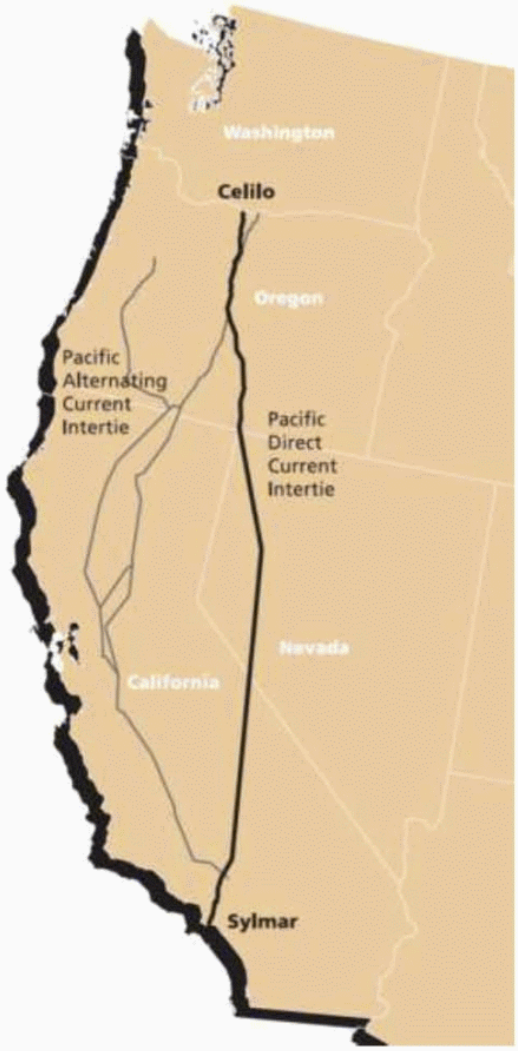
Comment Set G0014, cont.
California Botanical Habitat

Los Angeles began construction of the 850 mile Pacific Intertie to deliver 3,100 megawatts over DC power lines in 1965, from the Washington – Oregon border



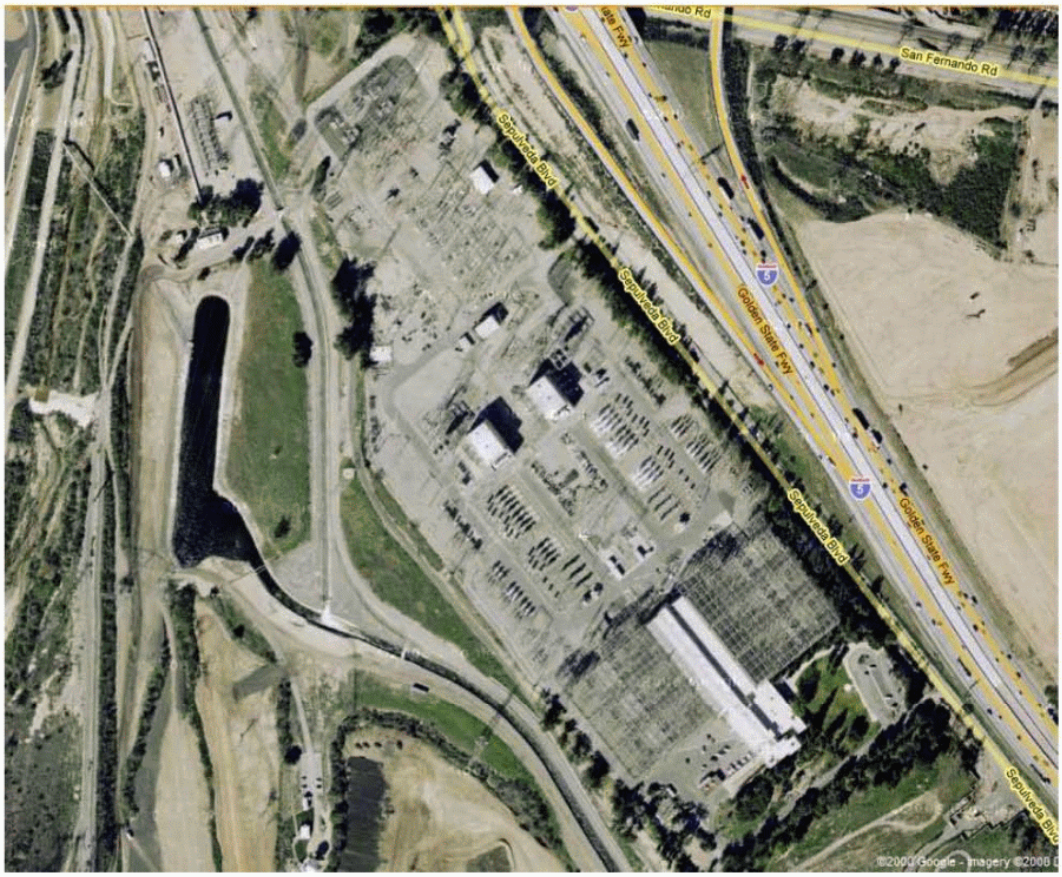
The LADWP's 850 mile 500 kV DC Intertie delivers 3100 megawatts using pairs of pylons carrying 2 cables each, 2 cables on one pylon for positive and 2 cables on the second pylon for negative. Each cable is steel reinforced aluminum 1.8 inches in diameter (ACSH 2312 mil designation). The DC to AC converter station and the AC to AC transformer distribution facility is located together in the San Fernando Valley near where the 210 and 5 Freeways meet. The DC to AC facilities are much smaller now. 500 kV DC is equivalent to the capacity of 1000 kV AC since there is a positive and negative difference on DC cables. The LADWP converter station and its large AC distribution facility for the city of Los Angeles and its 3100 megawatt lines are widely distributed over about 33 acres (in a area approximately 2400 feet by an average of 600 feet) west of the 5 freeway (or west of Sepulveda Blvd) and south of San Fernando Road, with a smaller portion being used for DC conversion. For a facility with less than 1/3 the capacity with newer hardware, approximately 5 acres would be sufficient for DC to AC conversion on a project the scale of the Sunrise Powerlink. In an urban setting such converter facilities have been placed completely underground, under a park or under a parking structure. To observe the considerably larger and older, 1965-70, LADWP facilities use Google Maps to find: San Fernando Rd & Sepulveda Blvd, Sylmar, CA 91342, then select satellite view.

