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ORIGINAL

Decision No. 79726

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Mary Hartzell, individually and as Trustee of the GUISEPPINA BIAGGINI TRUST, Complainant, et al., vs. PACIFIC GAS AND ELECTRIC COMPANY, Defendant.	Case No. 9075 (Filed June 8, 1970)
AND RELATED MATTERS.	Case No. 9115 (Filed September 11, 1970) Case No. 9182 (Filed January 25, 1971) Case No. 9189 (Filed February 3, 1971)

Arthur L. Hillman, Jr., and J. Bradley Bunnin, Attorneys at Law, for Pacific Gas and Electric Company, defendant.
Ogle & Gallo, by Charles E. Ogle and Ray Gallo, Attorneys at Law, for Biaggini Trust and Bassi family, complainants in Cases Nos. 9075 and 9115.
David Strain, Attorney at Law, for Sierra Club, complainant in Case No. 9189.
Dr. Norman K. Sanders, for Scenic Shoreline Preservation Conference, Inc., complainant in Case No. 9182.
Vincent MacKenzie, Attorney at Law, and Kenneth J. Kindblad, for the Commission staff.

O P I N I O N

General

On June 8, 1970, Mary Hartzell, individually and as trustee of the Guiseppina Biaggini Trust (Hartzell), filed Case No. 9075. On July 30, 1970, Pacific Gas and Electric Company (PG&E) filed its

answer to the complaint with a motion to dismiss the complaint. Oral argument on PG&E's motion to dismiss was heard on July 16, 1970.

On September 11, 1970, Louis Bassi, Mary Bassi, Alessio Bassi, Marguerite Bassi, E. L. Russell, Jane J. Russell, Richard F. Westerman, and Anne N. Westerman (Bassi) filed Case No. 9115, which complaint was virtually identical with the complaint filed by Hartzell. Complainants Russell and Westerman have withdrawn from this proceeding, and an order of dismissal has been filed.

On December 15, 1970, the Public Utilities Commission issued Decision No. 78102 in Case No. 9075 denying defendant's motion to dismiss the complaint and directing that the complaint be set for hearing on certain limited issues. Thereupon, consolidated hearings were set for Cases Nos. 9075 and 9115 to start January 19, 1971, in San Luis Obispo.

Decision No. 78102 found and concluded "...that complainants should have an opportunity to show that defendant herein had unreasonably or unnecessarily disregarded aesthetic, environmental or ecological considerations in the planning of the transmission line from Diablo Canyon to Gates, contrary to the order in Decision No. 75471." 1/

On December 31, 1970, Hartzell, in Case No. 9075, by mail filed a motion:

> "...that the location of the transmission line, and notice to the owners of the location of the lines is in issue in the hearing which is set on the Complaint in this matter; and...that the hearing on the Complaint in this matter be set at a time which would allow the complainants to undertake discovery before the hearing."

After informal conferences between counsel for the parties and the examiner and argument on the motion on January 19, 1971, the

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1/ Decision No. 75471, dated March 12, 1969, in Application No. 50028, authorized a second nuclear fuel power generating unit at Diablo Canyon in San Luis Obispo County and a second 500 kv single circuit transmission line from the Diablo Canyon Power Plant to Midway Substation near Battenwellen in Kern County.

location of the subject transmission lines was ruled to be an issue but notice to owners was not to be an issue in these proceedings.

Complainants' motion for a postponement of the hearings was denied upon the condition that PG&E present the evidence concerning the location of the transmission line before complainants put on their case on that issue.

Complainants in their opening brief urged reconsideration of the foregoing rulings. Decision No. 78102 disposed of the issue of notice to landowners. During the twenty-four days of hearing in San Luis Obispo and two days of hearing in San Francisco, starting January 19 and ending June 28, 1971, complainants have had ample opportunity to prepare their case, to cross-examine, in detail, defendant's witnesses, and to obtain from defendant voluntarily, or by order of the examiner, all material pertinent to their showing. Complainants do not set forth in their brief any specific information denied to them by rulings. Complainants' request that substantial deficiencies in the hearing be recognized and that a complete examination of this matter be ordered will be denied.

The hearing on Cases Nos. 9075 and 9115 commenced on January 19, 1971, defendant presenting its evidence concerning the location of the transmission lines. Hearings were held on January 19, 20, 21 and 22, 1971. On January 25, 1971, the Scenic Shoreline Preservation Conference, Inc. (Scenic) filed its complaint, Case No. 9182, against PG&E. On February 3, 1971, the Sierra Club (Sierra) filed its complaint, Case No. 9189, against PG&E with a motion to consolidate with Case No. 9075. The complaints by Scenic and Sierra were consolidated for hearing with Cases Nos. 9075 and 9115, the hearings resuming on March 8, 1971, in San Luis Obispo.

Relief Specifically Requested

The requests for specific relief in the complaints of Hartzell and Bassi are stated in identical terms as follows:

1. That the Commission make and issue a temporary order restraining defendant from proceeding with right-of-way acquisition

along the segment of the route defined herein, and restraining any further construction along that portion of the route which it has already acquired until alternate routes for the proposed transmission line are examined which will permit the final disposition of the matters complained of herein.

2. That the Commission order the staff of the Commission to undertake an investigation to examine all possible alternate routes and report to the Commission on the results of such an investigation.

3. That the Commission require defendant to undertake the study of alternate routes and to supply detailed cost data for construction and right-of-way acquisition in connection therewith.

4. That when an acceptable alternative is found, the Commission find that the current proposed route along that segment crossing complainant's property is unreasonable, improper, and against the public interest, and that the Commission make all necessary orders appropriate to enjoin, restrain, prevent and prohibit defendant permanently from constructing that portion of the transmission line of which complaint is made herein.[2/] [3/]

Scenic's request for relief is similar to that of Hartzell and Bassi, without being limited to particular property, as follows:

1. That the Commission issue a temporary order restraining Pacific from proceeding with right-of-way acquisition and powerline construction along the proposed route until alternative routes for the transmission line and alternative methods of construction are examined to avoid the impact complained of herein.

2/ Exhibit No. 12 delineates that the Hartzell property is located about three miles north of State Highway 1 and that the proposed 500 kv transmission line from Diablo Canyon Power Plant to Gates Substation would traverse about 2-1/4 miles of complainant's property.

3/ Exhibit No. 13 delineates that the Bassi property is located adjacent to United States Highway 101 and that the proposed 500 kv transmission lines from Diablo Canyon Power Plant to Midway Substation would traverse about 1 mile of complainant's property.

2. That the Commission order the staff to conduct independent investigations on alternate routes and/or alternate design and methods of construction and report to the Commission on the findings.

3. That the Commission order Pacific to conduct such studies and supply the cost data on alternative routes, design, and construction methods for consideration at public hearings.

4. That when the acceptable alternative routes, design, and construction are found after adequate hearings on the proposed projects, the Commission prevent Pacific from proceeding with the routes, design, and methods of construction causing the impact complained of herein.

Sierra's request for specific relief follows:

1. That the Commission make and issue a temporary order restraining defendant from proceeding with right-of-way acquisition and construction of access roads, transmission lines or towers until defendant, jointly with the staff of the Public Utilities Commission, has developed standards for the siting, construction and maintenance of such facilities which satisfactorily incorporate aesthetics and environmental standards.

2. That the Commission find that defendant has not complied with the order of the Public Utilities Commission in Decision No. 75471 that defendant give full consideration to aesthetic values and conservation of natural resources of the area.

3. That the Commission require defendant to undertake immediate steps to repair the environmental damage which has occurred.

4. That the Commission order the Public Utilities Commission staff to formulate environmental criteria for the construction of the electric transmission systems and that the Commission require defendant to comply with such environmental criteria.

5. That the Commission order its staff actively to supervise the implementation of the environmental criteria when they are established.

By Decision No. 78102, dated December 15, 1971, the Commission limited the hearing in the Hartzell case, Case No. 9075, and subsequently by consolidation in the Bassi, Scenic and Sierra cases, to an opportunity to show that defendant had unreasonably or unnecessarily disregarded aesthetic, environmental or ecological consideration in the planning of the transmission line from Diablo Canyon to Gates, contrary to the order in Decision No. 75471.

Certification of Transmission Lines

After 20 days of hearing, Decision No. 73278 on November 7, 1967, certified two 500 kv single circuit transmission lines and one 230 kv double circuit line in connection with the certification of the nuclear fuel power plant in Diablo Canyon, San Luis Obispo County. One of the 500 kv lines will extend eastward from the plant and south of the City of San Luis Obispo for some 84 miles to PG&E's Midway Substation in Kern County. The other 500 kv line will extend generally northeastward from the plant some 79 miles to PG&E's Gates Substation in Fresno County. Both of these lines connect with the 500 kv intertie system at these substations.

After hearings were held, the Commission, in its interim order, Decision No. 75471, dated March 12, 1969, authorized the second nuclear fuel power generating unit at Diablo Canyon Power Plant and a second 500 kv single circuit transmission line from Diablo Canyon to Midway Substation generally parallel to and adjacent to the transmission line to Midway Substation authorized in Decision No. 72378.

Exhibit No. 11 in this proceeding depicts the entire route of the above transmission lines between Diablo Canyon and Gates and Midway Substations. Diablo Canyon is in San Luis Obispo County on the coast approximately midway between Morro Bay and Avila Beach. Gates Substation is 10 or 12 miles west of the town of Coalinga and Midway Substation is about 25 miles west of Bakersfield.

Exhibit No. 12 shows the first 22 miles of the transmission line right-of-way being acquired by PG&E from Diablo Canyon to Gates

Substation. Between Diablo Canyon and the junction with the existing Morro Bay-Mesa 230 kv line where said double circuit 230 kv line terminates, a distance of about 10 miles, the right-of-way being acquired is shown to be about 500 feet wide and thereafter about 360 feet wide for the remaining 12 miles.

Exhibit No. 13 shows the first 27 miles of the transmission right-of-way from Diablo Canyon to Midway Substation. The right-of-way is shown to be about 1,100 feet for most of the transit across San Luis Obispo County.

The rights-of-way being acquired are of widths sufficient to install one additional 500 kv transmission line to Gates Substation and four additional 500 kv transmission lines to Midway Substation. The installation of these lines will be needed at such time as Pacific installs additional generating capacity at Diablo Canyon. Such additional generating capacity and transmission lines are presently not certified and will require the approval of this Commission before construction begins.

