

Statement

Southeastern Communities Review

Statements regarding the Recirculated Draft Environmental Impact Report / Supplemental Draft Environmental Impact Statement, of July 2008

**San Diego Gas & Electric Company's Sunrise Powerlink Project
(Applications A.05-12-014 and A.06-08-010)**

**To: The State of California Public Utilities Commission
and The Bureau of Land Management**

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From: CBH, P.O. Box 1032, Hemet, California 92546, August 25, 2008

California Public Utilities Commission, Public Advisor's Office at: CPUC Public Advisor, 505 Van Ness Avenue, Room 2103, San Francisco, CA 94102; or call 1-866-849-8390 or 1-415-703-2074; or email

public.advisor@cpuc.ca.gov.

Provided within the comment period ending August 25, 2008, which Susan Lee of Aspen Environmental said, at the August 4th 2008 meeting in Jacumba, would be extended at least 3 days, since considerable congestion would be expected at their email servers which could block their ability to receive emailed comments. Since Acrobat's compact version of this document is 7.6 megabytes an alternate email address was provided by Mark Tangard: mtangard@speakeasy.net in case Aspen's email server failed. This document was received by Aspen on August 25, 2008 and requested to be resent by Emily Capello due to corrupted data during transmission.

Part 2

As requested, this document contains power line routing information and maps for southeast San Diego County, from the Imperial County line through Jacumba, Bankhead Springs and Boulevard, with information on both underground AC and DC options, including efficiency issues related to completely underground DC power lines, cost data and medical citations on the effects of electromagnetic fields and the ionization of pollutants as a cancer promoter.

This document is part 2 of 2 parts

Environmentally Superior Underground & DC Transmission

Cost, reliability, safety, capacity and nondamaging advantages

The missing power line alternative that can be more profitable for SDG&E while offering full environmental protection in conformance with CEQA.

From the talk and paper provided to Commissioner Dian Grueneich at the CPUC Hearing in Ramona California, February 26, 2008

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Sunrise Powerlink A.06-08-010
Environmental Issues

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The Southern Route



The Southern Route

Delivering Power Without Environmental Damages at a Lower Cost Underground AC Segments and Full DC

We agree with SDG&E and Aspen Environmental that the Southern Route for the Sunrise Powerlink would be the most damaging and the least preferred.¹ However we also realize that it still remains as an available choice and that the Southern Route has been offered no environmental review with regard to lower impact alternatives, which are available, as has been offered for the Northern Route, as well as being offered no protection for the environment, nature reserves, residents, business, property losses,

¹ SDG&E'S Enhanced Northern Route, Chapter 6, Environmental Impacts, April 15, 2008, p. 30-40
http://www.sdge.com/sunrisepowerlink/filings/cpuc/031208/Chapter6SDGE_S_Enhanced_Northern_Route.pdf

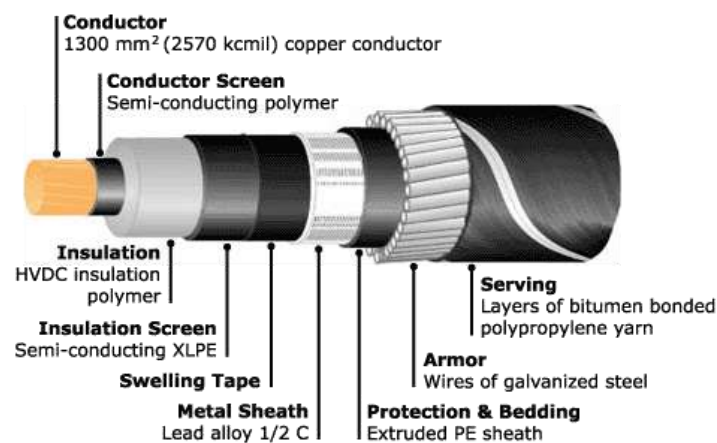
equivalent property replacement and no specified requirements for restoration, all of which would constitute a massive disaster for Southeastern San Diego County.

Significantly our research, required to address these issues, has led us to provide the details of a higher capacity DC underground alternative that could provide full environmental and economic protection for both the Northern or the Southern Routes, which costs less for SDG&E to implement; unlike the conclusions previously submitted by reviewers, which avoided research on the completely underground alternatives or used considerably older and erroneous data to discredit the approach; consequently we have provided a more contemporary review of underground systems; all essential information which has not been possible to convey through the CPUC proceedings, in spite of CEQA requirements to locate and provide environmentally protective alternatives.

Consequently the CPUC commissioners will not be adequately informed or prepared to make a reasonable decision regarding the Southern Route, or any route for that matter, nor can the State Park recommend the Southern Route as an alternative since it has not been offered any realistic consideration. While the No Wires alternatives, including local solar systems, may well be the best long term solution, however having 7,000 megawatts of renewable energy already scheduled to be available in Imperial County offers a powerful incentive to ultimately build at least 20 times the capacity of the Sunrise Powerlink being proposed, with horrendous damages for the region if it were above ground. However, by providing 3,000 megawatts in one underground cable pair in one 5 foot deep trench that's 1 foot in width along any highway, is far lower in cost and faster to install than the overhead AC lines proposed, as well as offering practically no environmental or economic damages to the region. We have absolutely no idea why this

alternative has not been carefully evaluated in the review process, since the criticisms provided against underground power lines during 2007 were based on both erroneous and obsolete information, which was accepted as fact, while realistic technical research or our own participation and efforts have not been provided consideration.

The following review of alternatives is only intended to be introductory in nature. Prior papers referenced herein, have provided considerably more research and engineering data for the specific details, which may be reviewed as needed.