Southern route alternatives and underground options | Page 89

G0014-26 cont.

Comment Set G0014, cont.
California Botanical Habitat

G0014-26 cont.



LADWP distribution facility in Sylmar California. DC to AC conversion supplied by ABB of Sweden represents a small portion of this proven facility that has been functioning efficiently for approximately 40 years, delivering 3,100 megawatts 850 miles from Oregon and Washington State hydroelectric dams on the Columbia River. Similar DC converter facilities have been built on less than 3 acres.

Electrical Grid Stabilization based on unpredictable renewable resources

"The growing market activities and the fast and successful development of regional intermittent energy generation with low predictability (wind power) led to [a] significant increase [in] cross-continental power flows. Even though the grid was originally developed for mutual assistance, it has now become the platform for shifting ever increasing power volumes across the continent. Against this background, grid operation has become much more challenging." from the UCTE Union for the coordination of transmission of electricity
http://www.abb.com/cawp/db0003db002698/55622466a2d2c488c12572c700568a95.aspx

Southern route alternatives and underground options	Page 90

Comment Set G0014, cont.
California Botanical Habitat

On a long-distance DC power line a savings of 2.5% or 25 megawatts, compared to overhead AC transmission losses can save $90,000 at .15/kWh every 24 hours or $32,850,000 per year, which can make up for any difference in cost of DC conversion in just a few years.

Erroneous information provided to the CPUC had suggested that DC converter stations would cost $250 or 500 million each, instead of estimates we obtained of $125 million, compared to $65 million for AC transformers, or $60 million extra. However, that is only the greatly exaggerated price of one component in a DC system that could cost $530 million less to build, or save building 2 additional overhead powerlinks, since the capacity of underground DC can triple the output at 500 kV, since its +500 to -500, or the equivalent of 1,00,000 volts in AC, as designed in the 2005 Siemens Tasmanian link (295 km) or the BritNed (260 km).

Additional criticisms claimed that DC converter stations required 40 acres. We examined DC converter stations of similar size that occupy less than 3 acres. We have been also informed that such facilities have also been placed underground below a parking structure.

Further criticisms indicated that DC was only suitable for extremely long distance applications, such as the 850 mile Pacific Intertie. However, links as short as 24 miles have been proven to be cost effective applications of underground DC, such as the Cross-Sound Cable connecting New Haven Connecticut with Long Island New York during 2003.

http://www.energy.siemens.com/cms/us/US_Products/Portfolio/HVSystemsupto800kV/HighVoltageDCTransmissionSystems/Documents/HVDC_References.pdf

High Voltage DC provides 25% lower line losses than AC

Most of the transmission lines that make up the North American transmission grid are high-voltage alternating current (HVAC) lines. Direct current (DC) transmission offers great advantages over AC, however: 25% lower line losses, two to five times the capacity of an AC line at similar voltage, plus the ability to precisely control the flow of power. Historically, the relatively high cost of HVDC terminal stations relegated the technology to being used only in long-haul applications like the Pacific DC Intertie, which connects the vast hydro power resources of the Columbia River with the population centers of Southern California. Currently High Voltage DC transmission is now being utilized in much shorter distances. The Cross-Sound Cable connecting Long Island and Connecticut is one example of this technology.

Energy Efficiency in the Power Grid

http://www02.abb.com/global/seitp/seitp202.nsf/c71c66c1f02e6575c125711f004660e6/64cee3203250d1b7c12572c8003b2b48/$FILE/Energy%20efficiency%20in%20the%20power%20grid.pdf

Southern route alternatives and underground options | Page 91

G0014-26 cont.

Comment Set G0014, cont.
California Botanical Habitat

G0014-26 cont.

III. Electric Vehicle Power Requirements, at 10 kWh / day, could require 20,000 megawatts

Electric Transportation

GM Volt, 161 horsepower electric car, 0-60 in 8.5 seconds, 600-700 mile range.

Impact of Plug-In Hybrid cars on electrical transmission capacity

General Motors Chevy Volt plug-in hybrid is estimated to require 240 watt hours of charging to travel one mile, or about 1 kWh to travel 4 miles and 10 kWh to move 40 miles, which is its expected all electric range. At 5½ cents per kilowatt hour (.05569) for peak summer rates to charge an electric vehicle, then each mile would cost about 1.4 cents in electricity costs through SDG&E. At the highest residential rates of 15¼ cents per kilowatt hour (.15267) the cost would be 3.8 cents per mile driven, which is still well below gasoline costs. At $3.60 per gallon, a 30 MPG vehicle would cost 12 cents per mile for