Diablo-Gates Right-of-Way Relocation Proposed by Hartzell and Bassi

The following exhibits are the most significant presented in conjunction with testimony concerning the route proposed for the Diablo-Gates 500 kv transmission line by witness for complainants Hartzell and Bassi:

(a) Exhibit No. 12 (PG&E's exhibit showing a portion of the location of the Diablo-Gates 500 kv transmission line and the Diablo-Morro Bay-Mesa 230 kv transmission line as proposed by PG&E)

(b) Exhibit No. 26 (showing the alternate route for the transmission lines proposed by complainants Hartzell and Bassi)

(c) Exhibit No. 81 (a composite map which combines the routes shown on Exhibits Nos. 12 and 26. Property ownerships and mile markers for the portion of complainants' route differing from PG&E's route are also indicated.)

(d) Exhibit No. 82 (letters from various public agencies opposing the alternate route proposed by complainants and supporting the PG&E route)

(e) Exhibit No. 83 (photographs showing complainants' proposed alternate route)

(f) Exhibit No. 84 (photographs of Hollister Peak)

(g) Exhibit No. 94 (complainants' photograph of Hollister Peak)

Hartzell and Bassi called Dr. Charles William Vrooman, an appraiser in San Luis Obispo County, who testified concerning the transmission lines proposed by PG&E and presented alternate route locations.

Complainants' alternate route diverges from defendant's route after the proposed Diablo-Gates transmission line crosses Coon Creek near the bottom of Section 4, shown on Exhibit No. 81 at the marker "0 mile". Complainants suggest moving the transmission line easterly commencing at or near the marker "0 mile" to avoid a point called "Elna" indicated on the map at elevation 1,325 and to which witness Vrooman referred as "Elna Peak". Elna actually is a monument marker on a ridge of hills which extends in a generally east-west direction and which must be crossed by the lines at some point.[4/] Witness Vrooman objected that PG&E had already built a 230 kv line across Elna and that the towers "are visible from the whole Los Osos-Baywood Park and southerly slope of Morro Bay, the Morro Bay State Park". He stated that the 500 kv towers would also be visible. He indicated that an easterly move could be done without interfering with the air navigation VORTAC station located in Section 2, to the east of marker "1 mile" at elevation 1,462. While witness Vrooman initially indicated that the FAA expected trouble from the PG&E route in the neighborhood of Elna, on cross-examination he indicated that such was not the case.

PG&E's principal witness in the issue of line location was its employee, Mr. John W. Page, Supervisor of Field Engineering. Witness Page stated that such a reroute would take the line through

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4/ We note that the alternate route crosses this ridge at an elevation of 1,320 feet and that the PG&E route crosses on the westerly side at an elevation ranging from 1,260 to 1,320 feet.

far morevisible, more open, terrain across the Los Osos Valley. Mr. Page also testified that the principal support road necessary for the construction of the transmission line has already been built in conjunction with the construction of the 230 kv feeder line and that to relocate the line at this time would necessitate the building of additional construction roads, as well as create a second pair of transmission lines a relatively short distance away from the existing 230 kv feeder line, but not in a common corridor.

Witness Vrooman discussed the area of Clark Valley and Los Osos Valley. Clark Valley is shown on Exhibit No. 81 between mile markers "2 miles" and "3 miles", and Los Osos Valley is located between mile markers "4 miles" and "5 miles". Witness Vrooman testified that the PG&E route crossing Clark Valley comes extremely close to one residence, and one of the 230 kv towers already constructed is extremely visible from a second residence. He stated that the PG&E route is right up against the area of settlement and the cemetery. He indicated that proper weight was not given to the cemetery itself, to the subdivision area just west of the cemetery, and to the area where the line crosses the northerly side of Warden Lake which has been purchased for subdivision purposes. Witness Vrooman indicated that the Los Osos Valley is destined for growth in the future and is growing very rapidly at this time at an increasing rate of speed. He said that the Los Osos Valley is developing at its extremities, that is at the Morro Bay-Baywood Park end and at the other end of the valley where Foothill Boulevard comes out from San Luis Obispo. He stated that the most desirable route for a transmission line in this area "would be somewhere near the central point, other things being equal". Witness Vrooman said that the route proposed by him "about midway between the extension of the settlement of the Los Osos and the extension of settlement out of Foothill Boulevard from San Luis Obispo" was superior. He also indicated that it crosses as far from existing residence as possible. Witness Vrooman's route then would cut across land which belongs to California State Polytechnic College (Cal Poly).

Witness Page disagreed with the location selected by witness Vrooman. Witness Page did not agree that the development of the Los Osos Valley was solely from the two extremities. He also stated that the crossing of the valley selected by witness Vrooman was unacceptable as it was far more visible and across more open country. The level, flat, open terrain crossed by the alternate route proposed by witness Vrooman is shown in the first photograph in Exhibit No. 83.

The next critical area discussed by witness Vrooman was that of Hollister Peak. Witness Vrooman contended that the PG&E route "defaces" Hollister Peak, that the 230 kv feeder line already constructed has defaced Hollister Peak and that the construction of the 500 kv lines in the PG&E location would cause more defacement. He argued that the most beautiful view of Hollister Peak was from the east and southeast or from the north and that the line would cut across the base of the peak and the line of vision of this peak. Witness Vrooman also indicated Tomascini Rock would be affected by the PG&E route.

Planning Director Rogoway for San Luis Obispo County testified that Hollister Peak "is one of the most significant scenic landmarks in the county". Witness Rogoway also testified that PG&E, at the request of the Planning Commission, following a considerable study made by special committees of the Planning Commission, relocated the transmission lines to remove them from Hollister Peak. At the outset the lines were halfway up the side slope of the Peak. As a result of PG&E's contact with the County Planning Department, seeking its concurrence with the proposed route, and as a result of studies made by that Department, the location of the transmission line was altered at the request of the Planning Department. Concerning the present location of the transmission lines as proposed by PG&E, witness Rogoway testified:

"The location where the towers are shown on this map was the result of review by the Planning Commission, not by conditional use, but by voluntary review of Pacific Gas and Electric since submitting their alignments to the Planning Commission for review, and the Planning Commission reacting to the placement of the towers across Hollister Peak.

"At the initial outset the lines were halfway up on the side of the peak.

"And, as a result of the meetings with the Planning Commission, they relocated that tower line off the immediate slopes of the Peak.

"It's the towers that are of concern.

"And, so far as I can recall, the towers in this particular area were not particularly objectionable in the location where they were sited on the modified alignment.

"...I must concede that when you ask it in that sense it would be better if the lines were off the peak." (Tr. 1,060-61.)

Witness Rogoway indicated that PG&E submitted the proposed transmission line routings to him for departmental study and his comments, that the line route was altered in most cases to meet requests of the Planning Department, that the route of the lines was not considered at a public hearing, that notification of Planning Commission action was not given affected landowners and that the Planning Commission finally approved PG&E's proposed route, or routes, as an agenda item, or items, at a regular open meeting in October, 1966.

Witness Vrooman's proposed alternate route would locate the transmission line approximately 2 miles west of Hollister Peak and would cross property owned by Cal Poly, a proposed freeway interchange, and property presently being used by the National Guard. In addition, witness Vrooman's proposed route is in relatively close proximity to the Camp San Luis Obispo Airstrip.

Witness Page testified that PG&E does not have the power to condemn rights-of-way across the property of Cal Poly, the State of California Military Department and the United States Forest Service and that the concurrence of these agencies is required to cross their properties.

Letters from the foregoing public agencies opposing complainants' proposed route are reproduced in Exhibit No. 82.

The position of the Forest Service is stated in a letter dated April 19, 1971, as follows:

> "The Forest Service believes that the location of this transmission line is the most acceptable and suitable for the National Forest resources involved. We have only approved it after giving other alternative routes thorough study and consideration. Further, we feel that the alternative route proposed by Mary Hartzell and Louis Bassi, et al, would have a detrimental effect on the resources of the Los Padres National Forest by placing an additional 1.23 miles of transmission line on National Forest land plus an access road necessary to erect the transmission line. In order to minimize the amount of adverse resource damage to the watershed, wildlife, and open spaces of these valuable public lands we oppose the alternate route across the lands administered by the Los Padres National Forest."

Witness Vrooman testified that the PG&E route interferes with the development of the San Luisito Creek and San Bernardo Creek Valleys because of the effect the lines have upon "aesthetic aspects, the amenities and the views that exist", that in his opinion the transmission line towers are located on high ground. Further, witness Vrooman noted the homes in the area where Banning School formerly existed and in the area just west of "Quintara Cemetery". PG&E's witness maintains that complainants' route would cross San Luisito Valley in a much more open and broad area than the route proposed by PG&E and that complainants' crossing of the existing Morro Bay-Midway 230 kv transmission line is very unsatisfactory since exceptionally high towers would be required for the crossing, approximately 215 to 220 feet in height. A satisfactory crossing is available some little distance to the east of the crossing proposed.

We note that the proposed reroute of the transmission line would cause the right-of-way to be substantially removed from complainants' property and also at higher elevation on United States Forest Service land. Complainants' route rejoins defendant's route at "mile 14.5". The proposed rerouting of the Diablo-Gates transmission line right-of-way is opposed by PG&E.

Diablo-Midway Right-of-Way Relocation Proposed by Hartzell and Bassi

The following exhibits are the most significant presented in conjunction with testimony concerning the transmission line routes proposed for the Diablo-Midway 500 kv transmission line by witness Vrooman for complainants:

(a) Exhibit No. 13 (PG&E's exhibit showing a portion of the location of the Diablo-Midway 500 kv transmission line)

(b) Exhibit No. 27 (showing complainants Hartzell's and Bassi's proposed alternate route for the transmission line)

(c) Exhibit No. 85 (showing the route proposed by PG&E and the route proposed by the complainants. Mile markers for the portion of the complainants' routes differing from PG&E are also indicated.)

(d) Exhibit No. 86 (photographs showing the portion of complainants' proposed alternate route between the Diablo Canyon Power Plant and Highway 101)

Concerning complainants' proposed route for portions of PG&E's Diablo-Midway 500 kv transmission lines, witness Vrooman's testimony primarily was concerned with two areas: (a) from the power plant site to just east of Highway 101, i.e., from the plant to mile 10; and (b) from just southeast of Indian Knob to east of Corbit Canyon, i.e., from mile 11 to 17.