During the past several years the cost of high capacity underground power lines capable of delivering up to 3000 megawatts has declined, allowing up to triple the capacity of the proposed Sunrise Powerlink, while saving at least \$530,000,000 in construction costs, based on projects of similar length and capacity. The advantages can be an extreme reduction in environmental damages, with far greater safety, reliability and lower maintenance costs, along with zero impact to wilderness regions, state parks and federal lands, residential and business areas, which could amount to many billions of dollars in long term savings, both to the residents of California and for San Diego Gas and Electric. However for some reason a review of these issues has been ignored by SDG&E, the CPUC, it's consulting firms, engineers, economic and legal staff, and we have found significant

resistance to considering the information, even though there is no equivalent alternative that could defend the environment from the extraordinary damages proposed, all without increasing installation costs. The validity of the information provided here can be readily verified since over 50 high capacity underground DC systems have been installed worldwide, with demonstrated reliability, along with major environmental and economic advantages for all parties.

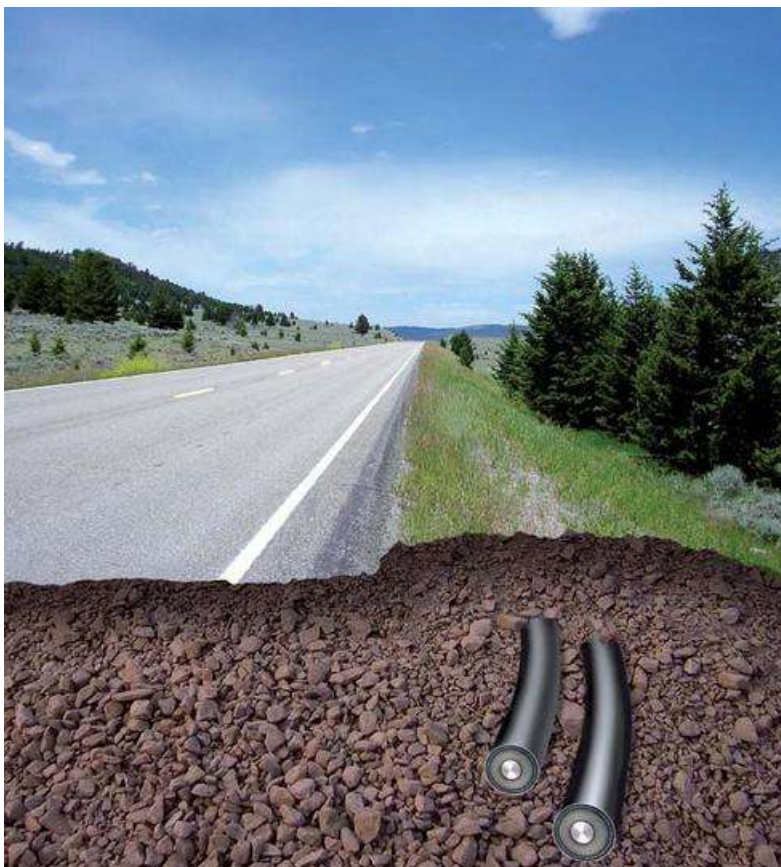
SDG&E Interconnection Requests

While we fully concur with the benefits of the “no wires” and solar options, there are however still powerful incentives² to continue evaluating high power lines along with a wide range of serious environmental and economic damages which will be borne by the people of the region, all based on erroneous and missing data, which has apparently been used as a determinative argument to avoid far less damaging underground DC. We have identified a number of options along the Southern Route in order to significantly reduce environmental damages, provide for future capacity and reduce construction costs, as well as provide significant improvements in security and reliability, fire and health safety,

² There are currently over 6,600 MW of interconnection requests by renewable resource projects that could be assisted by Sunrise. SDG&E currently has renewable energy under contract for about 60% (2000 GWH) of its 2010 RPS energy goals (of approximately 3500 GWH). Approximately 731 GWH will deliver through the Imperial Valley substation and are thus reliant on Sunrise. These deliveries more than double in 2011. SCE has another 250 MW of renewable wind generation located in Mexico under contract contemplating interconnecting to the SWPL. An 1150 MW dispatch limit currently exists on the SWPL between the Miguel substation and the Imperial Valley Substation, potentially stranding thousands of MW's of proposed new renewable generation based on the CAISO's existing standards. Thus, without Sunrise, the CAISO has determined that only a small fraction of the more than 7000 MW of renewable generation that is currently in the CAISO queue could be developed and simultaneously dispatched. (SDGE Chapter 6, Northern Route, page 6.28, April 15, 2008)

http://www.sdge.com/sunrisepowerlink/filings/cpuc/031208/Chapter6SDGE_S_Enhanced_Northern_Route.pdf

including an option to increase in transmission capacity and efficiency, with reduced maintenance, while eliminating any need for future environmental and economic damages.