Comment Set G0014, cont.
California Botanical Habitat

fuel, as well as require far greater maintenance, labor and parts expenses than an electric vehicle, which could amount to at least 10 cents per mile in addition, or totaling approximately 22 cents per mile, excluding depreciation of well over $1000 per year for the lower cost vehicles, which can easily exceed the cost of the gasoline, plus insurance which can range from $600 to well over $2000 dollars per year. Nevertheless, saving 20 cents per operating mile can cut transportation costs to less than ½ for most people. So if 1 million people drive their plug-in electric cars an average of 40 miles per day, and need to use 10 kilowatt hours to charge their vehicles over a 10 hour period, that would amount to an additional demand of 1000 megawatts. Naturally, when people notice that they could easily afford to move away from 1 ton vehicles and drive 3 ton trucks again, then electric consumption would rapidly grow for three reasons. 1st there would be no incentive to drive a gasoline powered vehicle so nearly all domestic and small business vehicles would shift toward plug-in technology. 2nd Since plug-in electric is considerably more efficient than gasoline, then heavy vehicles would no doubt once again replace conventional automobiles, perhaps tripling electric vehicle charging consumption. 3rd Since there is a continuing rapid population influx across California's borders, with a population that doubles every 20 years, then far greater electrical capacity will have to be provided for. So is the proposed electrical capacity for the Sunrise Powerlink capable of charging 3 to 6 million cars which require 30 kilowatt hours of charging capacity every day? That would amount to between 10,000 and 20,000 megawatts, or about 10 to 20 times the proposed Sunrise Powerlink for San Diego County alone, and about 60 to 80 times the capacity of the Sunrise Powerlink to charge all the household vehicles in 5 Southern California counties. How could any overhead power line system carry cables heavy enough or voltages high enough to address such a demand, without covering over Southern California with 80 additional Sunrise Powerlinks? Obviously weight is not an issue with higher efficiency DC copper underground cables, which can already quadruple the capacity of the Sunrise Powerlink, operating at 600 kV DC using only two 6¼ inch cables in a 5 foot deep trench, 1 foot in width. Why would underground DC transmission be avoided? Because there is more familiarity with the AC transformers at SDG&E? So far not one reason based on fact, overall cost savings and environmental protection has been offered which supports overhead power line construction.

G0014-26 cont.

Photovoltaic Automotive Charging

If solar panels were used to charge a plug-in hybrid car such as a Chevy Volt, then 1 kW of photovoltaic panels during 10 hours could fully charge the car to run 40 miles. If Nanosolar's panels were used, at a cost of $1 per watt, then the cost of the panels would be $1000 which would pay for itself in fuel savings alone within 10,000 miles of driving, which would typically occur well within 1 year, with panels that could last well over 30

Comment Set G0014, cont.
California Botanical Habitat

years. Apparently photovoltaic panels can power a car over 50 times cheaper than gasoline, so spending $50 at a gas station could be replaced by a $1 solar investment.

G0014-26 cont.

Autos, SUV's and pickups registered for 2006 in Southern California

San Diego County	2,295,324	(autos 1,875,748 + (trucks 503,511 * .83 = 419,576)
Orange County	2,281,798	(autos 1,926,712 + (trucks 426,120 * .83 = 355,086)
Riverside County	1,417,570	(autos 1,091,918 + (trucks 390,798 * .83 = 325,652)
Los Angeles County	6,912,168	(autos 5,917,189 + (trucks 1,194,022 * .83 = 994,979)
Ventura County	650,085	(autos 524,605 + (trucks 150,582 * .83 = 125,480)
Total:	13,556,945	cars, SUV's and pick-ups

From California DMV

Nanowire Battery Technology

- **Increasing the range of an affordable electric car beyond 400 miles**
- **Providing solar electric storage for night and days of reserve capacity**

Stanford researchers have found a way to use silicon nanowires to reinvent the rechargeable lithium-ion batteries that power laptops, iPods, video cameras, cell phones, and countless other devices.

The new technology, developed through research led by Yi Cui, assistant professor of materials science and engineering, produces 10 times the amount of electricity of existing lithium-ion, known as Li-ion, batteries. A laptop that now runs on battery for two hours could operate for 20 hours, a boon to ocean-hopping business travelers.

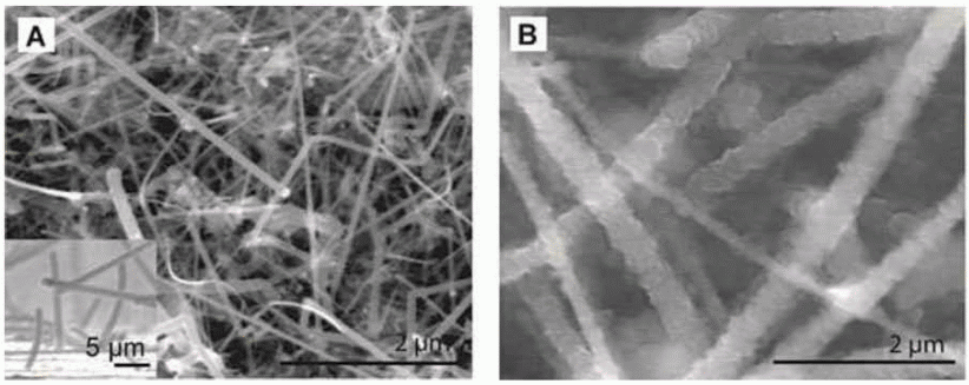
"It's not a small improvement," Cui said. "It's a revolutionary development."

The breakthrough is described in a paper, *"High-performance lithium battery anodes using silicon nanowires,"* published online Dec. 16 in Nature Nanotechnology, written by Cui, his graduate chemistry student Candace Chan and five others.

The greatly expanded storage capacity could make Li-ion batteries attractive to electric car manufacturers. Cui suggested that they could also be used in homes or offices to store electricity generated by rooftop solar panels.

Comment Set G0014, cont.
California Botanical Habitat

G0014-26 cont.



Photos taken by a scanning electron microscope of silicon nanowires before (left) and after (right) absorbing lithium. Both photos were taken at the same magnification. The work is described in "High-performance lithium battery anodes using silicon nanowires," published online Dec. 16, 2007 in Nature Nanotechnology.

