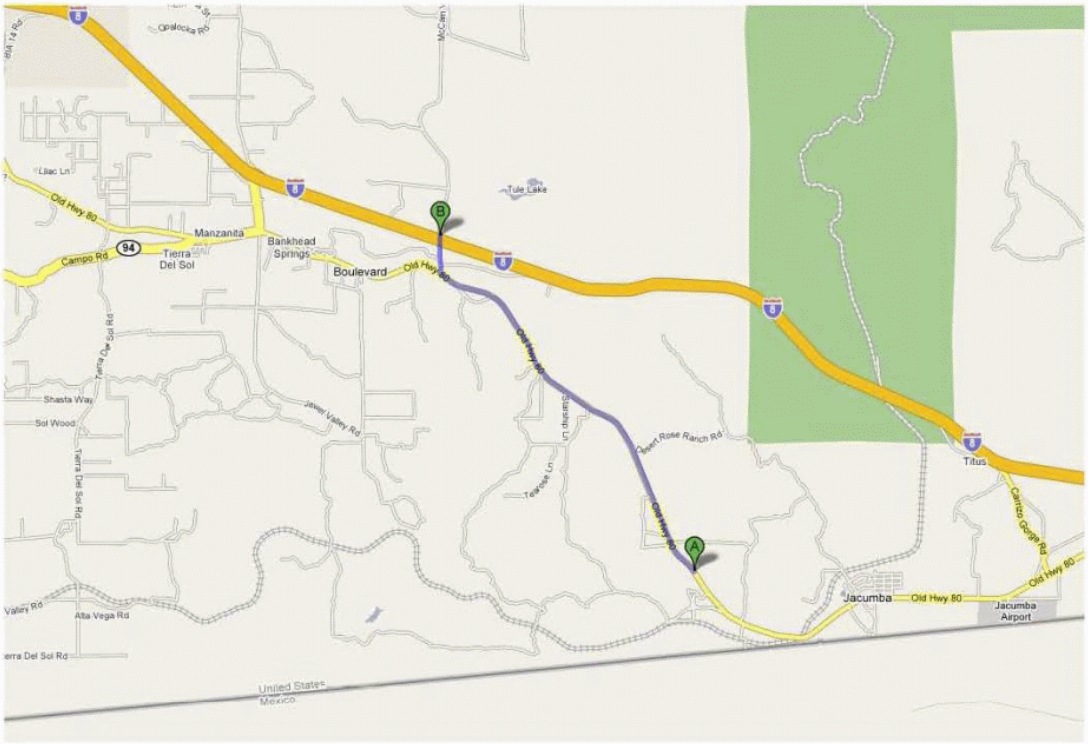
G0014-26 cont.

B) Southeast San Diego County 18 mile Underground Route Alternative 2, and related problems, (not recommended, although preferable to overhead power lines)

Map of an underground AC power line (shown as a blue line between points A and B) beneath Old Highway 80, beginning at the San Diego County line and ending at Interstate 8 northwest of the Campo Acorn Casino. Unfortunately this 18 mile route would provide a potent EMF discharge to anyone driving on this section of Old Highway 80. Further the northwesterly direction and windiness of Old Highway 80 make this an inefficient route, providing inadequate or incomplete protection for the region compared to the prior described, more southerly route, which runs in more of a straight line form the county line westerly past Campo California. This route would no doubt cost more than option/plan A, however with greater highway construction difficulties and EMF health related impacts to vehicular traffic.

Southern route alternatives and underground options | Page 73

Comment Set G0014, cont.
California Botanical Habitat



C) Southeast San Diego County 4.3 mile Underground Route Alternative 3, and related problems, (not recommended, although preferable to overhead power lines)

Map of a limited 4.3 mile underground AC power line (shown as a blue line between points A and B) starting at the point where existing high power lines cross Old Highway 80 west of Jacumba, then northerly under Old Highway 80 to McCain Valley Road north and under Interstate 8 to overhead power lines to desecrate the beautiful McCain Valley BLM property as shown in the picture below. While this short underground AC segment would afford some protection for the anthropological preserve and many ranches and homes in Bankhead Springs, between Jacumba and Boulevard, still a great deal of exposure and destructive impact would remain for the region, along with high EMF levels under Old Highway 80. Consequently the first and more direct route between the county-line to a point northwest of Campo could provide considerably more protection for the region.