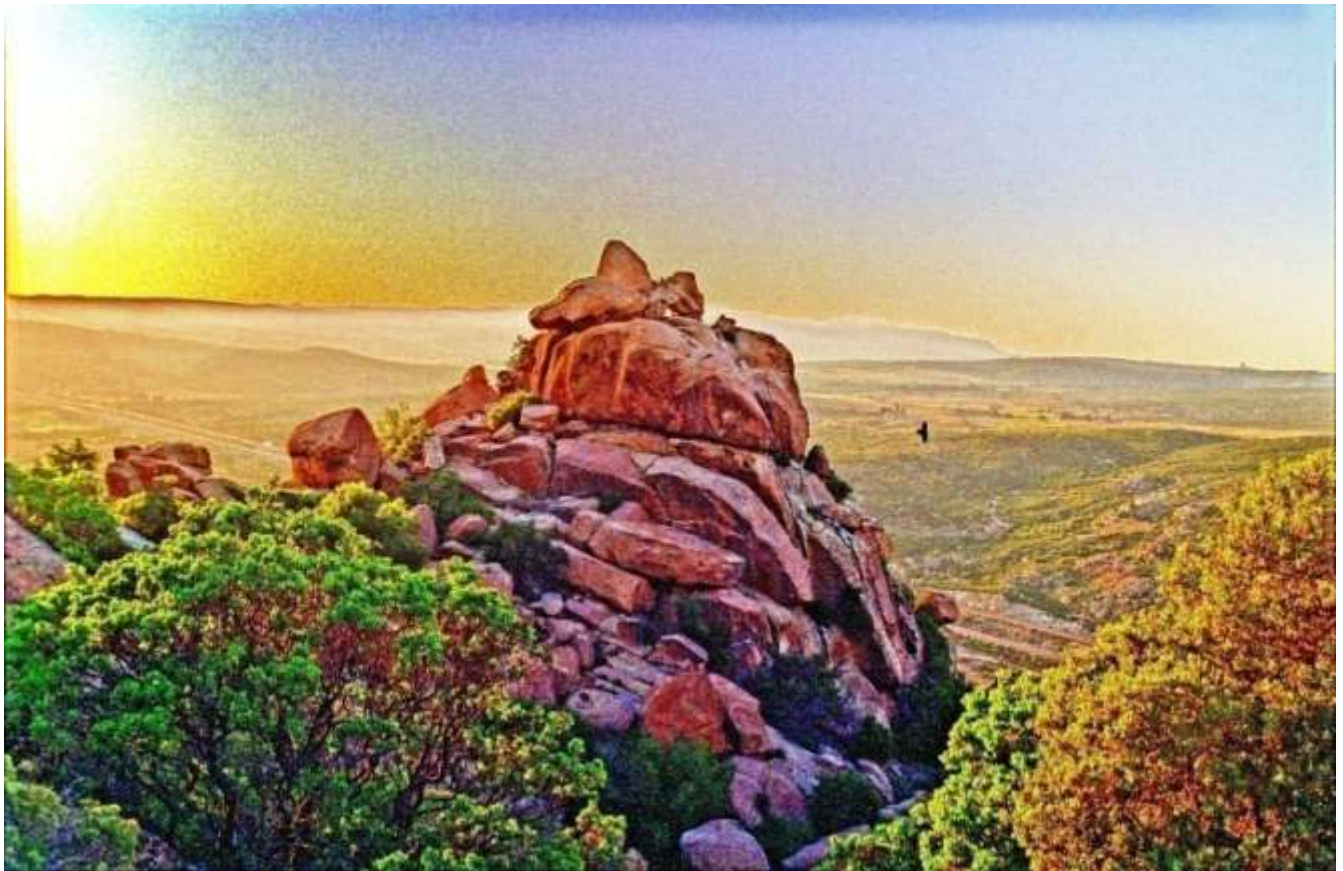


Underground DC cables along a highway

Since weight and cable fatigue are not problems with underground power lines, heavier copper cables can be utilized, capable of delivering 3,000 megawatts using only 2 cables, without causing significant environmental, property or business damages, EMF, ionization or related health risks; all at a far lower cost than overhead power lines, saving SDG&E approximately \$530,000,000 in installation costs plus many billions in damages. (All more economically installed in one small trench 5 feet in depth and 1 foot in width with a concrete cap or under roadway pavement, all of which is continuously and more rapidly installed).

The underground approaches mentioned can become a significant opportunity both for SDG&E and the CPUC to review and utilize an extremely low impact environmental approach that can protect California's environment and economic future, saving billions of dollars in property losses, as well as save SDG&E billions in long term construction costs and liabilities by using a more efficient, more reliable, less damaging and safer

underground approach to power line construction, all of which has been demonstrated in over 50 large scale underground high power lines that have been installed worldwide.



Paleoanthropological Nature Reserve, Research Center and Recreation Area, Bankhead Springs California, elevation 3615 feet, overlooking Interstate 8 west and the McCain Valley, all targeted for 170 tall pylons and an array of extra high voltage cables.

Above is a proposed mountain top location for 170 foot high pylons to carry hot sagging 500,000 volt power lines, despite the fact that underground power line alternatives are available that cost considerably less to install than the high-impact, environmentally destructive overhead high-power lines being proposed.

To be of assistance with the Sunrise Powerlink issues currently being addressed, there are several solutions that could be of mutual benefit for the region, both environmentally and economically, as well as in terms of reduced installation and maintenance costs, as well as in terms of improved reliability and safety.

1. First, while we have noticed the significant long term economic and environmental advantages available through on-site solar facilities, we are also not in opposition to nondamaging power lines; in fact we would encourage 3 times the capacity as SDG&E has proposed for the Sunrise Powerlink, because power demands will undoubtedly grow substantially particularly as major car manufacturers begin delivering plug-in hybrid vehicles in 2 years, which could ultimately require the equivalent of 20 additional Sunrise Powerlinks, just for San Diego, which naturally would have an extraordinarily devastating effect on the region, if the extra high voltage power lines were above ground. Further, the additional cost of the larger 6.2 inch diameter copper cables is far less costly than building 2 new powerlinks and the extra capacity doesn't need to be used until it's needed.
2. Naturally, like thousands of others in the region, we are also very concerned about sustaining serious damages as a result of the impact of 500,000 volt power lines on 170 foot tall pylons overhead, bisecting our research and nature reserve, as well as incurring any lack of interest by SDG&E to pay for those damages, particularly if extra high-voltage power lines are to be built directly through our Anthropological Reserve, which would devastate our wilderness, research, construction and recreational areas, as they exist and are currently planned, and we would clearly be extremely concerned about the responsibility of SDG&E to pay for the Anthropological Reserve based on equivalent quality, size, viewshed and accessibility (see Appendix B), in addition to the labor and expenses related to our

transition, which has taken decades of research, labor and planning to accomplish to this point.