Witness Vrooman would have the Diablo-Midway transmission line adjacent to the southeast side of, and parallel to, the Diablo-Gates line as it leaves the plant switchyard and goes up Diablo Canyon to the first angle point in Section 17. This would route the line on the north side of Saddle Peak in contrast with the PG&E route on the south side of the peak. The witness states that in so locating the line "we are protected from both directions, whereas on the south side you are protected from one,...[and]...this would enable us to cross at less damaging points farther east". The witness, however, admitted that the PG&E route on the south side of Saddle Peak was not

visible from the Avila area though he stated that it would be seen by pleasure boats at sea. He further indicated that the PG&E route was not visible from most of the beach.

Witness Vrooman indicated that he would then go "in general up the Diablo Canyon Valley and then...cross the divide between the Diablo Canyon Valley and the Davis Canyon and...tend to follow the north side of the Davis Canyon". He would cross See Canyon (at about mile 6) between residences located there and cross the ridge further north than the PG&E route. He stated that his route then crosses the San Luis Creek Valley and Highway 101 at a narrow point. He testified that the PG&E route crosses the east of Highway 101 where a small golf course was projected. He further stated that where the PG&E route crosses the Bassi property it crosses at a high point of the ridge and that the towers are visible for some distance from the area on the south of Avila Beach and Squire Canyon Road.

Witness for PG&E opposed such a reroute as not desirable or feasible for a number of reasons. First, the reroute goes up Diablo Canyon and would necessitate the use of both side slopes of Diablo Canyon and the removal of many Bishop Pine trees on the north slope of Diablo Canyon (Exhibit No. 86, Photos 1 & 2). As the route proceeds toward Hill 1639 (at approximately mile 3 on Exhibit No. 85), there would be a problem of siting towers on the slopes as well as with heavy tree growth (Exhibit No. 86, Photo 2). In addition, a problem of construction, particularly of roads, is created when a corridor of transmission lines as wide as this one is located in a narrow canyon. The reroute would require three sets of towers on each slope and roads on both slopes.

Defendant's witness testified that it would be impossible to construct between mile 3 and mile 4 of the proposed reroute without creating conflict with the VORTAC station. Since throughout this portion of the relocated route there is a considerable growth of Bishop Pines along the slopes, particularly on the north slopes, there are construction and road problems on the steep side hills.

Defendant maintains the proposed reroute between the plant and Highway 101 is completely unfeasible, if not impossible, as a transmission line corridor route.

East of Highway 101 complainants' route is the same as defendant's as it passes to the south of Indian Knob and thereafter breaks away from defendant's route to cross Price Canyon road about 1.3 miles north of defendant's crossing. Complainants' route rejoins defendant's route at "mile 17".

Complainants break away from the present PG&E route southeast of Indian Knob would cause the route to cross the shale oil field area. Witness Vrooman testified "the feasibility of developing these things economically in some doubtful time in the future as evident by the action of at least one of the oil companies quite recently in abandoning their leases on a portion of the property which has substantial deposits".

It is claimed that complainants' reroute avoids all settled areas (specifically referring to Arroyo Grande Canyon, Carpenter Canyon, Corbit Canyon and Price Canyon) and that it crossed over flat or grazing land, while the present PG&E route is through an area of rolling hills covered with oak trees. The witness indicated that Carpenter Canyon, Corbit Canyon, Arroyo Grande Canyon and Price Canyon contain rural homesites and that activity in the area includes horse farms, a goat ranch and small rural homesites. He indicated that people built their homes to take advantage of the view and that the PG&E route is within the view of 50 to 60 homes, although fewer than a dozen of the homes are actually touched by the right-of-way.

The witness also criticized the PG&E route because it crosses in the middle of a piece of irrigated land on the Biddle Ranch and that the PG&E route follows a ridge or a hog back which he claimed make the towers quite visible. Witness Vrooman admitted that his proposed alternate route would make an airport unuseable and come close to the airport owner's house.

Complainants' proposed alternate route is very similar to a route originally proposed by PG&E and from which it was moved at the request of the Shell Oil Co., Signal Oil Co., who owned the oil shale deposits and the San Luis Obispo County Planning Commission, who were concerned with the oil shale as a natural resource.

Witness Page stated he did not know exactly what considerations concerned the County, but PG&E was requested to avoid the area by the San Luis Obispo Planning Department. The government oil shale maps used by the witness in preparing the original route of the line through the oil shale area did not accurately show the richness of the deposits, which he subsequently learned about through the considerable exploration work done by the owners and the more detailed information concerning the geology which they made available. He stated that considering the world supply of oil, this deposit will be utilized some time in the not too distant future.

The staff of this Commission and the Sierra Club support the reroute proposed by witness Vrooman between "mile 11" and "mile 17". They argue as follows:

> A proposed transmission route to the south and around the "oil shale lands" adjacent to Price and Tiber Canyons several miles north of Pismo Beach is an unnecessarily long route, would be more prominent in traversing hill and oak tree areas, and would affect a more settled region. Utilizing the shorter route recommended by witness Vrooman would be more compatible with the aesthetics and environmental considerations required of defendant in constructing its facilities, would traverse a more "industrialized" area among sparsely located oil wells and may be less costly because of difference in length. The evidence shows no existing or contemplated shale oil development in the area in the near future nor evidence that a transmission line is inconsistent with shale oil development. The proximity of the existing few oil wells does not appear to be a factor in this area.

We note that record does not show what the actual right-of-way and line construction costs of the alternate proposals would be in this area.

Diablo-Midway Right-of-Way Relocation in the Carrizo Plains Area

The following exhibits are the most significant of those presented in conjunction with testimony concerning the proposed relocation of the Diablo-Midway 500 kv transmission line in the Carrizo Plains area:

(a) Exhibit No. 30 (map of Carrizo Plains Area)

(b) Exhibit No. 31 (overlay of Exhibit No. 30 delineating transmission line right-of-way and Grayson-Owens Company ranch headquarters)

(c) Exhibit No. 69 (photograph of right-of-way on Hill 2284)

(d) Exhibit No. 88 (photographs of Hill 2284 and vicinity)

(e) Exhibit No. 92 (map of agricultural preserve applications and California Valley Subdivision)

(f) Exhibit No. 93 (photographs of California Valley Subdivision)

Relocation of a portion of the Diablo-Midway 500 kv lines in the Carrizo Plains area was first requested by the son of the president of Grayson-Owens Company, which owns a 22,000-acre ranch approximately 60 miles east of San Luis Obispo, in the Carrizo Plains, a rather desolate, dry, largely uninhabited area in east San Luis Obispo County.

The transmission line right-of-way across the ranch runs in a generally east-west direction through the center of the ranch and is visible from the ranch headquarters. The access road for the transmission line has been constructed.

The line crosses a prominence on the ranch, generally referred to in the proceedings as Hill 2284 or Hill 2283, located in the southwest quadrant of Section 10 depicted on Exhibits Nos. 30 and 31. Hill 2284 is a knob, or crest, on a ridge line which extends for a number of miles generally from the northwest to southeast.

Although the ranch witness testified that the ranch company had recently granted PG&E a right-of-way for approximately $50,000, and had never requested that the line be moved, he nevertheless advocated that the line be relocated approximately 1,300 feet southeast through what is called a draw, or saddle, at about elevation 2,050 feet.

Plotting on Exhibit No. 31 the route of the right-of-way depicted on the overlay Exhibit No. 30, we note that the right-of-way crosses on the south to southeast side of Hill 2284 at elevations ranging from 2,100 to 2,250 feet. Ranch headquarters is nearly a mile

north to northwest of Hill 2284 at about elevation 1,900 feet. PG&E witness testified that the first tower on Hill 2284 will be off the top of the hill, that the second tower will be on top of the hill, and the third tower will be off the crest of the hill.

Photographs, Exhibit No. 88, of access roads on Hill 2284 indicate that the routing shown on Exhibits Nos. 30 and 31 may not be that actually to be constructed.

Witness for defendant, a real estate appraiser, presented the results of his population and land use study of the Carrizo Plains area, outlined in blue on Exhibit No. 92, a map showing all of San Luis Obispo County. The Carrizo Plains area encompasses some 400,000 acres or 625 square miles of eastern San Luis Obispo County, an area larger than the combined areas of the City of Los Angeles and San Francisco, with 119 square miles left over. The location of the transmission line is shown on Exhibit No. 92 by the red line.

In making the population and land use study, the witness obtained maps of the area and gathered information with respect to its social, economic and governmental features, including studies of soils, weather, roads, population, patterns of growth, public utilities, services to the public that are available in the area and the general land use and economic base of the area. In preparing the study, the witness conferred with the County Flood Control Engineering Department, the County Road Department, the County Clerk's Office, the Atascadero School District, the County Planning Department, the Building Department, the Assessors' roles, representatives of the California Valley Subdivision, and other informed persons who live in the area.

The Carrizo Plains area can be described as follows:

1. Topography.

The western boundary of the Carrizo Plains runs along the top of the ridge of mountains that separates the coastal area from the Carrizo Plains. The Carrizo Plains range from mountainous land to rolling foothills with a flat, large, high desert plateau or valley section in the center, and extending over to the easterly boundary with another ridge of hills separating the plateau from the Central Valley. The southerly boundary is a range of hills separating the Carrizo Plains from the Cuyama Valley area and the northerly boundary is rather indeterminate.

2. Access: Most Roads are Unpaved.

The Carrizo Plains is approximately a 55 to 60 mile drive from San Luis Obispo. From San Luis Obispo one drives north up Highway 101, turning off at Santa Marguerita and continuing eastward on Highway 58, a two-lane state highway, to the intersection of the Shandon-Cuyama Valley Road which traverses the valley in a basically north-south direction. At Soda Lake the road becomes a dirt road and continues on to the Cuyama Valley. The majority of the roads in the area are unpaved farm roads or subdivision roads that were put in for the development of the California Valley Subdivision.

3. Limited Services Are Available.

There is a small grade school in the area, first through sixth grades, with approximately 30 students attending. The nearest grammar school (seventh and eighth grades) and high school is in the Atascadero area some 45 miles away. After the sixth grade, students must attend school in Atascadero to which they are bussed and where they live in dormitories during the week, returning home on weekends.