Southern route alternatives and underground options | Page 74

G0014-26 cont.

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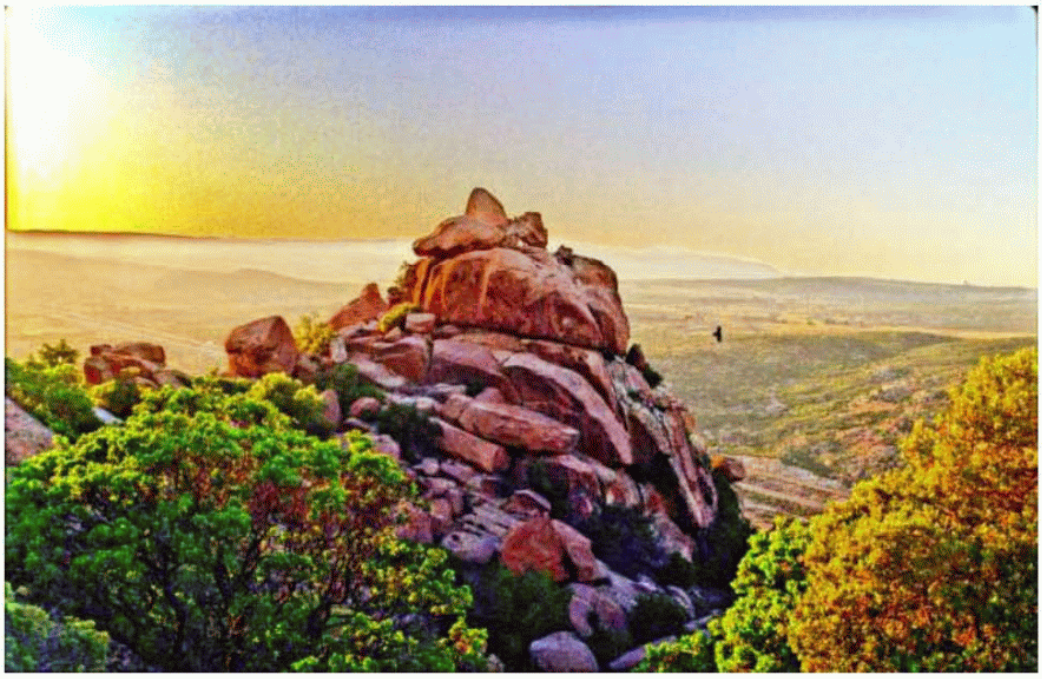
California Botanical Habitat

EMF Notification

If AC cables are placed under highways with EMF levels greater than 2 milligauss (mG), then warning signs indicating the EMF levels and health implications relative to developmental and carcinogenic effects need to be posted at the beginning and end of those cable segments, so that travelers at risk to damages including pregnant women, children, older individuals or anyone with a family history of cancer can avoid those roads. Naturally, overhead power lines should be provided the same consideration.

G0014-26 cont.



Anthropological Nature Reserve, Research Center and Campgrounds, overlooking the BLM's McCain Valley, each targeted for the destructive impacts of 500,000 volt high-power lines on numerous 170 foot tall pylons, which would end the protection and uses of the nature reserve, in spite of the fact that lower cost, environmentally benign alternatives are available, that have not been offered any consideration. Under what legal principles is it possible that reservations are afforded protection from destructive impacts but nowhere else?