Reference links:

Stanford: http://news-service.stanford.edu/news/2008/january9/nanowire-010908.html
Nanowire Battery (Yi Cui): http://www.gm-volt.com/2007/12/21/gm-voltcom-interview-with-dr-cui-inventor-of-silicon-nanowire-lithium-ion-battery-breakthrough/
GM Plug-in hybrid charging: http://en.wikipedia.org/wiki/Battery_electric_vehicle
SDGE Vehicle rates: http://www.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_EV-TOU-3.pdf
SDGE Residential rates: http://www.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_DR.pdf
Nanosolar photovoltaics: http://www.nanosolar.com/about.htm
Nanosolar Wikipedia: http://en.wikipedia.org/wiki/Nanosolar
DMV Vehicle count: http://www.dmv.ca.gov/about/profile/est_fees_pd_by_county.pdf, 5/6 (approx. 83%) of the trucks listed are pick-up trucks typically for household use according the California DMV statistical division, or about 1/6 are higher capacity and long-haul highway vehicles.

Comment Set G0014, cont.
California Botanical Habitat

IV. Solar Electric Generation at $1 per watt equals ½ cent per kilowatt hour

The first choice alternative to the Sunrise Powerlink was gas fired powerplants. While that is a vastly more attractive option than overhead extra high voltage power lines, it's also evident that the printed copper indium gallium diselenide photovoltaics being used on homes, carports, office buildings and large scale power plants, with panel costs at $1 per watt,[8] can be completive with gas powered power plant construction, particularly for peak demand generation purposes.

Nanosolar's photovoltaic panels are being priced at $1 per watt, which amounts to ½ cent per kWh, or 30 to 80 times less costly than from utility companies.

[8] NanoSolar in San Jose California and Berlin Germany, http://en.wikipedia.org/wiki/Nanosolar http://www.nanosolar.com/index.html

Southern route alternatives and underground options | Page 96

G0014-26 cont.

Comment Set G0014, cont.
California Botanical Habitat

Nanosolar Photovoltaic Panels

Solar panels that could deliver 1000 watts would cost $1000 and deliver approximately 12 kilowatt hours of electricity per day, for more than 40 years, delivering a total of over 175,200 kWh, at $.0057 per kWh or about ½ cent per kWh. With electric companies charging 15 to 40 cents per kWh, then the newer panels can generate electricity at 30 to 80 times less cost, which would mean that the power companies could ultimately supply most of its power at night and during rainy weather, so that anyone on the electrical grid wouldn't need batteries or a back-up system. However, it may ultimately be less costly to charge high capacity Nano-Lithium-Ion batteries at home. Nevertheless, we live in a service oriented society that may not be interested in participating in their own electrical generation, unless installers can make the solution reliable and effortless. While it may take a while for a few homes to be adapted, or for parking lots to be covered with solar panels, companies are being created in California to address the installation of photovoltaic systems, along with the implementation of large scale 50 to 100 megawatt solar installations in China and Europe, utilizing the same panels.

While large numbers of people are not prepared to adapt to roof top solar, higher cost natural gas and petroleum may change that perspective. 1st long life solar panels are now able to provide far higher capacities at $1 per watt, and 2nd companies are being developed to provide professional installation and maintenance at affordable prices. Which is very different than what occurred during the 1970's when uneducated and often incompetent construction workers who didn't understand the technology and couldn't find the parts, simply ripped out solar heating systems in new homes and replaced them with the old technology they understood.

154 megawatt solar concentrator power station in Victoria Australia, at the higher cost of $2.70 per watt, potentially located on a farm, (solarsystems.com).

Southern route alternatives and underground options | Page 97

G0014-26 cont.

Comment Set G0014, cont.
California Botanical Habitat

G0014-26 cont.

1.6 megawatts of solar generation on the roof of Google's offices

153 kilowatt from a solar carport in Vacaville California

Southern route alternatives and underground options	Page 98

Comment Set G0014, cont.
California Botanical Habitat

G0014-26 cont.

Solar tree in Styria Austria (70 panels on 5 branches, occupying a little over 1 square foot on the ground)

Recipients:

The information herein was presented as testimony and in written form to the CPUC with Commissioner Grueneich and Steven J. Weismann Administrative Law Judge, in Ramona California on February 26, 2008 7-9:30pm, at the Charles Nunn Performing Arts Center, 1521 Hanson Lane, Ramona CA 92065

Service list: http://docs.cpuc.ca.gov/PUBLISHED/SERVICE_LISTS/A0608010_71846.HTM

CPUC Public Advisor, 505 Van Ness Avenue, Room 2103, San Francisco, California 94102
866-849-8390, 415-703-2074, public.advisor@cpuc.ca.gov

Aspen Environmental Group, 235 Montgomery St, Suite 935, San Francisco, CA 94104-3002
Tel: 415.955.4775, sunrise@AspenEG.com or aspen@aspeneg.com

:cpucSunriseUnderground Southern Routes © 2008 cbh/upa

Southern route alternatives and underground options	Page 99

Comment Set G0014, cont.
California Botanical Habitat

V. Review (re: Sunrise Powerlink A.06-08-010 and the Southern Route Alternatives)

G0014-26 cont.

Last month we resubmitted our motion for party status, based on comments provided to us by the CPUC, and based on an earlier filing recommendation by the CPUC and Aspen. Unfortunately during the past 3 months there has been no response. We are asking for the opportunity to provide a few questions regarding environmental aspects of the Sunrise Powerlink particularly along the proposed Southern Route, which has not been reviewed by the CPUC, SDG&E or Aspen, which we know would be critical to reducing the environmental impacts of the power line particularly along the Southern Route.