In addition there is a county road equipment yard, a forestry station and a community hall where farm bureau meetings are held. There are one service station, a small grocery store, a restaurant and a motel within the entire 625 square mile area.

4. Limited Utilities Are Available.

A large portion of the area has telephone service. In the northern portion electricity is provided to most ranches, while in the southerly portion electricity is generally provided by individual power plants. Water generally is provided by domestic wells, pumped by electricity, gasoline or diesel engines, or windmills. Cattle watering facilities and some of the residences are provided water by windmill pumps.

5. The Economic Base is Primarily Agriculture.

The economic base of the Carrizo Plains is primarily agriculture, with dry farming and livestock operations.

6. General Land Use is Limited to High-Risk, Low-Yield Dry Farming, Cattle Grazing, and a Subdivision Largely Without Population.

Approximately 95 percent of the area is devoted to agriculture with the other 5 percent in the California Valley subdivision, a rural speculative recreational subdivision. California Valley subdivision is shown in green on Exhibit No. 92.

The entire population of the Carrizo Plains, an area larger than the Cities of San Francisco and Los Angeles combined, is approximately 175 people. In California Valley there has been an increase of around 30 people in the last ten or eleven years, indicating a fairly static population.

a. Agriculture. Approximately 40 percent of the Carrizo Plains agricultural operations is dry farming; the balance is cattle grazing. The area is a marginal farm area. Generally a crop is raised every other year and the land is in summer fallow the years that crops are not raised. The sparse rainfall of the area makes this necessary. In order to collect enough moisture the soils must be mulched one year, collecting rainfall and conserving moisture, with crops planted the following year either to wheat or barley. If enough rainfall comes a crop grows.

The climate in the area is extreme, characterized by cold winters with freezing temperatures going to 20 or

30 degrees with extremes as low as minus two degrees. In the summer time it is generally very hot and dry, characterized by temperatures of 105 or 110 degrees with extremes at 114 degrees. The fall of the year is generally milder, while the spring is the best time of the year, at which time it is generally green with mild warm weather. Average rainfall is between four and eight inches per year.

The soils are generally clay adobes or clay loams. Drainage is to the south end of the plain where moisture is trapped around the Cerro Lake Basin. In this area the soils are underlain with hard pan, and are alkaline in nature.

The principal crops, barley and wheat, are governed to a certain extent by governmental allotments which have been given the area. Yields on barley are around 900 pounds per acre every other year and wheat 700 pounds per acre every other year. Temperature and rainfall can alter the yields tremendously. Generally there is one good crop during each six or seven year period.

b. The California Valley Subdivision. The California Valley subdivision contains around 19,365 acres constituting approximately 5 percent of the total Carrizo Plains area. The first unit of California Valley was recorded in 1960 when the area was divided into slightly over 7,000 lots and a nationwide promotional sales program was initiated to sell lots for $10 down and $10 a month. Two and one-half acre lots were sold for $995 each. The area was represented as being right in the center of California, halfway between San Francisco and Los Angeles, and halfway between the Sierra Mountains and the Blue Pacific Ocean. The property sales price included the land and a graded road to the property. There is neither water, nor sewer facilities, nor electricity, and the roads are not all-weather roads. Since commencement of the venture in 1960, approximately 30 people have moved into the area; and according to the records of the County Building Department there have been 29 cabins or dwellings started to date with three completions filed. The California Valley subdivision can be visualized by reviewing Exhibit No. 93, consisting of ten photographs showing the terrain and improvements in the California Valley subdivision area.

The Carrizo Plains in the vicinity of the Grayson-Owens Ranch is not a settled area, but is a rural area with very few people. The only people in the vicinity of Hill 2284 are those at the ranch headquarters.

c. Land Values Are Low. Agricultural values for farm land in the area generally ranges from $80 to $120 per acre in the Carrizo Plains; grazing land ranges from $20 to $60 per acre. In California Valley, 2-1/2 acre lots are selling at between $1,000 and $2,000.

It was the opinion of defendant's witness that the Carrizo Plains area will remain an agricultural area, but there will continue to be some marginal effect caused by California Valley subdivision. The agricultural use of the area will continue as it has for the past 100 years indicated by the fact that many ranchers have applied for zoning and agricultural preserve status, committing the land to remain in agriculture for the next 20 years to obtain the benefits of taxes based upon agricultural economic values. In order to obtain preserve status an owner must make a written commitment by contract, giving his speculative rights to the county in return for county taxation on an agricultural basis. The Grayson-Owens Carrizo Ranch has filed an application for agricultural preserve status indicating an intention to continue agricultural use of that property for at least the next 20 years.

d. The Towers Will Be Visible to Residents of the Ranch, But Not From California Valley Subdivision. The representative of the ranch testified that the tower at Hill 2284 would be visible from the southern part of California Valley subdivision six miles away. Defendant testified that said tower was not visible from California Valley subdivision, that the transmission lines would not be visible from California Valley Subdivision and that probably the only people within eye distance of the tower on Hill 2284, even with binoculars, are the people at the Grayson-Owens Ranch.

e. The Towers Will Not Affect the Highest and Best Use of the Ranch. Defendant's land appraiser stated that he had made a study of the effect of the transmission line upon the Grayson-Owens Ranch and that in his opinion the highest and best use of the land was not affected by the building of the transmission lines.

f. The Cost of Relocation. PG&E presented testimony that the cost of relocation of the two certified lines would be $118,400 in additional construction costs plus $74,700 for the installation and removal of the tower footings on the present route and additional engineering costs, or a total of $193,100.

Defendant's witness testified that were the transmission line being laid out by him today as an original proposition, he would probably automatically route it to miss the knoll. He stated that a number of things have intervened since the route was originally selected in 1965, and that there is much more concern about the visibility of towers today, even in remote areas, as demonstrated in these hearings.

Defendant argues that other changes have also occurred since the original location of these lines. The structures have been designed, materials ordered, easements acquired, and the line is partly constructed. For these reasons the line should not be relocated at this time, since it would not be a wise expenditure of the required $193,100 to move the line. The area is remote and arid. It is normally not a pretty area. Few people live in the area. Probably the only people within eye distance of the tower on the knob, even with binoculars, are the people at Carrizo Ranch. Further, testimony reveals that not all of the towers on the knob would be visible at the ranch, except in a few places, and that other towers are visible from the ranch. Defendant maintains that it would be a foolish expenditure of funds, after foundations are in and roads constructed, to relocate this portion of this transmission line.

The staff argues that defendant in the case of the tower sites on Hill 2284 has not avoided prominences where possible, although the stated policy is to so avoid, that the projected costs of the reroute around Hill 2284 are unrealistic and not true "out-of-pocket" costs, and that defendant should construct the transmission towers and lines in the "saddle" area 1/2 mile southeast of Hill 2284 in order to make the lines less obtrusive. The staff's position is supported by Sierra who argues that PG&E has applied erroneous standards regarding relocation of the transmission lines in the Carrizo Plains.

Sierra maintains that the resolution of the issue of line relocation in the Carrizo Plains will determine whether PG&E actually must apply the principles it claims to use in the routing of transmission lines. Sierra argues that the failure of landowners to object, payment for easement and remoteness are erroneous criteria and no basis for failing to give full consideration to aesthetics and conservation of natural resources; that isolation from present development is no justification for the willful or negligent refusal to follow principles which were well known when their line was planned. Stating that PG&E had cut costs by using the height of Hill 2284 to lengthen line spans and to eliminate a tower, Sierra urges that such acts must be stopped by this Commission making clear that the utilities' obligation toward the environment do not terminate beyond the sight lines of actively traveled roads. Sierra maintains the defendant's statements of the cost of relocation are erroneous in that a reasonable rerouting might go some distance further back along the route, thus eliminating a dog leg and the need for any new angle towers. Since the expenses of new angle towers is the major part of the total cost of rerouting, the cost of relocation would be substantially reduced if rerouting over distance were utilized.

Complainants Hartzell and Bassi joined with the staff and Sierra in urging the rerouting of the right-of-way in the Carrizo Plains area.

Principal Factors Considered by PG&E in Locating Electric Transmission Lines

Witness for defendant testified that the following factors are considered in the selection of transmission routes with knowledge of all factors over the complete length of the line:

1. Termini.
2. Line length and directness of route.
3. Settled areas and land use:
   a. Airports.
   b. Radio stations, telephone and telegraph facilities.
   c. Wells.

4. Aesthetics and environment.
5. Construction and maintenance considerations.
6. Proximity to existing transmission lines.
7. Consultation with public agencies and interested organizations and individuals.
8. Cost.
9. Security.
10. Terrain and contour of land.

In addition, for each specific route general and specific controls which resulted in the location of the proposed routes were reviewed in detail as summarized and discussed in the voluminous briefs herein.

Road Building

PG&E transmission line access road building methods are criticized by complainants and staff as not giving full consideration to aesthetic values and the protection of the environment.

Over private lands in the Diablo Creek-Coon Creek area, PG&E built a two-lane, outsloped road which cost approximately $3,500 to $5,000 per mile. On Forest Service land permanent roads, basically 14-feet wide, were constructed at a cost of $42,000 to $60,000 per mile.

Sierra would have PG&E be required to adopt and enforce road construction, erosion control and revegetation standards no less restrictive than those of the Forest Service.

Roads on private lands are primarily outsloped, meaning that water drainage from roads on hills is not collected but is expected to run off the road and down the sides of fill slopes. Forest Service roads are primarily insloped with a drainage ditch to collect the water on the hill side of the road, with culverts under the road to carry the water off and beyond the fill slopes. Sierra does not oppose outslope roads per se, but urges that fill surfaces be stabilized to prevent erosion and that overcasting not be allowed to prevent the creation of excessive visual scars.

Where the road is partially on a cut into the hill and partially on fill, Forest Service standards require that the fill be compacted in one-foot lifts with a sheep's foot roller, thereby establishing a solid fill surface less likely to erode. PG&E standards do not require this level of compaction, which results in fill surfaces which will continue to erode and slough off. On Forest Service property, where roads are built on the sides of steep hills, rather than overcasting excess materials from cuts, spoil material must be end hauled, that is, carried to a disposal site selected by the Forest Service, where the spoil material is also compacted to prevent erosion.