Southern route alternatives and underground options | Page 75

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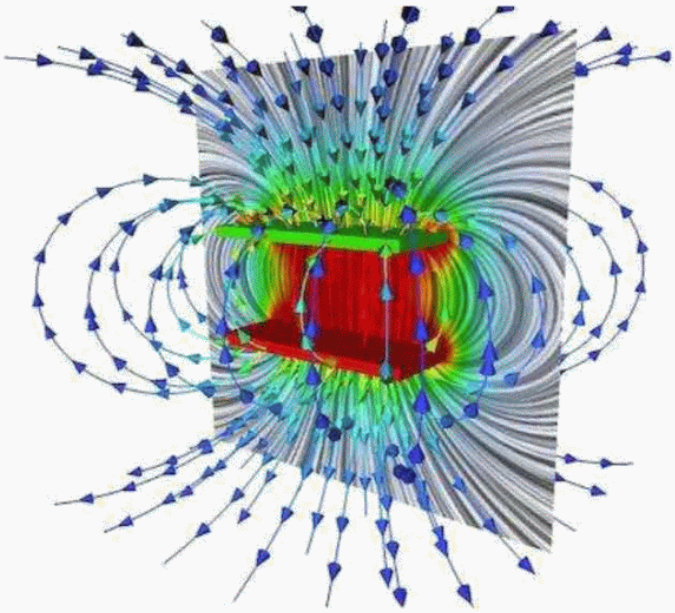
California Botanical Habitat

EMF and risks



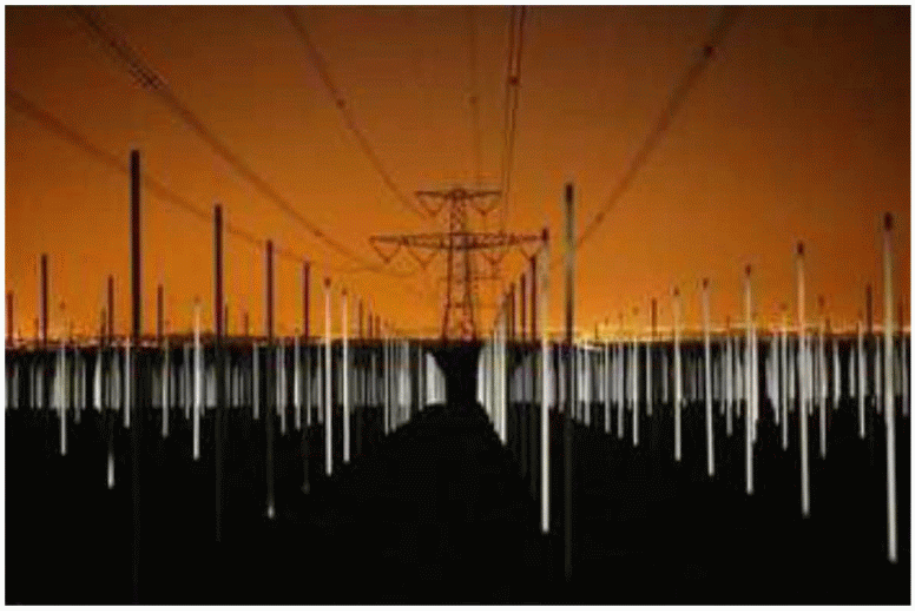
Electro Magnetic Fields have been used in medicine for over 25 years to align the nucleus of the hydrogen atoms throughout our bodies, so that they will be energized and act as trillions of radio frequency transmitters so that the interior of our bodies can be observed without surgery. However, these electro-magnetic fields are typically delivered to a specific region of our body for just a few thousandths of a second, and all the nuclei of the atoms in our cells will continue to measurably ring for up to 2 seconds. Our molecular structures respond to the effects of electro-magnetic fields or EMF, which does influence our intracellular processes, including regulation, growth, repair and replication, as well as carcinogenic activation. However, since nearly everybody has been exposed to EMF it becomes impossible to find a local population that would be the control group in any study, which has not already been exposed to EMF. Naturally the electrical industry uses this as an argument to declare that damages resulting from EMF exposure cannot be conclusive; much as the tobacco industry had done for over a century. Nevertheless, medical scientists in Europe, in large studies have determined that Leukemia rates in children can increase by 70% by simply residing in a home which is a little closer to ordinary power lines. Extra high power lines such as the proposed Sunrise Powerlink can provide hundreds of times greater impact, however it may take a politically influenced organizations perhaps another century to consider the details of the currently available medical studies. From the perspective of history the loss of thousands or millions of lives is not particularly relevant when economic issues are being considered.