Community and security options

3. Finally, underground cables³ whether AC or DC, have not been offered for Southeastern San Diego County (see Appendix A), although they have been proposed extensively for the Northern Route. Underground cables through the eastern 22 miles of San Diego County alone could eliminate impacts to 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, the Cleveland National Forest, and our Anthropological Reserve, all of which would be otherwise damaged or made uninhabitable, bisected and permanently degraded by huge pylons supporting hot sagging 500,000 volt power lines directly overhead, along with increasing medical evidence that electro-magnetic fields from such high power lines increases leukemia rates by 70%, in addition to causing significant increases in lung cancer through the ionization of pollutants. While the effects of capacitance limits the length of underground AC cables to 20-24 miles and creates considerably more difficult installation and load balancing problems for SDG&E, however underground

³ Reuters News Service (May 21, 2007) reports that Homeland Security is paying over 60% of the cost for Consolidated Edison to install a more secure high capacity underground cable to protect Manhattan's power infrastructure by 2010. So why are we paying more money, and avoiding financial assistance, in order to create an environmental disaster that devastates property values, diminishes the health and security of our region, and offers no help from available federal resources that are being made available for underground cables? My understanding, as of a year ago, is that SDG&E has not requested financial assistance from Homeland Security to provide a more secure underground power line for San Diego.

DC presents none of these problems, in fact DC eliminates considerable transmission inefficiencies and phase synchronization difficulties that can crash a large scale AC system.

4. While over 50 underground DC power lines have been installed worldwide with vastly lower damages and lower costs⁴ than the proposed Sunrise Powerlink, while offering triple the capacity or over 3,000 megawatts at 500 kV - 600 kV in one comparatively small trench without using a conduit, which can be rapidly and continuously trenched under or along existing roadways, without devastating or damaging thousands of properties along the route, harming families or defacing the scenic and recreational areas of San Diego County, which are a significant component of California's \$90 billion per year recreation and tourism industry, and an indispensable asset of California, that no one can afford to restore and would be impossible to replace. However, we do not see that SDG&E or the CPUC has provided much or any significant protection for at least \$20 billion in short to medium term damages that would be inflicted by overhead extra high-voltage power lines as proposed and the 9,000 acres of peripheral impact. All of which is also seriously detrimental to SDG&E financially, based on installation expenditures, limited capacity and liabilities alone, while inflicting extremely costly impacts on

⁴ The BritNed UK-Netherlands powerlink delivers 1300 megawatts over 161.5 miles at 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, as well as lower cost underground DC option.

numerous communities, permanent damages to the environment, as well as potential medical liabilities.

350 fires per year costing \$4 billion in 2007

In excess of 350 fires per year are started by high power lines in California, which included the burning of the majority of approximately 2000 homes in Southern California during 2007 with over \$4 billion in damages and 3000 homes during 2003, including the burning of our own home when power lines oscillated and arced during a high winds, which the power company termed an "Act of God", without any economic consideration for the losses we incurred, nor ever offering any effort to make the power lines more secure. Apparently the victims of disastrous power line engineering and corporate decisions are required to repeatedly pay for all damages and losses, even into the billions of dollars (reference Appendix D).

We have spent the better part of 2 decades protecting our anthropological reserve from severe and needless impacts, excavations, road building and now 160 foot tall pylons anchored to the tops of our mountains carrying an array of hot sagging 500,000 volt high-voltage power lines directly over land which is essential to our research, laboratory, visitor and recreational areas. To defend ourselves from such extreme and unnecessary damages we have provided SDG&E, Sempra Energy and the CPUC a considerable research effort into safer, lower cost, extremely low environmental impact engineering alternatives, expending four thousand hours researching and documenting these alternatives, including DC power line options, which we gather from their comments that SDG&E has not independently reviewed these subjects in any significant way. So far, we can only expect that SDG&E's has no intention of reconsidering its existing power line engineering efforts

even if all environmental damages could be eliminated and SDG&E could save \$530 million in construction costs, undoubtedly because they would not be expected to pay for all the damages or restoration costs they inflict against the environment or anyone. Also, since even the CPUC has apparently not invested in a technical review of these issues including underground DC, although we are aware of a consultant addressing some of these issues for Aspen, there apparently is still little likelihood that the Commissioners will have been brought up to speed, to fully understand the issues and make an informed decision. Consequently, we are concerned that while the details have been fought over at hearings in San Francisco, the larger issues will not be addressed and the results will be catastrophic for the environment, provide too little capacity, create staggering losses for property owners, destroy the future of the region, as well as be more costly for SDG&E, and of course our efforts and the efforts of many others will be wasted.

Eminent domain without *just compensation*

We understand that eminent domain does not imply providing “just compensation” for anyone’s loss, in violation of the Constitution it simply transfers the burdens of massive habitat, health and property losses to land owners, far in excess of any compensation that would be provided, in fact far beyond any commercial price established for the land, which would necessitate equivalent replacement costs for our Anthropological Reserve. Apparently eminent domain has been interpreted as a license to cause massive economic, environmental and health damages, as documented by prior power line projects, as well as through large scale medical studies. Growing medical evidence does not offer the power industry a case for *plausible deniability* since molecular cell biology has been providing a more detailed understanding of cellular developmental mechanisms which are dependent on our own internal cellular electrical fields which function the nano to milliamp

range, which when disturbed by stronger external EMF and ionization generated by high power lines, can significantly disturb processes of RNA replication, ATP production, cell repair, as well as neural growth patterns.