Forest Service standards appear to be designed to insure the permanence of the road. From the environmental standpoint, Sierra maintains the standards prevent erosion, encourage revegetation of slopes and reduce visual scars and that PG&E private road standards do not. PG&E has placed fill on steep slopes so that water running rapidly down the surfaces speeds erosion. Culverts, which when used on Forest Service lands take water off the fill slopes onto undamaged soil, on PG&E private land roads open in the midst of fill slopes, thus accentuating erosion. On private land roads, PG&E uses water bars designed to carry water off road surfaces that dump the water on highly erosive, uncompacted soil, thereby causing more erosion. Excessive overcasting, not permitted by Forest Service standards, not only causes erosion, but also, since the Monterey soil in this area is white or yellow in color, makes a scar highly visible for great distances. Excessive overcasting may cause unnecessary damage to root systems of native plants such as Bishop pines, hard chaparral and other species. The new fill surfaces, made up of subsoil, are deficient in nutrients, which make the recovery of plant life difficult and in some cases impossible.

Complainants maintain that the effects of cheap road building - erosion, siltation of streams, damage to fish and filter feeders, destruction of the watersheds, visual degradation - impair the quality of life in San Luis Obispo County.

PG&E indicated that in the course of this proceeding its road building standards have been upgraded. Although PG&E testified that roads built since the construction of the Diablo Gates road are being built to a 14-foot standard, this record does not clearly establish when and where the 14-foot width standard were first applied or where and when end hauling would be used to prevent large overcast areas.

PG&E standards for private roads appear inadequate to prevent erosion, and replanting programs appear to be insufficient and late in formulation. PG&E neglected erosion control through planting or otherwise protecting fill slopes during the rainy season of 1969-70. Although there was extensive testimony about a planting program, PG&E's efforts began in September 1970 and seem to be mainly on test plots, not on the road fills.

PG&E's present plans do not require protection of bare fill slopes in all instances. Hydroseeding, which is relied upon by PG&E, is not required everywhere. Other than hydroseeding and the planting of pine seedlings, many of the steps recommended by Sierra Club experts to encourage plant growth, such as the benching of fill slopes to decrease the speed of water run-off, use of straw or other kinds of mulch to reduce damage to new plants and fill surfaces from rain water, the creation of steps in the fill surface to collect moisture for plants, the netting of fill surfaces to stabilize seeded soil, etc., have not been done and are not planned by PG&E. Tree planting programs are in the planning stage.

Helicopter Use.

Sierra advocates that PG&E be required to make full use of helicopters in transmission line tower construction, maintaining that PG&E gave little consideration to the use of helicopters to prevent environmental problems caused by large roads in hilly terrain. The use of helicopters for construction does not eliminate the need of roads for maintenance, but the width of the maintenance road can be substantially reduced.

PG&E uses helicopters in stringing line conductors for limited tower construction areas of extremely difficult access and/or high scenic value such as the Feather River Canyon, and for limited line patrolling and maintenance and repair. Defendant maintains that reliance on helicopters for maintenance and repairing raises many problems.

Among the problems discussed by defendant in this proceeding were the following:

a. Helicopter patrolling of a single circuit transmission line has been done successfully. However, twin circuit tower lines in the horizontally configuration require the helicopter to fly further away from the lines so that patrolling becomes more difficult because of the difficulty in seeing a broken, chipped or cracked grey insulator when viewed from a distance.

b. Washing of insulators necessary to prevent flashovers cannot be performed by helicopter.

c. Minor work on transmission lines, such as routine changes of insulators, replacement of a broken conductor strand, replacement of a damper or tightening a spacer, can generally be accomplished by hand tools and can be done easily with helicopters. The helicopter lands at some distance and the employees walk in. Minor work is usually accomplished by helicopter; but when the problem on the line is major, helicopters are not adequate. If a structure is washed out or collapses, or an insulator or conductor fails, heavy equipment must be brought to the site to handle the weights and tensions involved. Under these conditions, the helicopters ability to place workmen is not enough.

d. After transmission lines are built, the conductors and structures occupy the right-of-way. Often there is no place to land a helicopter adjacent to operating lines, particularly in wooded or brushy areas. Helicopter repair requires the creation of helipads by clearing and leveling an area outside the right-of-way.

Defendant maintains there is a serious safety problem in constructing electric transmission lines by helicopter. Although the record indicates that during the past 3 years PG&E has had serious accidents involving helicopters, no comparison with road

equipment is presented. Sierra's witness testified that he knew of no one in California who has been injured working under a helicopter and that while the dangers were different, helicopter and road construction methods are probably about equally dangerous.

Witnesses indicate that there are a number of ways in which helicopter construction is hazardous:

1. To maintain an efficient sequence of construction, an assembly-line type of operation must proceed step by step, maintaining regular continuity. This need creates a tendency to fly under hazardous conditions.

2. Flying large masses of metal which approach the helicopter's lifting capacity adjacent to energized lines creates hazards to workmen, pilots and at times the public. On the Diablo transmission lines, the separation between an energized line and a tower being flown adjacent to it might be as little as 45 feet. A helicopter may use a rotor with a radius of 30 feet.

3. Electrically, in the approach to any energized line, the helicopter and the mass of metal it is carrying pick up static charges of electricity and at the same time pick up induced charges of electricity. These can reach 3,000 volts, discharging 10 to 30 milliamps of current. This causes the helicopter or the load itself to become energized or "hot". Such current is hazardous and must be drained off or grounded. This can be difficult to do. A ground rod should be driven, attached to a long ground cable. All employees must ground the suspended load before touching it. Even this is not always effective, because many times in hot, dry or rocky areas the ground rod is not effective. In addition, where several employees are involved, there is the hazard of the ground being applied too late. De-energizing and grounding lines adjacent to the one under construction is not always effective.

4. Flying close to structures and energized conductors in areas subject to gusty winds, irregular thermal air currents, clouds, etc., is hazardous to personnel and places the energized circuits in jeopardy and is thereby a hazard to continuity of service to the public. Steady winds in excess of twenty miles per hour are considered too high. Gust increments in the neighborhood of five miles

per hour are considered too dangerous. At the present time hearings are in process with regard to the adoption of safety standards by the Human Relations Agency of the Department of Industrial Relations, Division of Industrial Safety of the State of California, which would prohibit the use of helicopters in such construction where the wind velocity exceeds 20 miles per hour or where gusts exceed 5 miles per hour.

The helicopter use is also reduced or limited by high temperatures, which can reduce lifting capability 50 percent at a temperature of 90 degrees, fog, clouds, and rain.

5. When suspended loads are flown, they tend to swing and gyrate, and must be "touched down" to stop the motion. In confined areas, such as in the coastal mountains, where tower locations are on small narrow work areas, this is dangerous to personnel. This problem is increased when there are winds. It appears that labor unions in California are claiming it is unsafe for men to work around helicopters.

6. To fly rope pulling lines so that the rope will drop into the trails cleared of brush and trees requires low and slow flying. As a helicopter drops into a canyon and goes over a hill, the pilot can experience varying wind and temperature conditions which can be dangerous. It is possible to avoid the problem by waiting for an ideal day and then stringing enough rope for several crew-days of work. Such a procedure is claimed not to be feasible for tower construction.

7. One method of erecting towers is to use the helicopter not only to fly the tower steel to the site but also to fly a gin pole to the site and use the gin pole to erect the tower. Other methods are to transport pre-assembled towers from a marshalling yard to the tower site or to transport the material to the tower site by helicopter, assemblying the tower on the ground, and tilting the assembled tower up by helicopter. This later method is limited to fairly level terrain. In the preferred method, a gin pole must be supported vertically, which generally requires four guy lines. In steep mountain country, these guy lines often have to be anchored or

placed far down in the bottom of a canyon, thus creating a multitude of hazards. In addition, when working next to energized lines, such guy lines often have to be placed close to energized lines.

Sierra's witness indicated that tower erection by helicopter is only possible with aluminum, but PG&E does not agree that helicopter construction is necessarily so limited.

Other important considerations in the use of helicopters are:

1. Constructing a major transmission line is an assembly line procedure. Activities extend throughout the right-of-way over distances of 20 to 25 miles. If helicopters are the only means of transporting men and materials, a large fleet is required. This problem is accentuated and the logistical difficulties increase during foggy, windy and inclement weather.

2. The right-of-way is normally occupied by men, equipment and materials and may not be available for helicopter landings. Helipads outside the right-of-way then have to be cleared and leveled. This involves the clearing of an area of trees and brush and, when the terrain is steep, the building of a pad with structural timbers so that the helicopter will have a place to land.

3. Major transmission line components of 500 kv lines are too heavy for most helicopters. Towers weigh 8 to 37 tons, foundations require 74 to 132 tons of concrete, and conductor reels weigh approximately nine tons.

   These heavy weights require a large number of trips to carry in the material required for the construction of the tower and many pours of concrete.

4. Major transmission line construction requires the use of very heavy equipment. For instance, to construct the type of tower utilized in the subject transmission lines, the foundation holes run from 42 inches to 4 feet in diameter and in some of the hillside country will go as deep as 23 feet. At the bottom of these holes there must be an undercut to develop the foundation uplift capacity that is required. This requires very large holedigging equipment. A mechanical holedigger on wheels weighs approximately 18-1/2 tons. An alternative tractor-mounted piece of equipment weighs approximately 17 tons. Necessary concrete mixers weigh approximately 20 tons when they are loaded. Pullers and tensioners for the stringing of conductor weigh from 15 to 20 tons.

5. Since wet concrete weighs approximately 4,000 pounds to the yard, many flights are necessary to complete a pour. This can cause an additional problem where a lengthy flight is required, since the finer material in the concrete works its way to the top and the heavier material works its way to the bottom during a long flight, making the concrete pour inferior.

   Concrete should be placed in a continuous pour. If flying weather changes and completion of the concrete pour is delayed, the quality of the foundation is reduced.

6. Helicopters are costly. Helicopters involve high fixed costs, involving not only the purchase price of the ship, but insurance rates as well. Operators charge ferry time from and to their headquarters and require two or three hours minimum fee per day whether they fly or not. The Sikorsky Skycrane, with an advertised capability of lifting 10 tons, which experience has shown to be closer to 8 tons, costs about $3,000 per hour.