G0014-26 cont.

Comment Set G0014, cont.
California Botanical Habitat

Large scale underground DC power line installations, which do not radiate EMF in France, Australia and Sweden indicates that the difference in cost between installing underground DC and overhead AC, can be considerably less costly for underground DC technology. If environmental damages, cancer deaths, business and property losses were included as a part of the cost of evaluating overhead AC high-power lines, then a project such as the Sunrise Powerlink could immediately save at least $6 billion by implementing underground DC power lines instead of AC, and the short to medium term savings could easily exceed $20 billion. But apparently such massive losses have never been experienced by the installer, because the damages are passed on to the people through eminent domain or increased rates, typically as a result of being kept uninformed or sabotaged by extremely costly and overly complex judicial procedures, while politically influenced agencies have the option of avoiding consideration of any issues critical to the environment, health or the economic survival of a region. Any adversarial process that perpetuates misunderstandings or damages is a comparatively new and untested economic theory that can inflict massive and unrecoverable damages to any region, which has been thoroughly researched by historians and archeologists, unfortunately with little effect on our review or decision making process, or any help in avoiding needless damages, nor resolving any interest in providing for full restitution, or even calculating the full extent of the damages being proposed.

G0014-26 cont.

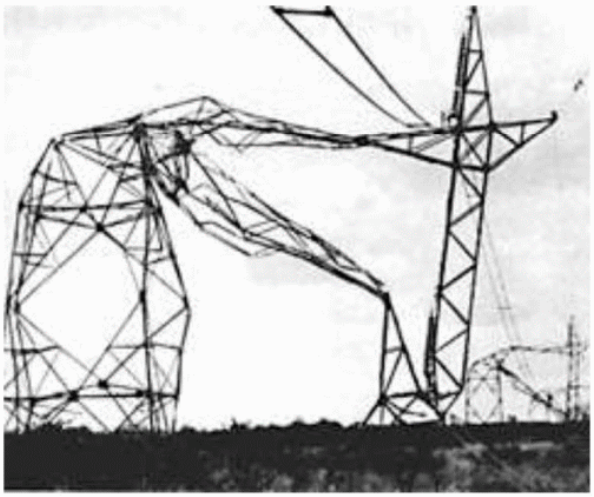


Hundreds of vertical fluorescent lights are electrified and illuminated, by proximity to overhead power lines, due to large losses, in excess of 6% of all power generated during transmission

Comment Set G0014, cont.
California Botanical Habitat

The small increase in hardware cost needed for underground DC has frequently been exaggerated by several hundred percent in order to discredit this option. However using underground DC has several other installation advantages, such as a significant increase in transmission efficiency which can more than cover any cost difference between overhead AC and underground DC power lines, along with providing 300% greater transmission capacity, by eliminating the need to replicate the Sunrise Powerlink every few years, particularly since plug-in hybrid vehicles have a long term potential of requiring over 20 additional 1000 megawatt Sunrise Power links during the next few decades. Apparently, cost, safety or environmental advantages of underground DC that can deliver billions in savings and improve profits for Sempra Energy have not been reviewed or Sempra simply insists on inflicting needless and massive damages to the people of California. If we can't review the undisclosed intentions that are determined to inflict needless environmental damages at even greater cost to SDG&E, then there may be little hope of ever obtaining any beneficial or a cost effective result.

G0014-26 cont.