Cellular electron transport mechanism with oscillating EMF interference



For example, the mitochondria incorporates a multi stage electron transport mechanism ⁵

⁵ The mitochondria is essentially a multi stage electron transport mechanism based on oxidation. In the presence of oxygen 24 to 28 molecules of ATP are derived from one molecule of glucose going through the Krebs' cycle, plus four molecules from glycolysis. The oxidative process takes place at a subatomic level with the electron being the main player, with two equal electric charges one centimeter apart and exerting a force of one dyne on each other, each charge is one esu in magnitude. By knowing the charge of an electron we can see that one esu is equivalent to two billion (2×10^9) electrons. A current flow of one Ampere is equivalent to the flow of 6×10^{18} electrons per second. Also, the frequency of the current would have to be low in order to prevent the electrons from traveling in short bursts. A low frequency would allow the electrons to move in a steady stream (23 minutes per cycle) allows these ultra-low DC currents to function as antioxidants, at levels between 100 nA and 1 mA (depending on body mass), which

No defense, recovery or restitution process has been established to protect people from EMF exposure, ionization of pollutants as a source of lung cancer, or a measured 70% increase in leukemia deaths due to low level EMF exposures in a study involving 29,081 children who prior to birth lived within 650 feet of relatively low voltage suburban power lines. No doubt with voltages which are 50 times higher, as are being proposed for the Sunrise Powerlink, and transmission capacities which are hundreds of times greater, the impact to our region will be massive, while delivering a proportionally greater morbidity rate. However, since the population is relatively low the expectation may be that the effects will be less noticed. *British Medical Journal (vol. 330, p. 1290)*

Damages and federal restraint

Other than tribal lands, which are offered a federal defense against intrusion, environmental or property destruction by SDG&E,⁶ apparently everybody else is classified as commercial property which is disposable by force, without Constitutional or equivalent protections, without any defense or recovery process available, not for our losses of irreplaceable natural resources, not for our massive economic losses and not for our lives. We have not seen where the CPUC has required SDG&E to provide for full restoration of

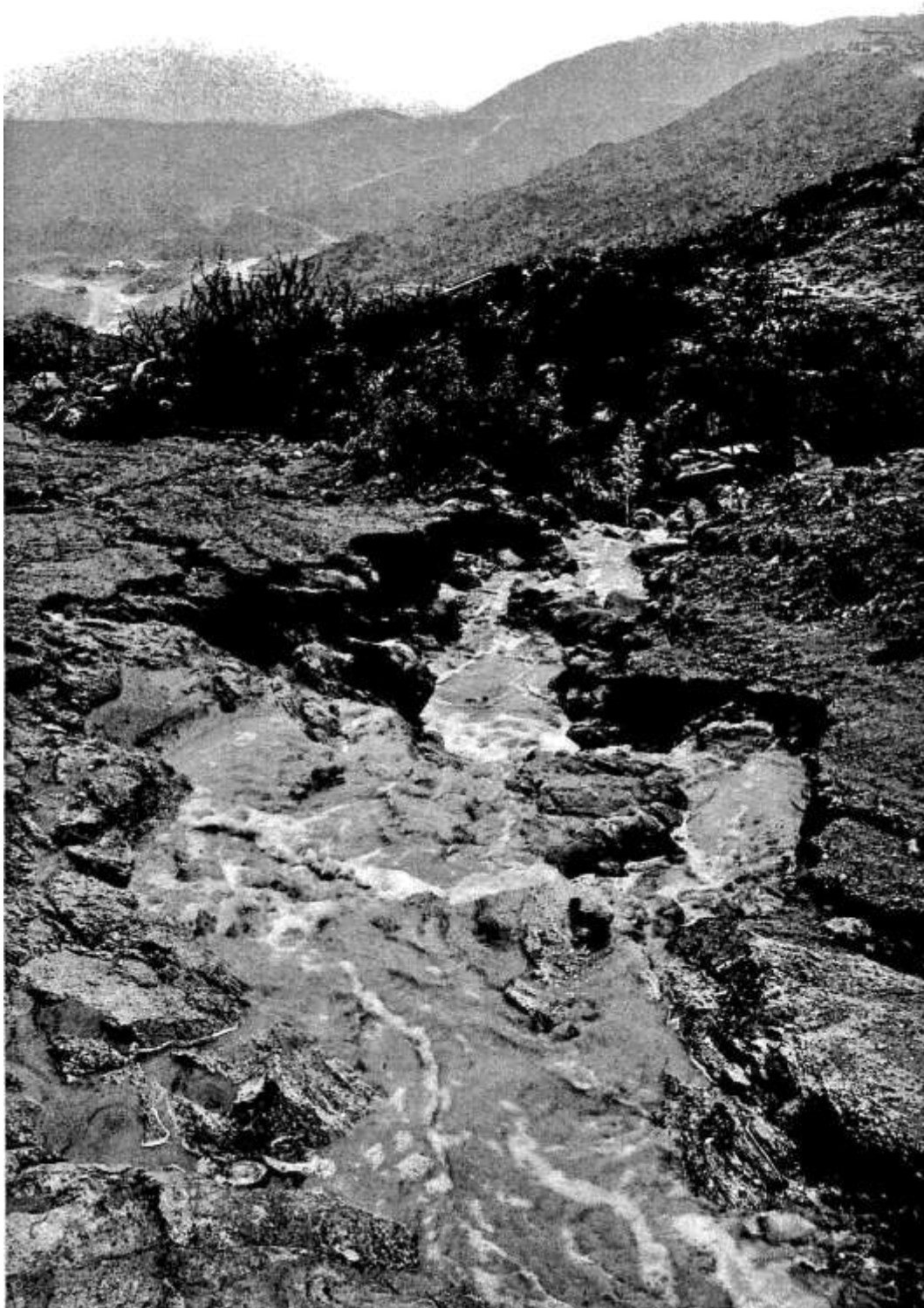
supports the process of cellular repair and wound healing, with higher frequency electromagnetic fields disrupting the cellular repair mechanisms.