We also noticed that practically no environmental protection has been provided along the Southern Route (in the Environmental Draft of January 3, 2008), and that no protective options have been offered, as has been done for the Northern Route. Apparently none of our comments have been reviewed or understood at all, through the process of meetings or by submitting written comments, which we have verified in person. As a result, we believe that it is extremely relevant to have a few specific issues addressed, which we would be available to provide in whatever form is preferred or allowed; in writing only if that would be more convenient or timely for your process.

Individuals at the CPUC, Aspen and SDG&E recommended that we rapidly address these issues as a Party to this case, since we have researched the issues extensively and are familiar with the critical engineering and environmental details, which have not been addressed to date. Further, SDG&E has postponed an environmental review of our area, and its nature reserves, which we do not take as any lack of intention to bulldoze our region. However, it may well suggest the recognition of a larger view of these issues that needs to be accommodated along the proposed Southern Route, which was recently noticed and commented on by SDG&E.

Could a Southern Route be chosen without an environmental review, that is clearly needed to help reconsider a number of lower impact options that are available; or could a continuing delay in any environmental review for the Southern Route simply be a perfunctory procedure which is done in order to avoid any actual consideration whatsoever prior to the needless bulldozing our region, -- as has been noted in our San Diego County newspapers, and by residents of the region?

I understand that your review process is intended to be both fair and thorough. However, if it could somehow completely fail to notice or avoid major environmental issues along the Southern Route the results could be disastrous and the damages completely unnecessary. Unfortunately, these are issues that <u>are</u> being completely overlooked by SDG&E, and very significantly they are <u>not</u> more costly to resolve in a mutually beneficial way, both for SDG&E and for this entire region.

Our central question remains: Can we present specific questions which are relevant to the Southern Route as a part of this proceeding? -- The information we have provided here is primarily introductory in nature, and we will continue to participate by providing additional information essential to addressing CEQA requirements. -- Thank you for all your consideration and efforts in this and related matters.

Comment Set G0014, cont.
California Botanical Habitat

G0014-26 cont.

SDG&E indicates damages to southern route are greater

TABLE 6-3: SDG&E's Enhanced Northern Route Affects Fewer Significant Lands
*Area affected presented in acres, unless noted otherwise

Land Designation	Enhanced Northern Route	Aspen's Southern Route
Bureau of Land Management	753.6	993.9
National Forest Service – Cleveland National Forest	8.9	352
Tribal Land	0	70.2
California State Parks – ABDSP	271.7***	0
Agency Designated Viewshed	27.7	322.8
Scenic Highways, Byways, or Trails (number of)	18	10
Off Road Vehicle Area	10.0	105
Open Space	65.8	51.2
Preserve or Reserve Land	151.2	330.2
Designated Critical Habitat	292.5	413.8

***Because SDG&E's Enhanced Northern Route would be Constructed within existing disturbed areas, there are zero acres of newly disturbed lands within the ABDSP transmission line corridor.

SDG&E's Enhanced Northern Route has Greater Potential to Avoid Significant Cultural Resources.

Table 6-3
Active Renewable Generation Projects in the CAISO Queue
As of February 29th, 2008

LOCATION	MW	RENEWABLE TYPE
East County	201	Wind
Imperial Valley Sub	1112	Solar
Imperial Valley Sub	3000	Wind
Border Substation	27	Biomass
SWPL	1980	Wind
Miguel Substation	500	Wind
SWPL	375	Solar

Southern route alternatives and underground options | Page 101

Comment Set G0014, cont.
California Botanical Habitat

SDG&E indicates that demand is 7 times greater than Powerlink capacity

B. The Enhanced Northern Route Will Allow SDG&E to Access Those Renewables to Meet Its RPS Mandate.

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. Given that Sunrise will add 1,000 MW of transfer capability out of Imperial Valley to San Diego, Sunrise is necessary for SDG&E and the state to meet their and the state to meet their respective RPS goals. As demonstrated in this Chapter, the Enhanced Northern Route permutation of the project would serve this need best.
http://www.sdge.com/sunrisepowerlink/filings/cpuc/031208/Chapter6SDGE_S_Enhanced_Northern_Route.pdf

While SDG&E has shown that there is an extraordinary demand for transmission capacity in order to carry renewable resources, which is currently estimated to be 7 times the capacity of the proposed Sunrise Powerlink. However, the estimated environmental impact on the Southern Route of 2,649.1 acres, which is visible to millions of people per year, would create the highest environmental impact, creating in excess of 4.14 square miles of impact and damages to an extraordinarily significant wilderness region which would incur habitat and geological restoration losses in the billions,[9] with combined property, health, restoration and replacement costs, as well as business damages, of at least $20 billion for relatively short term impacts. Unfortunately, the project reviewers had

[9] If damaged the areas amounted to 2,649.1 acres (115,394,796 sqft) with full restoration efforts being accomplished over a 40 years period at $25/sqft (or 62 cents per year or 5.2 cents per month) the cost would then be only $2.9 billion (2,884,869,900); which does not include residential, ranch and business property losses in the region, nor include replacement costs for nature reserves and recreational areas which offers payment for property which has equivalent wilderness habitat, geological landmarks, viewshed, access, utility resources, and urban proximity, not to disregard growing medical evidence based on molecular cell biology which continues to demonstrate disruptions of the cellular development process, including carcinogenic developments, which are over 70% greater, based on airborne ionization and electromagnetic fields (EMF) created by high power lines.

Southern route alternatives and underground options | Page 102

G0014-26 cont.