Wind damages above. Hot sagging cables on pylons increase community dangers, accidents, fires, power outages, environmental, business, medical and insurance losses. What are the benefits? They cost more to erect and maintain than to dig a 1 foot by 5 feet deep trench with two cables. During the night of October 21-22, 2007 wind velocities in excess of 110 MPH were recorded in many parts of Southern California.

- So, why would consideration of local solar or underground DC alternatives be avoided, unless it was predetermined that avoidance of environmental damages, cancer deaths and property loss was of no interest and exempt of liability?

Southern route alternatives and underground options	Page 78

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California Botanical Habitat

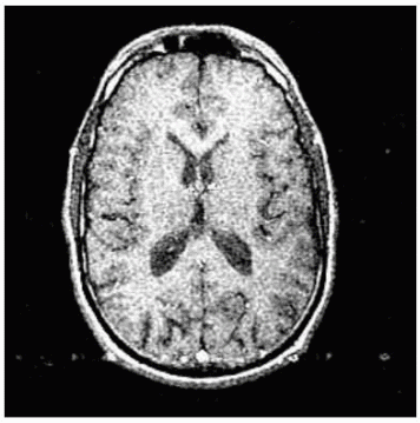
- If that is the position, which is clearly being repeatedly demonstrated, then what is the engineering, economic or legal alternative to perpetuating intentional damages? Does it cost more or less, and if it cost less to avoid damages then why would a beneficial approach be avoided?

- What justification is there for any applicant to assert or deny almost all environmental, property, business and medical damages along a 150 mile route, as well as assert an almost complete disregard for well over $20 billion in personal, business and real estate losses that thousands of others could incur, all without providing for the full restitution of all their losses, including the full and complete replacement of all property, environmental damages and economic losses proposed and inflicted?

- What sort of review would avoid assigning responsibility or an economic evaluation of the losses, or worse encourage massive and needless personal and economic damages, as well as allow for irreplaceable environmental losses, as if it were a right?

G0014-26 cont.

Magnetic Resonance of Atomic Nuclei



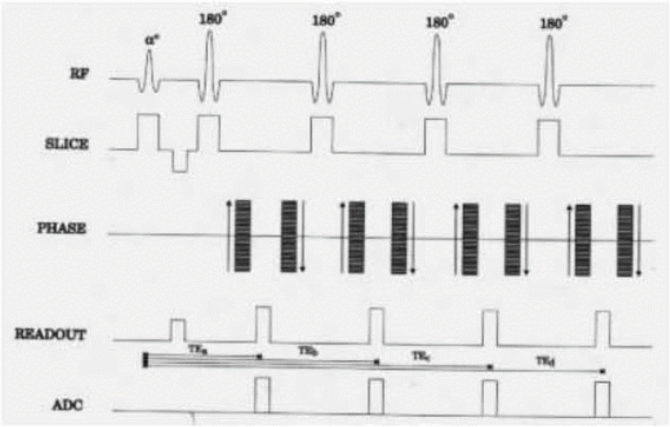
20 millisecond electro-magnetic image of the brain

The basic phenomenon of nuclear magnetic resonance has been known since the 1940s (Le Bihan, 1995), and MRI has been developed over the last 30 years (Cohen & Bookheimer, 1994). Magnetic resonance can be adequately understood in terms of electromagnetic theory, as follows. All atomic nuclei spin on their axes; nuclei have a positive electronic charge; and any spinning charged particle will act as a magnet with north and south poles located on the axis of spin. In magnetic resonance studies, an

Comment Set G0014, cont.
California Botanical Habitat

object is put in a strong, externally-imposed magnetic field ("main magnetic field"); the spin-axes of all the nuclei in the object line up with the field, with the north poles of the nuclei pointing in the "southward" direction of the field. This creates an average vector of magnetization of the object that points parallel to the magnetic field (the main magnetic field is conventionally referred to as pointing along the z-axis) (Horowitz, 1995).