⁶ The Campo Band Has Refused to Allow Sunrise to be Constructed Across Their Reservation and There Is No Guarantee That The La Posta Tribe Will Agree to Allow Sunrise to be Constructed On Their Reservation. Further, the Tribe denied SDG&E permission and access to survey the segment. SDG&E cannot condemn Tribal trust lands because these lands are owned by the United States, and any easement across these lands must have the consent of the Tribe for whom such land is held in trust. If the Tribe does not perceive a benefit from locating the project on Tribal lands, it has no incentive to conclude negotiations quickly and may not come to the table willingly at all, let alone willing to come to mutually agreeable terms. SDGE Chapter 10, Aspen's Southern Route Review, page 10.2

damages, restitution of losses, nor equivalent replacement of sites impacted with unrestorable damages or pylons and overhead power lines, nor have we seen any full assessment of habitat damages, full restoration strategies or cost summaries, which we know vastly exceed estimates quoted by SDG&E. Under SDG&E's 230 kV power line near Campo, we observed approximately 10 acres of habitat destruction per pylon, for clearings and access roads, which went from pylon to pylon, excluding entrance roads, or about 9,000 acres (14 square miles) for almost 700 pylons, with full restoration costs over a 40 year period at \$20 per sq ft (50 cents/year) totaling \$7.8 billion, which includes wells, drip irrigation, propagation of indigenous species, transportation, education and botanical research to improve survival rates and minimize irrigation requirements; all of which defines maintenance and restoration as impossible goals that will never be fulfilled by SDG&E, as has been documented on another property adjacent to an SDG&E power line in Appendix C.

Not providing a fully underground power line option only insures that the most damaging approach possible will be taken.

As the lack of protective alternatives for the Southern Route became apparent by February of 2008, so apparently we would need to make every effort to address the gravity of these issues again for the 7th time, particularly after seeing the environmental damages near prior SDG&E power lines, the complaints of neighbors that are ignored, and a long history of costly litigation required to address any issue.



Environmental Damages along hundreds of high-power line access roads (photos from CPUC complaints against the Powerlink by a neighbor of an existing SDG&E power line, see Appendix C). [Photo of an SDG&E Power Line Access Road During Rain Cutting a Ravine Without Maintenance](#)

Reserve access

We realize that the staff at SDG&E and subcontracting firms have a specialized role, and that solving any larger issue even if it could save SDG&E billions of dollars may not be pertinent to their work. So, perhaps the matter of access, mentioned in item number 2 may be the only relevant issues to SDG&E's employees. However, I am obligated to mention that items numbers 3 and 4, which are relevant to right-of-ways, could significantly benefit SDG&E's efforts, as well as eliminate the destruction of decades of our efforts and investments by hundreds of others. Of course, as anyone would expect, SDG&E may find it in their financial interest to claim a lack of knowledge of major damages being caused, or claim that they had no alternatives, or that the State was responsible for the decision process, or that the medical data was not available, or that the irreplaceable natural qualities of this region were practically worthless since it's not developed urban property, or perhaps anyone who died of cancer ultimately couldn't prove their case against ionized carcinogens or EMF in a court of law. As you may know, all this information has been provided to SDG&E and the CPUC by C.B.H., and that if you or SDG&E need additional scientific, engineering, environmental or economic information, we could offer considerably more research or assistance; something we noticed that most employees and consultants have apparently learned to avoid, perhaps to maintain their jobs, unfortunately also to the detriment of SDG&E, as well as those impacted. Naturally, demanding to make damaging decisions, when harmless, as well as lower cost alternatives are available is an unnecessary act of force.

Accommodating, enforcing or inadvertently sanctioning damages to this anthropological nature reserve, including the devastation of our projects, our personal and economic survival, does adversely impact many decades of research, labor and investment, as well as the efforts of our participants, without securing indemnification and full replacement costs, which does certainly move toward the complete unraveling and destruction of the entire project here, as well as constitute criminal activity for participation, which would include any form of participation of our own as well, along with creating financial liabilities for all damages and losses, including the cost of a comparable reserve with equivalent wilderness, natural geologic features and monuments, recreational

capabilities, research, access, viewshed and anthropological values, which apparently would then become a major liability and financial responsible for the entire Anthropological Reserve, all of which combined is clearly not replaceable, not available on the market as an equivalent site, nor approximated at real estate prices less than \$50 per square foot for all conservancy acreage, which is less than the cost of restoration, in addition to habitat restoration costs of \$50 to \$75 per square foot, including equipment, irrigation, transportation, soil monitoring, botanical expertise, labor and expenses, which are required over not less than 40 years. More recently we have seen significant wilderness areas listed at higher amounts which are not better or in any way advantageous, all of which is a small fraction of the value of suburban developments or commercial properties, all having an extraordinarily limited lifespan, in addition to high maintenance costs.

In order to simply verify that SDG&E is not intending to cause damages or avoid restitution for all damages and losses that we would incur, we have included an acknowledgement form (Appendix E) which SDG&E may sign and return to us to accommodate their onsite access schedule at their convenience. Naturally, we request their forwarding us a list of anticipated visitation dates and groups or persons entering for the year, so that we could scheduled at least a month in advance, or provide for their rescheduling at a mutually convenient time. As SDG&E mentioned, if we are required to maintain personnel for on demand access or convenience, then we ask to be advised regarding reimbursement for assistance, related time and expense, and who we would contact regarding the entry schedule.