   The Sikorsky S61 helicopter with a nominal 4 ton lift capacity, costs approximately $1,200 per hour. Some of the smaller helicopters, capable of lifting 2 tons, costs about $700 per hour; smaller crafts cost less. By contrast land cranes being rented for outside contractors on the Diablo-Midway line cost PG&E $18 an hour, while PG&E owned cranes cost approximately $17 per hour to operate.

7. The availability of helicopters is a problem. On the West Coast there are very few large helicopters available to civilians and there are not many more medium sized helicopters available. The real problem of availability is having them when needed. Operations can be seriously affected, particularly in the summer, when the state or federal forest service requisitions all helicopters in an area for fire fighting purposes, which can disrupt the construction program.

PG&E witnesses indicate that helicopter construction is planned on the Diablo-Midway transmission line in the area from Wild Cherry Canyon to See Canyon where line construction will be visible from Avila Beach and to the public traveling along Highway 101. The record does not show when this decision was made. This will minimize the size of the necessary access road by performing as many of the functions of construction as possible by helicopter. The need for roads will not be eliminated, but will be minimized. In this area a road with a basic width of ten feet will be constructed, rather than the standard 14 foot road. The road will widen around turns. The 10 foot road is alleged to be the minimum for many portions of PG&E's work, including taking men to the working sites, maintaining the transmission line, and getting to the work locations at times when flying is not possible. Approximately 15 to 18 percent of the road may exceed the basic 10 foot width. PG&E's equipment, other than light vehicles, need at least a 14 foot road. Such vehicles are eight feet wide, and it is necessary to provide a three foot clearance on each side. This is required in hilly terrain, because when the vehicles are driven down the center of the road the rear wheels do not track immediately behind the front wheels.

Helicopters will be used to string conductor lead lines and pulling lines on the Diablo transmission lines. Areas in which helicopters will be so used include the following:

a. On the Diablo-Midway 500 kv transmission line:

From Diablo Canyon to Highway 101;

In the area above Squire Canyon;

In the area west of Price Canyon;

In the area to the south of Lopez Lake; and

Much of the Branch Mountain area and the Los Padres National Forest.

b. On the Diablo-Gates 500 kv transmission line:

From Diablo Canyon to Los Osos Valley;

The area adjacent to Highway 41;

In steep canyons between Los Padres National Forest and Highway 101; and

Through Los Padres National Forest.

A study by PG&E of the added cost of using helicopters to construct the 500 kv lines over U.S. Forest Service lands, Exhibit No. 98, indicates that the cost for a total of 48.48 miles of line would increase from $1,900,440 if normal minimum construction procedures were used to $4,068,880 if complete airlift construction were used. An offsetting credit for the needed road construction eliminated by airlift construction can vary from $4,000 to $60,000 per mile, depending on the type of road construction assumed. Such effects are not included in the above estimates.

Sierra maintains that PG&E's specifications for the project give no evidence of any true interest in helicopters in that the specifications of the towers force aluminum manufacturers to duplicate in aluminum tower designs based on steel. PG&E has made no tests of designs by aluminum manufacturers. Aluminum appears to be competitive only in combination with helicopter delivery, erection and minimum access roads. Sierra argues that since PG&E is unique in the industry in having its own construction capacity geared to road building, and since its construction capacity does not include helicopters of sufficient power to construct transmission lines, PG&E is not interested in aluminum towers or helicopters.

A great deal of argument between counsel involved the question whether PG&E knew that the aluminum manufacturer's bid involved helicopter delivery to the tower site. Sierra's witness on use of helicopters testified this would be the only way the bid would make sense, because aluminum is competitive only when helicopter delivered so that the cost of roads can be deducted. It appears PG&E gave no credit to the aluminum bids because of savings in road construction.

Route Selection Process

Sierra maintains that PG&E's transmission line route selection process fails adequately to consider aesthetics and to conserve natural resources by failing to meet standards stated in "Environmental Criteria for Electric Transmission Systems" published by the Departments of Interior and Agriculture (Exhibit No. 70). In the preface to that volume, it is stated:

> "The key to success in the efforts to minimize the impact and optimize the compatibility of electric transmission systems on the environment is co-ordination - involving the industry, all interested Federal, State and local governments (especially those with planning responsibilities) and the private sector. It is the responsibility of management to ensure that this co-ordination takes place at the earliest possible time in the planning process.

> "The purpose of co-ordination is to identify all interests affected by the electric transmission facility, to explore alternatives and to resolve conflicts." (Page ix, emphasis supplied.)

Additionally, Sierra maintains that PG&E utilized inadequate specialized help and that PG&E standards are inadequate.

Sierra proposed that a utility be required to survey community needs and aspirations preliminary to selection of transmission line corridors to protect the interests of the local communities.

A model for decision making was proposed by Sierra's witness, a landscape architect, in which needed information on community values and objectives and of ecological realities would either be correlated by a computer system or delineated on maps. To obtain information for the map of community values and objectives the utility would solicit by mail and by interviews the opinions of all interested groups such as chambers of commerce, agricultural groups, conservationists, realtors and developers, as well as elected representatives. An extensive series of maps of ecological realities would be prepared to delineate all components of a functioning ecosystem including such items as slope analysis, slope exposure to solar radiation, stability of geological formation, soil stability and erodability, rainfall, wind, fog, flora and wildlife. This information would be combined into a map of theoretical durability to illuminate the areas which could best withstand physical disruption, or could withstand no disruption, such as roads. The two types of information would be compared to evolve a series of transmission line routes where the community values are not in conflict or are in minimum conflict with what is ecologically practical or where ecological practical routes would violate community values. Thus, a full range of alternate routes representing areas of least conflict would be developed in graphic form on topographic maps for presentation to public bodies and interested groups to such a presentation would provide a feedback process to refine the community values previously depicted.

The witness testified that ecological information can and has been recorded and stored in computers for future printout, notably first in this state by San Diego County for planning county road construction and by private firms in the development of planning criteria. Based on a similar study made by the witness in the Santa Cruz mountain area, the witness estimated that the proposed planning procedure for the Gates and Midway lines would cost between $500,000 and $700,000, assuming a two-year study period and a commercial basis without substantial non-profit academic contribution.

Sierra maintains that PG&E in selecting the routes did not consult specialists outside of PG&E with professional expertise concerning land and environment, such as people with degrees in the Soil Conservation Service, geologists, demographers, botanists, range botanists, appraisers, oil engineers, meteorologists, and ecologists or foresters with degrees. Sierra argues that there is a failure to consider the desires of the public adequately and specialized opinion was unheard since one individual in PG&E judged the questions of potential development areas and made the choices between competing priorities.

Standards of Construction

Sierra and staff maintain that PG&E has not established nor pursued adequate road designs and construction standards which meet sufficient environmental criteria. The factors, earlier listed herein, considered by PG&E in line location appear to have been applied in San Luis Obispo County without the evaluation of established relative priorities.

Sierra would have PG&E ordered to adopt and follow the concepts set forth in the publication of the United States Departments of Interior and Agriculture entitled "Environmental Criteria for Electric Transmission System", Exhibit No. 70. Also, Sierra would have PG&E required to adopt and enforce road construction, erosion control and revegetation standards, no less restrictive than those of the Forest Service as set forth in the Forest Service Special Use Permit (Road), Exhibit No. 65.

The staff would have PG&E be required to adopt standards for design, construction, maintenance and repair of access roads, transmission towers and lines, and attendant facilities in order to satisfactorily accomplish environmental and aesthetic goals and minimize the ecological and aesthetic impact caused by the project and to file such standards with the Commission. The staff attached an appendix to its opening brief setting forth recommended guidelines for such standards.

PG&E maintains that it does have standards for line construction adequate to protect the environment and give consideration to aesthetic values, citing Exhibit No. 99, entitled "Foreman's Guide Improving Appearances of Overhead Power Lines".

In response to direction by the examiner that defendant produce in this proceeding all instructions sent to field personnel used in the building of access roads, including all supplementary construction memoranda, PG&E prepared Exhibit No. 99. However, it appears that verbal instructions have also been issued recently changing procedures as a result of this proceeding for a number of items, such as in "end hauling" to dispose of excess soil material.

Exhibit No. 99 contains the following sections:

Section No.	Section Title
100	Introduction
200	Selection of Rights-of-Way and Design of Power Lines
300	Acquisition of Rights-of-Way
400	Clearing of Rights-of-Way
500	Chemical Treatment of Rights-of-Way
600	Road Construction
700	Gates
800	Planting
900	Painting

We note that much of the material in Exhibit No. 99 has been recently, and perhaps hastily, prepared. For example, PG&E's witness, a forester, who testified extensively on defendant's replanting tests and efforts, was not aware of any PG&E written guidelines or standards for replanting rights-of-way until he was shown Exhibit No. 96 which is also included in Exhibit No. 99 as Section 600 and refers to Section 800, Planting, of Exhibit No. 99.

Tower Design

Sierra maintains PG&E has failed to give full consideration to aesthetics in the design of its transmission towers in that PG&E prefers a lattice design to the "art form" of tubular structures. PG&E presently does not have a tubular structure design for a 500 kv tower. Sierra advocates that at crossings of well traveled roads the towers should be of what it considers to be the more attractive tubular design.

PG&E considers that lattice type of design blends into backgrounds due to a "see-through" effect better than the more massive tubular design, particularly when the tower is galvanprimed or otherwise painted.

Sierra and PG&E differ on the extent such blending by surface treatment should be used. The Forest Service requires all towers to be galvanprimed or otherwise painted. PG&E is not planning to treat all towers on private land. Sierra would have all towers surface treated.

Environmental Supervision

In order to effect compliance with PUC orders before unremediable breaches of its orders have occurred, Sierra proposed in its opening brief that the Commission appoint such a number of Environmental Control Officers (ECO) as are necessary to supervise compliance.

The ECOs would review all road and spur construction, in progress and completed, and would prepare recommendations for corrections to bring such roads into compliance as far as may be possible with standards developed with regard to erosion control, revegetation and minimization of visual impact of such construction. The ECOs would have full authority to hire independant experts to study the problems involved. The standard which would be overriding in the decisions of the ECOs will be the return of the areas affected by PG&E construction to their natural state at the earliest possible time and to the greatest degree possible.