Comment Set G0014, cont.
California Botanical Habitat

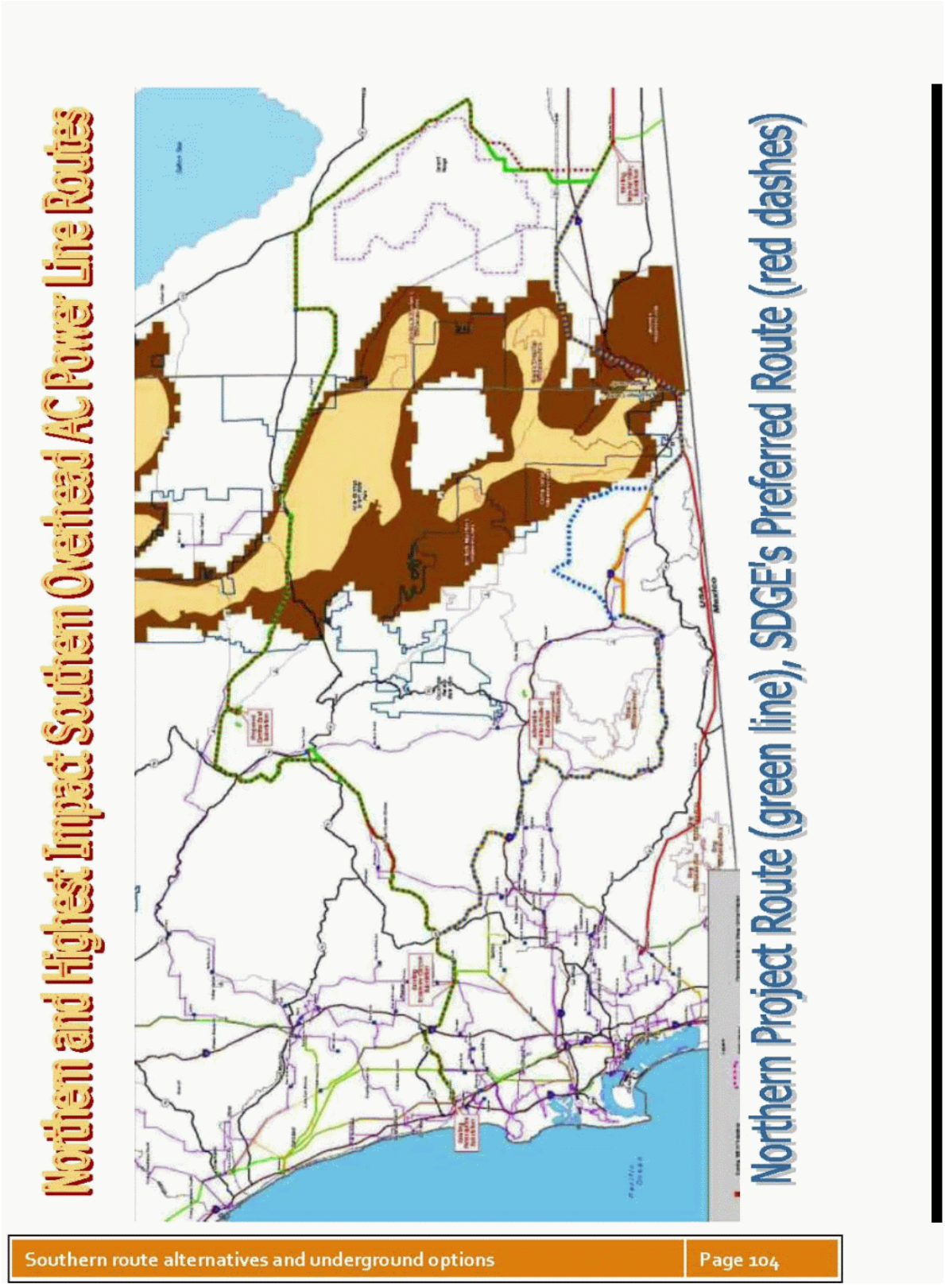
decided that it was too complicated to enumerate the full economic impact and the full range of losses that would be inflicted on the people and the wilderness of this region, and so have avoided analysis and the use of data that is known and is publicly available. Accurate data could have been assembled by analyzing all known cost and impact issues, particularly if a strategy for data collection and analysis was developed. Will the lack of a detailed analysis then be the basis for using eminent domain and an excuse to inflict many billions of dollars in losses, while paying less than 1% of the damages, in violation of state, federal and constitutional requirements?

G0014-26 cont.

SDG&E's data shows that 1,000 megawatts would be immediately inadequate to deliver 7,000 megawatts of renewable power to San Diego, Los Angeles or Orange County. Unfortunately the cable cross sections required to deliver such capacities would be far too heavy for the pylons proposed and the cables being suspended, so many more such power lines would have to be developed. Besides as oil prices rise significantly, a dependency on plug-in hybrid vehicles would require more than 20 such 1,000 megawatt power lines for San Diego alone, and over 85 such power lines for Southern California. Overhead power line technology can not address the growing energy demands nor the engineering problems being created in California, and it would cost far more to continue with overhead AC than the considerably higher capacity underground DC systems being installed in Europe and Australia, which inflict practically no damages to the environment or any communities. The other decentralized alternative, printed solar panels, can also deliver the enormous capacity required to ultimately power the region's transportation system, at $1 per watt, or about ½ cent per kilowatt hour.