Appendices (part 1)

1. Appendix A, Underground AC Power Line Segment for Southeastern San Diego County (22 miles), pages 23-24.
2. Low Cost Underground DC Power Line County Highway Route, 114 miles from El Centro's Imperial Valley Substation (IVS) to San Diego's Sycamore Canyon Substation (SCS), pages 25-26.
3. **Lower Cost Direct Underground DC Power Line, 101 miles from El Centro's Imperial Valley Substation (IVS) to San Diego's Sycamore Canyon Substation (SCS), pages 27-28**.
4. Appendix B, C.B.H. Site Survey Photographs, page 29-44.
5. Appendix C, SDG&E's Past and Continuing Environmental and Property Damage Photographs, pages 45-60.
6. Appendix D, **High power lines and fire ignition through: wind, smoke and grounding problems, pages 61-64**.
7. Appendix E, SDG&E Access Agreement, pages 65-66.

Part 2, pages 67-119

For additional information: www.undergroundpower.us

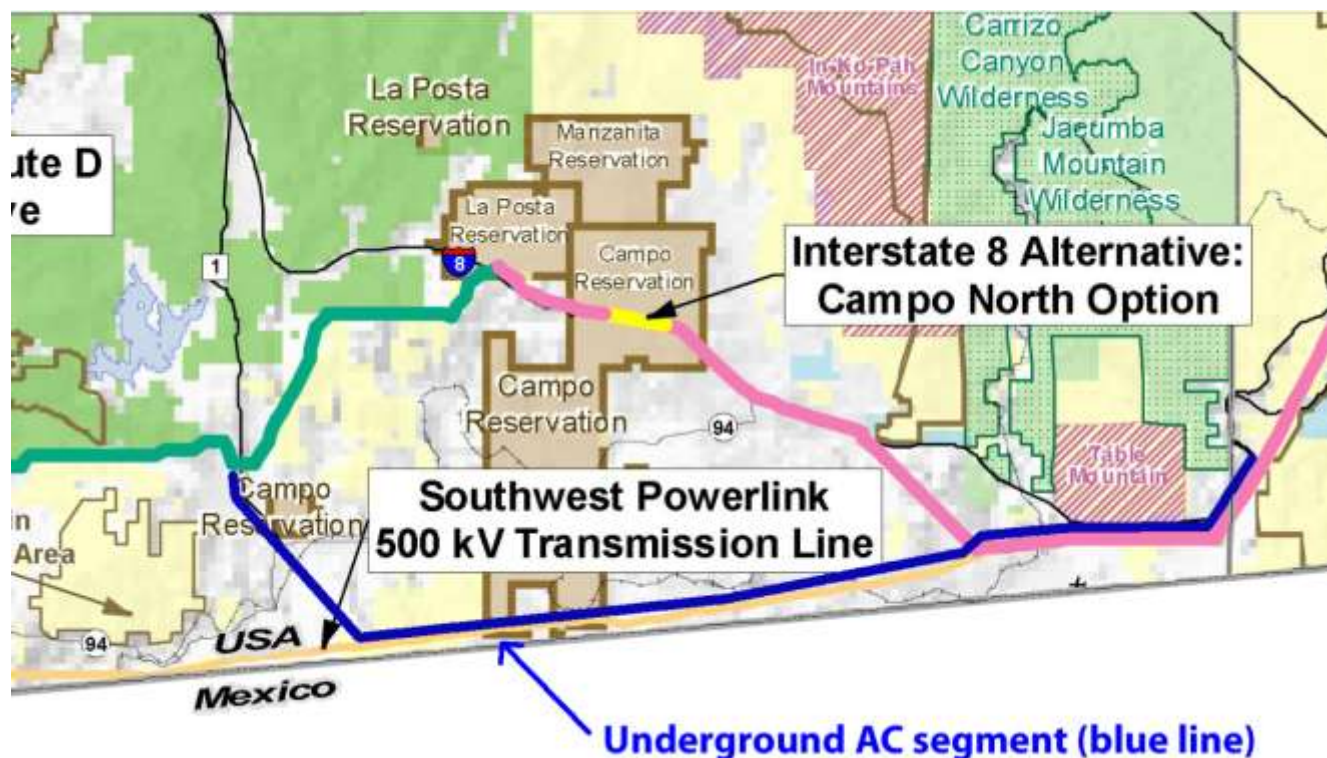
Appendix A, Underground AC power line segment for Southeast San Diego County



From east of the San Diego County line connecting to Route D west of Campo (22 miles).

Appendix A, 22 mile AC segment from Jacumba to west of Campo

The image on the previous 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.



Southeast San Diego County 22 mile Underground AC power line Route

This route could minimize alternating current 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 risks, along with minimizing other categories of threat, and almost all security requirements over a significant portion of eastern San Diego County. Although such an underground route would be greatly preferable to overhead AC power lines, there are considerably greater economic and environmental advantages to underground DC for the full 150 mile or a 101 mile route.

**Underground DC power line, all county highways route
Extending 114 miles from Imperial to San Diego County:**



From Imperial Valley Substation to Sycamore Canyon Substation along county highways avoiding Freeways and Interstate 8, from El Centro to San Diego with DC to AC converter stations and AC extensions at each end.

Fully underground 114 mile DC route, El Centro to San Diego north

Underground DC power line, 114 miles from El Centro's Imperial Valley Substation to San Diego's Sycamore Canyon Substation