G0014-26 cont.



As the nuclei relax, each becomes a miniature radio transmitter, giving out a characteristic pulse that changes over time, depending on the local microenvironment surrounding the proton. For example, hydrogen nuclei in fats have a different microenvironment than do those in water, and thus transmit different pulses. Due to these differences, in conjunction with the different water-to-fat ratios of different tissues, different tissues transmit different radio signals. These miniature radio transmissions can be used to form MRI images (Horowitz, 1995).

Childhood leukemia in the advanced stage

Comment Set G0014, cont.
California Botanical Habitat

EMF, Pulsed and oscillating electrical fields do significantly impact the fundamental structure of our biology and interfere with the molecular functioning of cells and tissue structures, which have been shown to be directly related to human cancer formation in large scale epidemiological studies. A large scale study including 29,081 children has shown a 70% higher incidence for childhood leukemia as a result of proximity to power lines. However, the power industry claims that, "The evidence is not conclusive yet", nevertheless they are unable to point to any other cause.

G0014-26 cont.

Roger Ebert during 2006 after four surgeries to remove cancerous growths from his salivary gland, which has been linked to RF radiation and levels of cell phone usage. The tobacco industry spent over 100 years denying any linkage between smoking and cancer, or any increased health risks. Attorneys are still being paid to protect the profitability of extreme hazards by blaming the victims or denying the risks. However, perpetuating damages does not save money or protect wealth.

http://www.neuroguide.com/gregg.html
http://www.mriontheweb.nl/Joomla4/en/Spinecho-2.html
http://www.cis.rit.edu/htbooks/mri/chap-8/chap-8.htm

Comment Set G0014, cont.
California Botanical Habitat

Fires started by overhead power lines have burned thousands of homes in California, without restitution (including our home)

G0014-26 cont.

After over 2000 homes were burned during the fall of 2007, once again the Los Angeles County Board of Supervisors determined that during high winds, high-power lines were responsible for most losses, which burned homes up to $17 million in value and totaled $2.26 billion in insurance company losses alone, and have identified high power lines as being the cause of over 351 fires per year in California. As a result Los Angeles County Supervisor Zev Yaroslavsky announced in a televised news conference that he was requiring that the Southern California Edison place all high-power lines in the Santa Monica Mountains and Malibu underground as a fire security requirement. Currently litigation is required to address the existing engineering risks in order to reduce hazards and losses due to fire and high speed winds which have exceed 110 miles per hour (during the night of October 21-22, 2007) and have resulted in extreme fire risks from overhead power lines, smoke acting as a conductor and flames commonly between 100-200 feet in height.

San Diego County

Comment Set G0014, cont.
California Botanical Habitat

G0014-26 cont.

San Bernardino County (Green Valley Lake)

Riverside County (Lake Arrowhead mansions)

Comment Set G0014, cont.
California Botanical Habitat

Orange County (Irvine)

The underground engineering solutions recommended by LA County are far less costly than needlessly perpetuating fire risks and massive insurance losses. Utility company habits, such as preferring overhead AC for long distance transmission, need to change to provide protection to homes and the environment, as well as save millions in installation costs, compared to more economical underground power line installation and maintenance costs. http://www.cadesertco.org/news/LA%20Times%20Nov%204.pdf