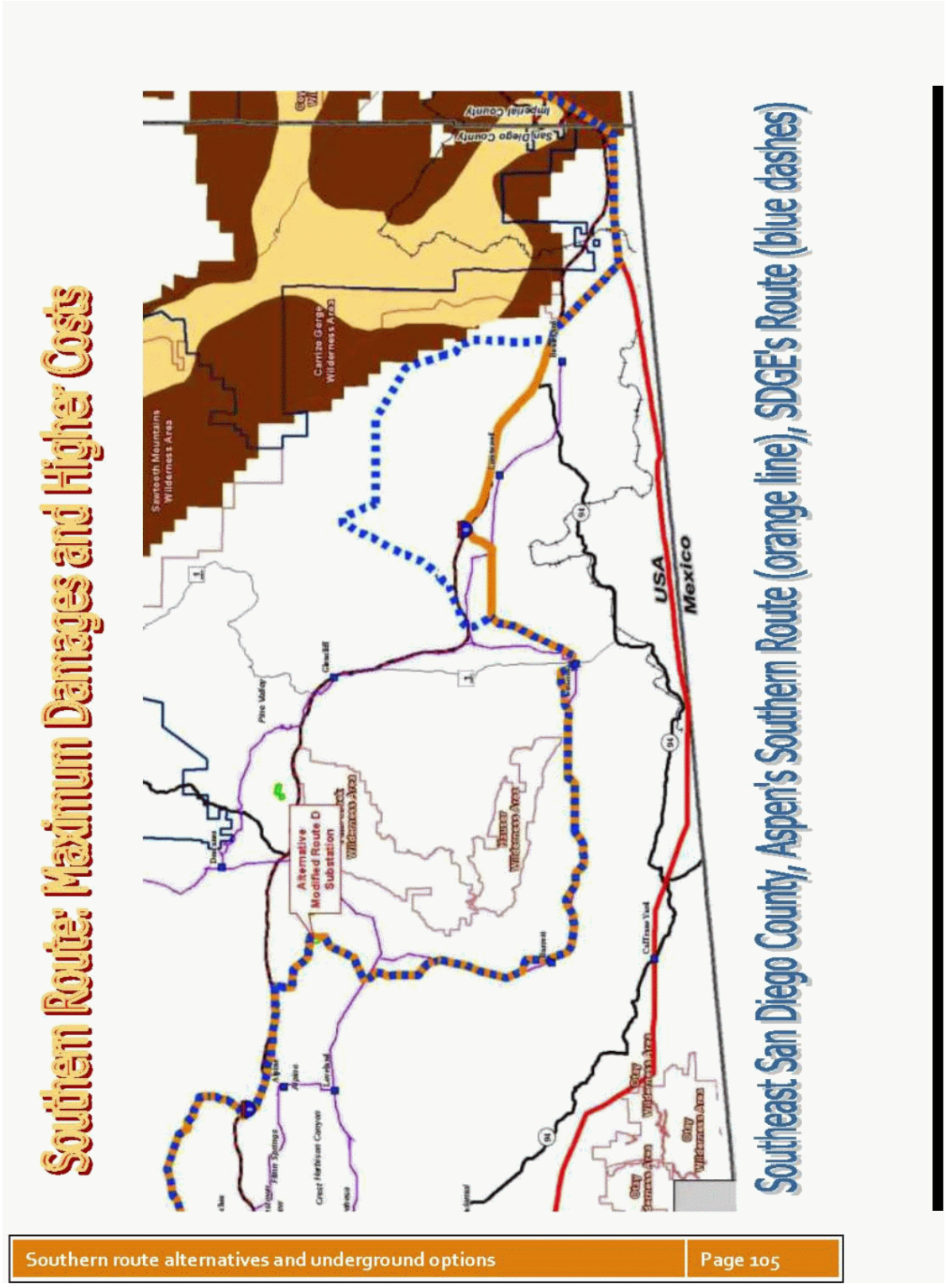
So how could SDG&E or the CPUC object to a lower cost underground DC transmission, that can deliver 3,000 megawatts on 2 six-inch cables in one trench 1 foot wide by 5 feet deep, that can eliminate massive damages and be continuously and rapidly installed? SDG&E's data regarding transmission capacity now required (7000 megawatts) and the cost of environmental damages are not supported by their own design, while higher capacity solutions, that are far safer and have no significant environmental impact, and cost far less to install, have all been rejected. Unfortunately only the damaging alternatives are now being evaluated, with the most damaging, being the Southern Route (either Aspen's Southern Route or SDGE's Modified Southern Route). Clearly the massive damages proposed may well be disregarded because the CPUC, Aspen and SDG&E have avoided calculating the damages and avoided evaluating the losses. No total has been provided for environmental losses, geologic damages, habitat restoration costs, property devaluations, equivalent property replacement costs, medical and personal losses resulting from cancer and related health hazards due to EMF and downwind pollutant ionization exposures, the viewshed losses, a proportional loss to California's $90 billion per year tourism and recreation industry, nor losses to ranches, businesses or to development.

Comment Set G0014, cont.
California Botanical Habitat



G0014-26 cont.