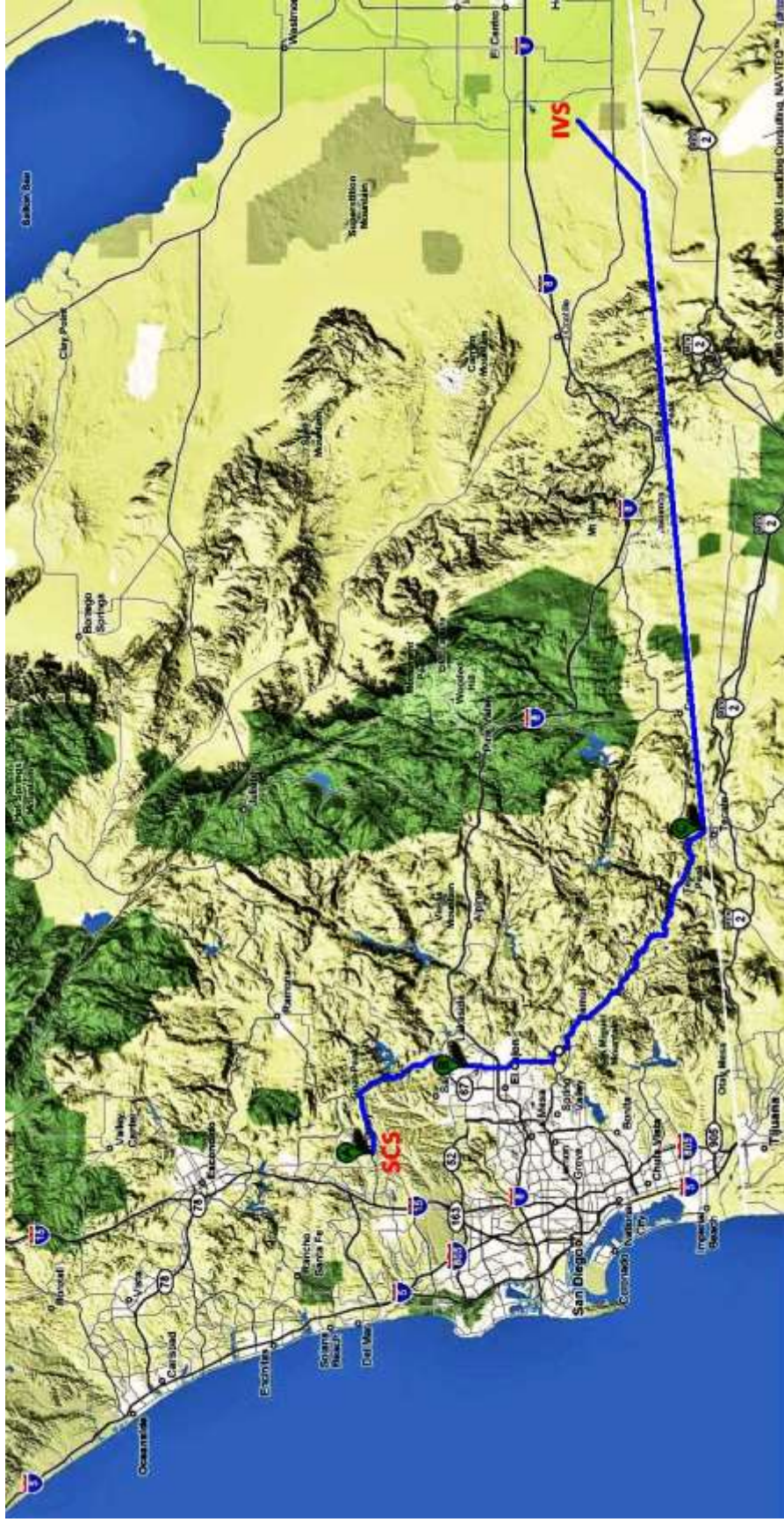
Directions from West to East, avoiding Freeways and Interstate 8, using only county roads, based on low EMF highway travel (less than 2 milligauss, mG):

1. Starting at the San Diego Sycamore Canyon Substation, head northeast to
2. Scripps Poway Parkway, then east to
3. Highway 67 south, then to
4. Highway 54 south, then to
5. Highway 94 southeast, through Campo then into Imperial County east of Interstate 8, to
6. Highway 98 (Yuha Cutoff) east, through Coyote Wells, toward El Centro, then
7. Diagonal at a 45 degree angle across desert on existing unpaved road, north of river bed, (which is not illustrated) directly to the Imperial Valley Substation, which is east of El Centro.

Security Note:

Since the rural areas east of San Diego do not have high-speed internet service, clearly the trench could carry fiber optic cables to monitor the performance, moisture and temperature of the DC power line, as well as provide an internet backbone for the region (installed in PVC conduit), which would also serve as an early monitoring system with video surveillance for the security of the power line which would be available for public viewing, monitoring of fires, crime and the environment.

Minimal Impact Underground DC Alternative, lower in cost than overhead AC power lines. Underground DC route for the full 101 miles from Imperial to San Diego County:



From Imperial Valley Substation IVS to Sycamore Canyon Substation SCS along county roads avoiding Freeways and Interstate 8, from El Centro to San Diego with DC to AC converter stations and AC extensions at each end.

Fully underground 101 mile DC route, El Centro to San Diego north

Underground DC power line, 101 miles from El Centro's Imperial Valley Substation (IVS) to San Diego's Sycamore Canyon Substation (SCS)

The lowest impact and lowest cost southern route reviewed:

Directions from West to East, avoiding Freeways and Interstate 8, using only county roads, based on low EMF highway travel (less than 2 milligauss, mG):

1. Starting at the San Diego Sycamore Canyon Substation, head northeast to
2. Scripps Poway Parkway, then east to
3. Highway 67 south, then to
4. Highway 54 south, then to
5. Highway 94 southeast, to
6. Highway 188 south to the border north of Tecate, (46 miles to this point)
7. Then east along unpaved power line roads and right-of-ways, continuing past Jacumba into Imperial County
8. Diagonal at a 45 degree angle across the desert on existing unpaved road (north of river bed) directly to the Imperial Valley Substation, which is west of El Centro, for an additional 55 miles, totaling 101 miles underground.

Security Note:

Since the rural areas east of San Diego do not have high-speed internet service, clearly the trench could carry fiber optic cables to monitor the performance, moisture and temperature of the DC power line, as well as provide an internet backbone for the region (installed in PVC conduit), which would also serve as an early monitoring system with video surveillance for the security of the power line which would be available for public viewing, monitoring of fires, crime and the environment.