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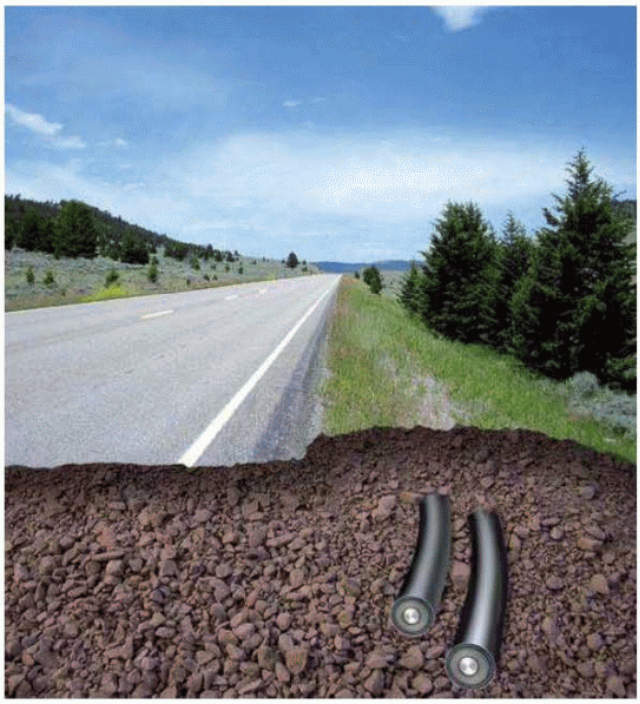
II. An underground DC powerlink that saves 150 miles of San Diego County and the Anza Borrego Desert State Park, *at lower cost* than overhead AC power lines

G0014-26 cont.



Two 6 inch underground DC cables can provide 4 times the capacity as the overhead Sunrise Powerlink. The trenching depth for underground cables is typically 5 feet by 1 foot in width with a protective cap and no conduit being used for the direct burial cables.

More than 50 long distance high-voltage, high-capacity underground and under ocean DC power lines have been installed worldwide, with higher capacity, greater efficiency, better

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safety, better reliability, vastly lower environmental impact, far lower property and economic damages, and at a significantly lower cost than overhead AC power lines.

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The BritNed UK-Netherlands powerlink can deliver 1300 megawatts over 161.5 miles for a cost of 600 million Euros, or $870 million, all of which is higher in capacity and longer in distance than the Sunrise Powerlink and provided at a considerably lower cost than the overhead AC power lines being proposed. With a cost of $870 million for the 161.5 mile BritNed Powerlink, then the $1.4 billion Sunrise Powerlink would cost an additional $530,000,000 (or 1.6 times more) in order to build approximately 700 huge pylons 160 feet in height, all in order to avoid a vastly more benign underground DC option. http://www.nationalgrid.com/NR/rdonlyres/88FF9856-8D4E-47F9-85DB-B8BDB3CCF24B/17288/BRITNED2.pdf

Table: Selected project examples

Project	Country	MW	Year	Main purpose
SwePol	Sweden-Poland	600	2000	Subsea cross-border inter-connection
Italy-Greece	Italy-Greece	500	2001	Subsea cross-border inter-connection
Murraylink	Australia	220	2002	Underground merchant grid inter-connection
Troll A	Norway	84	2005	Power to offshore gas platform from shore
Estlink	Estonia-Finland	350	2006	Underground/subsea cross-border inter-connect
NorNed	Norway-Netherlands	700	2008	Subsea cross-border inter-connection
Nord E.ON 1	Germany	400	2009	Underground/subsea offshore wind park
SAPEI	Italy	1000	2009	Subsea island connection
BritNed	UK-Netherlands	1300	2009	Subsea cross-border inter-connection

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161.5 mile, 1300 megawatt BritNed DC powerlink ($870 million construction cost)

DC Converter Stations

Based on the Norway-Netherlands DC link (shown below) a 1000 megawatt DC converter station could fit on less than 3 acres (not 40 acres as was claimed by consultants) and would cost an estimated $125 million (not $250-500 million as claimed), which could reduce the overall construction costs by up to 38% based on actual construction data. However, underground DC could also save an additional $20 billion or more in short term environmental damages, business and property losses, along with providing at least a 300% increase in transmission capacity, higher transmission efficiency, lower maintenance, better security, along with the elimination of EMF and related medical liabilities.

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580 kilometer (360 mile) 700 megawatt 450,000 volt DC underwater cable between Norway and the Netherlands

700 megawatt 450,000 volt DC to AC Converter station on a 3 acre parcel, using approximately 2.75 acres (2007)

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