Comment Set G0014, cont.
California Botanical Habitat

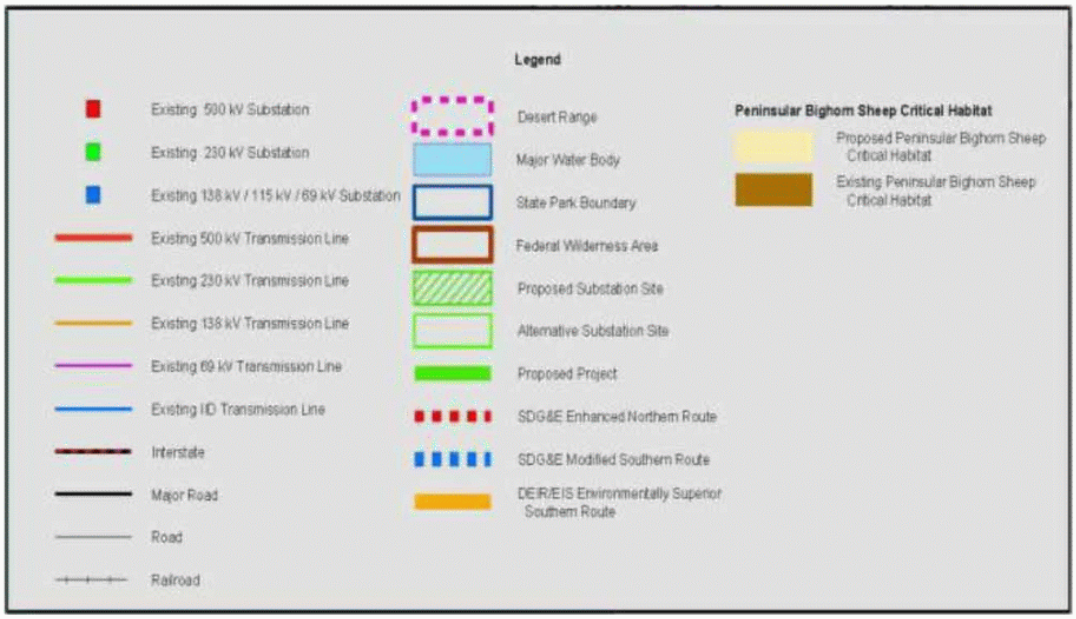


G0014-26 cont.

Comment Set G0014, cont.
California Botanical Habitat

G0014-26 cont.

Northern vs. southern route evaluation



SDGE Northern and Southern AC Routes, Power Line Map (page 114):
http://www.sdge.com/sunrisepowerlink/filings/cpuc/031208/Chapter_1_Rebuttal_Testimony_SDGE_CBD_SierraClub.pdf

CHAPTER 1, PREPARED REBUTTAL TESTIMONY OF SAN DIEGO GAS & ELECTRIC COMPANY IN RESPONSE TO PHASE 2 TESTIMONY OF THE CENTER FOR BIOLOGICAL DIVERSITY AND THE SIERRA CLUB (BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA) March 28, 2008, Updated on April 15, 2008

The choices for power line routes have in several significant instances been decided based on incomplete and inaccurate data, which has resulted in several erroneous conclusions, all without considering the significantly less damaging alternatives which are available and without evaluating the cost of the damages being inflicted. That offers the possibility of a needless, massive and a very costly disaster. The alternatives available for the Southern Route, including underground DC and the cost of the alternative approaches to installation, as well as the environmental and economic damages have not been evaluated for the Sunrise Powerlink, nor have the most significant alternatives been considered, particularly for the Southern Route.

Southern route alternatives and underground options | Page 106

Comment Set G0014, cont.
California Botanical Habitat

24 cable, high-capacity pylon in Kuala Lumpur Malaysia, 689 foot height

Southern route alternatives and underground options | Page 107

G0014-26 cont.

Comment Set G0014, cont.
California Botanical Habitat

Power line capacity can also be increased by stacking 500kV AC cables on taller pylons such as this 210 meter (689 foot) tall pylon in Kuala Lumpur Malaysia, carrying 24 conducting cables, or others reaching 346.5 meters (1137 feet) in height in China. Fortunately these strategies don't save money, don't improve reliability or capacity, don't protect the environment or anyone's health, not in Malaysia, not in China, nor in San Diego County. So why are these overhead systems even considered as even vaguely reasonable, and why do thousands of people have to sacrifice their property, watch the degradation of their environment and endure serious health risks; because some engineer on the board of directors is more comfortable with AC and won't bother to consider underground DC? http://members.tripod.com/~aberkers/

G0014-26 cont.

Transmission Line Tradeoffs, Overhead AC vs Underground DC

Issue	Overhead AC	Underground DC
Installation Cost	$9.3 million per mile	$5.3 million per mile
Damages: environmental property and business	$40 million per mile	negligible
Fire hazards	Can be extremely costly	negligible
Aircraft hazards	Occasional fatal accidents	negligible
Maintenance cost	Requires system replacement	low
Reliability	Moderate reliability	high reliability
Weather hazards	Moderate risk	negligible risks
EMF and Ionization risks	Significant	negligible risks
Carcinogenic risks	Significant	negligible
Capacity per power line	Approx. 1,000 megawatts	3,000 – 5,000 megawatts
Phase synchronization	Significant to avoid failure	nonexistent problem
Terrorism risk	Significant problem	low risk

Southern route alternatives and underground options | Page 108

Comment Set G0014, cont.
California Botanical Habitat

Easement requirements	Complex and costly	use highway right of way
Eminent domain impact	Massive, damaging and costly	negligible use
Community response	Extreme opposition	minor concerns
Medical litigation	Increasingly larger risks	negligible
System condemnation	A future risk	negligible issue
Scenic degradation	Significant losses	nonexistent problem
Transmission efficiency	Significant losses	save 25% on losses
Power line length	Much longer, less direct	can save 49 miles on hwy
Transformer connection	Simplifies multiple connections	usually point to point
Converter station	Less costly transformers	more costly converters
Converter station size	No significant difference	no significant difference
Losses to the people	Over $40 million per mile avg.	negligible
Technological maturity	In use since 1893	since 1881, revised 1950's

The Los Angeles Department of Water and Power has proven over the past 40 years that an 850 mile, 500,000 volt, 3,100 megawatt DC power line eliminate phase synchronization offering greater reliability, greater transmission efficiency, as well as higher capacity than AC power, with no cable weight limitations for underground lines. There are currently over 50 large scale underground DC power lines in operation, with a significant growth in new large scale installations, which are more economical over a wide range of distances and power capacities.

Ramona California, February 26, 2008
CBH participant
PO Box 1032
Hemet, California 92546

G0014-26 cont.