The ECOs would be required to file reports with the Commission, no less often than monthly, showing the conclusions reached and orders made with regard to necessary corrective measures, amendments to any orders, and the implementation of same. ECOs would work closely with environmental groups interested in the problems, and would have the authority and be encouraged to allow conservation organizations to tour the affected areas and submit to the ECOs their suggestions and recommendations about needed repairs. The reports of the ECOs on a project would be submitted to the parties involved in an action.

The ECOs would be required to develop proposed standards for the construction of access road and spurs, for the revegetation of areas affected by road, spur and tower construction, and for the selection of routes so as to minimize the impact of transmission line construction on the countryside.

Finally, Sierra proposed that the ECOs would make a separate study of all phases of helicopter construction of transmission line construction, and would file a report thereon, with copies to the parties to this action, no later than January 1, 1972.

Discussion

We are cognizant of the wide and great concern dealing with environmental values in the areas of air pollution, radiation, thermal effects, land use, noise and aesthetics. We are equally concerned that these environmental problems may result in construction delays and a possible energy crisis. It is therefore incumbent upon us to integrate all these considerations - environmental and economic - in authorizing the construction of public utility facilities.

This integration requires the coordination of all parties - the utilities, manufacturers, government and the public. The instant case recapitulates some of the progress made during recent years in trying to accomplish an equitable, compatible facility, with a minimum impact on the natural state of things, yet fulfilling the demands of an ever-growing need for more energy.

The two 1,060 megawatt units currently under construction in the Diablo Canyon Nuclear Power Plant were certificated in 1967 and 1969. The original site chosen by PG&E was Nipomo Dunes, about 20 miles south of Diablo. After discussions with conservation groups, the utility and the state, the alternate location was agreed upon at an additional cost of several million dollars.

To minimize the environmental impact of electric generating plants and transmission lines, we issued General Order No. 131, effective July 1, 1970. In addition to providing for the certification of such plants and lines to meet the energy needs of the public, the general order formalizes procedures under which we give consideration to the impact of such facilities upon the air, water, and land, with emphasis on aesthetic, environmental and ecological requirements.

Relating to the instant cases, it should be noted that extra high voltage transmission lines now run the length of our state - two 500 kv AC lines and one 800 kv DC line. We have modified our General Order No. 95, Rules for Overhead Construction,

by extending them to include these higher voltages. The routing and construction of transmission lines has heretofore been before us through informal complaints and some formal complaints. These complaints generally related to the use of agricultural land and natural beauty.

In a report on "Environmental Criteria for Electric Transmission Systems" published by the Departments of the Interior and Agriculture in response to the President's "Message on Environment" on February 10, 1970, and the "National Environmental Act of 1969" effective January 1, 1970, it was stated:

> "The public interest is properly served when electric transmission facilities are planned, constructed and operated to provide the country with an adequate and reliable power supply that is compatible with our environment. The key to success in the efforts to minimize the impact and optimize the compatibility of electric transmission systems on the environment is coordination -- involving Federal, State, and local governments (especially, those with planning responsibilities) and the private sector."

We endorse, and will implement, and adopt as our policy this statement.

General Order No. 131 recognizes and emphasizes most strongly the underlying aspect of "compatibility" in considering the influences these facilities have upon their surroundings. The general order prescribes that the proposed line not produce an unreasonable burden on natural resources, aesthetics of the area, public health and safety, air and water quality in the vicinity, or parks, recreational and scenic areas, historic sites and building and archeological sites.

In granting the certificate to PG&E to construct the Diablo Canyon Nuclear Power Plant, the Commission in Decision No. 75471 specifically ordered:

> "...in designing its plants, switchyards and attendant facilities, applicant shall give full consideration to aesthetic values and conservation of natural resources of the area."

"Switchyards and attendant facilities" includes transmission rights-of-way, towers, lines and access roads for construction and maintenance thereof.

We are aware that matters involving transmission lines are never resolved to the satisfaction of all parties. Generally, the questions raised dealing with aesthetic values can only reflect subjective feelings of different individuals dealing with the nature of the beautiful and with judgments concerning beauty. By implication, consideration of these values concedes that each aesthete has highly developed sensibilities, with acute delight in beauty of color, line, sound and texture, and violent distaste for the ugly, shapeless and discordant. We must, in the final analysis, reach an amenable remedy in terms of the greatest public interest.

All transmission lines have an adverse effect on the natural resources and aesthetics of an area in which the proposed facilities are to be located. None of the relocations of the transmission lines herein proposed by complainants produce a lesser burden than those proposed by PG&E.

It must be noted, however, that the evidence in these cases establishes that PG&E did not fully comply with the admonition of the Commission in Decision No. 75471 in the clearing of rights-of-way, road construction and erosion prevention and control. It has been further established that PG&E has not sufficiently developed or adhered to adequate standards for the location, construction, and maintenance of access roads or transmission tower sites and corridors, which satisfactorily incorporate adequate aesthetic and compatible environmental standards or considerations.

This proceeding has afforded us with a unique opportunity to sample and to review the standards and practices applied by PG&E in construction of its electric power transmission network. The meritorious concern of complainants has caused during the period of this proceeding substantial formulation and formalization of standards by PG&E and progressive improvement in its practices. We shall require PG&E to investigate all possibilities of improving its transmission line construction standards and practices, and we shall expect PG&E to demonstrate its progress in its support of future requests for certificates of public convenience and necessity. Our interest and concern in this problem are continuing.

Findings and Conclusions

We find that:

1. This Commission has issued certificates of public convenience and necessity for the following transmission lines from the nuclear fuel power plant in Diablo Canyon, San Luis Obispo County:

   a. One 230 kv double circuit line to a junction near Hollister Peak with the existing Morro Bay-Mesa 230 kv line.

   b. One 500 kv single circuit line to Gates Substation.

   c. Two 500 kv single circuit lines to Midway Substation.

2. PG&E is acquiring by negotiations and condemnation actions transmission line rights-of-way for said certified lines and others presently planned with widths varying from about 350 feet to about 1,100 feet.

3. The routes for the Diablo to Gates and Diablo to Midway transmission lines were shown by approximation only in PG&E's applications for certificates to construct the first two generating units at Diablo Canyon and the planning, location and construction of the transmission lines and attendant roads and facilities are proper issues in this proceeding.

4. PG&E's policy and criteria for the location of transmission lines in general, and which were utilized in the location of the transmission lines which are the subject of this proceeding, are reasonable and appropriate and give consideration to the effect of transmission lines upon the air, water, land and other aesthetic, environmental and ecological requirements of the public.

5. Although it is not conclusively shown that defendant's towers on the transmission routes run "from peak to peak" or "prominence to prominence" as alleged by complainants, the evidence establishes that defendant, on occasion, as in the case of the tower sites on "Hill 2284" (on the Grayson-Owen Ranch in the Carrizo Plains) has not avoided all prominences where possible, although its stated policy is to so avoid.

6. PG&E consulted with, considered and gave consideration to the views and position of appropriate governmental agencies, including the San Luis Obispo County Planning Commission, the San Luis Obispo Board of Supervisors, the United States Department of Agriculture, the United States Forest Service, the Federal Aviation Administration, the United States Department of Interior, and Bureau of Land Management.

7. PG&E consulted with, considered and gave consideration to the views and positions of conservation organizations and other interested groups including the Sierra Club, the Morro Coast and Paso Robles Audubon Societies, California Native Plant Society, Squire Canyon Homeowners Association, and San Luis Obispo Pilots Association.

8. PG&E has studied and analyzed alternate routes for the transmission lines which are the subject of this proceeding.

9. Because of the alternative routes upon which evidence was received on these consolidated complaints, together with staff participation in these matters, it is unnecessary for the staff to conduct further investigations into "all possible alternative routes and report to the Commission on the results of such an investigation."

10. The evidence does not establish that defendant "deliberately lengthened its Diablo to Gates route near Hollister Peak, some one mile south of route 1 in order to avoid lands of the USA and enable defendant to retain its negotiating power under the law of eminent domain; or that defendant deliberately defaced Hollister Peak in selecting its transmission route."

11. Complainants' proposed relocation of portions of the Diablo-Gates transmission line would require duplication of most of the existing access roads between Diablo Canyon and Hollister Peak.

12. Said duplication of access roads would increase unnecessarily the adverse impact of transmission lines on the environment and aesthetic values of the area.

13. Complainants' proposed crossings of the Los Osos Valley and San Luisito Valley are more visible and cross more open country than that proposed by PG&E.

14. PG&E has given reasonable consideration to the location of the transmission line crossing the ridge near Hollister Peak to minimize aesthetic conflict with views of Hollister Peak.

15. The location of the transmission line near Hollister Peak as herein proposed by PG&E is not particularly objectionable to the Planning Commission of San Luis Obispo County.

16. Complainants' proposed location of the Diablo-Gates transmission line on public land is opposed by officials of California State Polytechnic College, California Military Department, and the United States Forest Service.

17. Complainants' proposed location of the Diablo-Midway transmission lines west of Highway 101 would result in an unnecessary adverse impact on trees and the environment due to the placement of a wide corridor of lines in a narrow canyon on steep slopes and the construction of roads either in duplicate on the sides of narrow canyons or on steep slopes.

18. Complainants' proposed location of the Diablo-Midway transmission lines west of Highway 101 would cause a conflict with an air navigation aide.

19. East of Highway 101, complainants' proposed location of the Diablo-Midway transmission line, is shorter in length than that proposed by PG&E.

20. The transmission line route proposed by PG&E east of Highway 101 is within the view of 50 to 60 homes.

21. The Planning Department of the County of San Luis Obispo requested PG&E to avoid oil shale deposits east of Highway 101.

22. Complainants' proposed route east of Highway 101 crosses said oil shale deposits and PG&E's proposed route avoids said deposits.

23. Complainants' proposed route would cross an area in which oil wells are located.

24. Service continuity and safety considerations should be the subject of further study particularly in producing oil well areas.

25. Comparative cost estimates including right-of-way costs should be provided.

26. The comparative aesthetic and environmental impact of lines through the oil shale deposits should be the subject of further study.

27. PG&E's proposed route places towers on a prominence, identified herein as Hill 2284, on the Grayson-Owen Ranch in the Carrizo Plains.

28. Transmission line towers on Hill 2284 will be visible from the headquarters of the Grayson-Owen Ranch.

29. Location of the transmission line in a saddle 1,300 feet southeast of Hill 2284 will not eliminate all view of transmission line towers on said ranch from said ranch headquarters.

30. The Grayson-Owen Ranch granted PG&E the transmission right-of-way shown on Exhibits Nos. 30 and 31 for a consideration of approximately $50,000.

31. Exhibits Nos. 30 and 31 were presented in this matter by an employee of the Grayson-Owen Ranch.

32. Exhibits Nos. 30 and 31 depict the location of the transmission right-of-way granted by the Grayson-Owen Ranch.

33. The Grayson-Owen Ranch had full opportunity to know that PG&E proposed to locate towers on and near Hill 2284.

34. Nothing in this record indicates that the Grayson-Owen Ranch protested the location of towers on Hill 2284 and proposed that the line be routed through said saddle when it granted PG&E the right-of-way across the ranch property.

35. Hill 2284 is located in a remote, undeveloped area with limited public access.

36. PG&E relied on the granting of the right-of-way to locate towers on Hill 2284.

37. To relocate the transmission line right-of-way to said saddle would cost not less than $193,000.

38. All transmission lines have an adverse effect on the natural resources environment and aesthetic values of an area in which the proposed facilities are to be located.

39. None of the relocations of the transmission lines herein proposed by complaints, except around Hill 2284 and possibly through oil shale deposits which relocation requires further study, produce a lesser burden than those proposed by PG&E on the natural resources, environment and aesthetic values of the areas in which the lines will be located.

40. The transmission lines proposed herein by PG&E between Diablo Canyon Nuclear Power Plant and its Gates and Midway Substations will not produce an unreasonable burden on natural resources, environment and aesthetic values of the area in which the proposed facilities are to be located, public health and safety, air and water quality in the vicinity, or parks, recreational and scenic areas, or historic sites and buildings or archeological sites.

41. Complainants' proposed relocation of portions of Diablo-Gates 500-kv transmission line and the Diable-Morro Bay-Mesa 230-kv transmission line is inferior to the route proposed by PG&E.

42. Complainants' proposed relocation of portions of the Diablo-Midway 500-kv transmission line are inferior to the routes proposed by PG&E except as herein indicated.

43. PG&E did not give full consideration to aesthetic values by proposing to place towers on or near Hill 2284 in the Carrizo Plains.

44. Hill 2284 is remote from centers of population, as in a remote and sparcely settled rural area, is not close to a much traveled roadway, and is viewed by few persons.

45. The relocation of the transmission line to a location in the "saddle" area southeast of Hill 2284 is justified only under the conditions that additional payments will not be required to the property owner for the revised easement, and the property owner will waive the right to cause removal by PG&E of footings already installed.

46. On private lands in the Diablo Creek-Coon Creek area, PG&E's road building methods do not give reasonable consideration to aesthetic values and to the protection of the environment in that PG&E constructed roads of excessive width, did not adequately stabilize fill slopes to prevent erosion, excessively overcast excess road material, placed fill on steep slopes, installed water bars which diverted water to uncompacted soil, and did not timely replant denuded areas.

47. PG&E's replanting and reseeding program began in September, 1970, three months after the first complaint in these proceedings was filed, and consists essentially of test plots.

48. PG&E has not given reasonable consideration to aesthetic values and to the protection of the environment in that its program of replanting and reseeding has not been timely nor of adequate extent.

49. Late in these proceedings, PG&E indicated it would make limited use of helicopters in the Wild Cherry Canyon and See Canyon areas to minimize access road construction.

50. This record does not demonstrate that PG&E has given reasonable consideration to aesthetic values and the formation of natural resources and the environment by use of helicopters for transmission line construction to minimize access road construction.

51. The evidence is not convincing that the use of helicopters for construction, maintenance, and repairs of transmission lines would be inordinately more expensive for ratepayers since defendant has insufficiently explored on this record the economic factors so involved.

52. It is reasonable that PG&E fully explore the use of helicopters in areas of especial ecological and aesthetic concern.

53. Defendant should not await adverse reaction from landowners before consideration of changes to accommodate aesthetic and environmental concern, and should solicit landowner and conservation group reaction to proposed transmission line route, placement and all factors relating thereto.

54. PG&E's transmission line route selection process does not reasonably delineate and resolve conflicts between the need of the utility, the values and objection of the community, and the ecological requirements of the affected area.

55. PG&E has not sufficiently developed or adhered to adequate standards for the location, construction, and maintenance of access roads or transmission tower sites and corridors, which satisfactorily incorporate adequate aesthetic and environmental standards or considerations.

56. The standards set forth in the Forest Service Special Use Permit (Road), Exhibit No. 35 of this proceeding, are for permanent road construction and in general are not appropriate for temporary and minimum access roads in remote and private areas.

57. The standards set forth in Exhibit No. 70 in this proceeding, entitled "Environmental Criteria for Electric Transmission Lines", are broadly based to guide judgment but do not contain sufficient detail covering all situations to enable enforcement of compliance.

58. Exhibit No. 99, entitled "Foreman's Guide Improving Appearances of Overhead Power Lines", is inadequate as a standard for the design, construction, maintenance and repair of access roads, transmission towers and lines, and attendant facilities to give reasonable consideration to aesthetic values and the conservation of natural resources.

59. PG&E presently does not have a design of aluminum 500 kv transmission line towers suitable for helicopter construction, nor does it have a tubular-structured 500 kv tower design compatible with modern architecture and developed areas.

60. The use of Commission employees as Environmental Control Officers would be a new activity for which the Legislature has made available neither funds nor staff.

61. It is reasonable that the transmission line and attendant facilities be built with careful consideration and surveillance by appropriate PG&E personnel with specific responsibility to assure that the construction, maintenance and repair of the transmission facilities are accomplished in a manner giving full consideration to aesthetic values and conservation of natural resources.

62. Said certified transmission lines are in the public interest and public convenience and necessity now require and will require construction of said lines.

We conclude that PG&E should be permitted to construct the certified 500-kv transmission lines in the rights-of-way proposed by defendant except as herein indicated, and that PG&E should take such action to ensure that reasonable consideration is given to aesthetic values and to protection of natural resources and the environment as hereinafter ordered.

O R D E R

IT IS ORDERED that:

1. The certificates of public convenience and necessity for the construction of transmission lines from the nuclear fuel power plant in Diablo Canyon, San Luis Obispo County, may be exercised as granted by Decision No. 73278 and by Decision No. 75471 except as herein indicated.

2. The Pacific Gas and Electric Company (PG&E) shall relocate the transmission line to a location in the "saddle" area southeast of Hill 2284 under the following conditions: On or before May 1, 1972, PG&E shall report to the Commission on its progress in relocating the transmission line southeast of Hill 2284. If the property owner has not by then provided the revised easement without additional payment and waived the right to cause removal by PG&E of footings already installed, PG&E may seek termination of this requirement. Otherwise such progress reports shall be made every thirty days thereafter until the relocation has been completed.

3. On or before April 1, 1972, PG&E shall furnish studies to the Commission, with copies to the parties herein, regarding the alternate route through oil shale lands covering service continuity and safety considerations, comparative cost estimates, and the comparative aesthetic and environmental impact.

4. On or before September 1, 1972, PG&E shall report to the Commission, with copies to the parties herein, regarding the transmission line route planning procedures outlined by Sierra Club witness Tito Patri, fully stating PG&E's objections, if any, to the adoption of such a procedure in the preplanning and planning of any future transmission route. PG&E shall not limit itself to objections, but shall, if and where the Patri proposal is inadequate, propose alternative procedures. The procedures should include public participation in the development of transmission line route criteria at the earliest possible stage, and the widest possible dissemination of alternate choices should be available to the public in sufficient time for the public to consider and inform this Commission of its views.

5. PG&E shall promptly survey all existing access roads of transmission lines from the nuclear fuel power plant in Diablo Canyon and shall report in writing on or before ninety days after the effective date hereof what action is now required to reasonably control erosion and to reasonably restore the areas affected by construction to their natural state. The reports shall identify areas of required action by maps, mileage reference and photographs and shall include proposed programs and estimated completion dates to implement proposed programs. Thereafter, at 6-month intervals, PG&E shall make, in writing, progress reports on the said programs.

6. PG&E shall designate appropriate PG&E personnel with specific responsibility and authority to assure that the construction, maintenance and repair of transmission facilities are accomplished in a manner giving reasonable consideration to aesthetic values and conservation of natural resources and the environment

and shall report in writing on or before ninety days after the effective date hereof the names, title, position and designated responsibilities and authority of said personnel.

7. In making future requests for bids to construct transmission lines or supply transmission line material at 230-kv and higher voltages, PG&E shall include specifications of tower design and on site delivery which will permit the use of helicopters for material delivery to and the tower erection on the tower sites. Comparative costs of the use of helicopters and conventional construction shall be furnished in writing to the Commission not less than ten days prior to the award of said bids.

8. PG&E shall promptly undertake the design of tubular-structured towers for 500-kv transmission lines and shall on or before January 1, 1973, submit in writing a progress report of the designs of said towers.

9. PG&E shall promptly solicit or design, consider and test towers made of aluminum or other material suitable for the construction of 230- and 500-kv transmission lines by the use of helicopters for tower delivery to and erected on the tower sites and shall report on or before January 1, 1973 progress of compliance with this ordering paragraph.

10. PG&E shall promptly develop comprehensive written standards and policies for the design, construction, maintenance and repair of access roads, transmission towers and lines, and attendant facilities which will give reasonable consideration to aesthetic values and conservation of the natural resources and the environment of the areas involved. Said written standards and policies shall be filed in this proceeding, with copies to the parties herein, on or before January 1, 1973.

11. All motions consistent with the findings and conclusions of this opinion and order are granted; those not consistent therewith are denied.

The Secretary of the Commission is directed to cause a certified copy of this order to be served upon the Pacific Gas and Electric Company and to cause a copy to be mailed to each appearance of record.

The effective date of this order shall be twenty days after the date hereof.

Dated at San Francisco, California, this 15th day of FEBRUARY, 1972.

Chairman

William Symons Jr.

Vernon L. Sturgeon

Commissioners

Commissioner J. P. Vukasin, Jr., being necessarily absent, did not participate in the disposition of this proceeding.