

Appendix D

Equity and Environmental Justice Considerations in Electromagnetic Fields (EMF) Policy

Decision Insights, Inc.

Equity and Environmental Justice Considerations in Electromagnetic Field (EMF) Policy

**Report of a workshop in Connection with the Power Grid and Land Use Policy
Analysis Project**

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1 D.1 Background and Introduction

2
3 Starting with an observation in 1979 that residential electromagnetic fields (EMFs)
4 may be associated with childhood leukemia (Wertheimer and Leeper, 1979), two decades of
5 research have examined the question whether these fields may be hazardous. Sources of EMF
6 exposure associated with health effects are powerlines and delivery equipment used in long-
7 distance transmission and local distribution of electric power as well as of fields produced by
8 household wiring and appliances. The laboratory research so far indicates that power-
9 frequency fields do produce biological effects under certain conditions. However, the
10 question whether these biological effects lead to adverse health effects is still under debate
11 because of the difficulties in conducting unequivocal epidemiological studies and because
12 current physical theories do not point to a clear, direct mechanism of interaction that could
13 produce effects from exposure to the relatively low-intensity fields that constitute everyday
14 exposure.

15
16 The health endpoints of concern are cancer, especially childhood leukemia, and certain
17 adult cancers such as male and female breast cancer, Alzheimer's disease, and depression.
18 Cancer is the endpoint examined in the majority of the epidemiological studies (over 50). Of
19 the 12 childhood cancer studies, ten are positive, with odds ratios in the neighborhood of 2.
20 The adult studies yield much more mixed results, leading to criticism that there is lack of
21 evidence that EMF exposure is the causative agent in these studies. The ubiquity of electric
22 power and the difficulty in obtaining "unexposed" control population add to these difficulties
23 in interpretation.

24
25 As an agent of exposure, EMF is different from the more familiar chemical exposures
26 because of its nature as a physical agent. The dose of a chemical is correctly envisioned as
27 the quantity of the chemical that enters the organism. In the EMF area, the exposures of
28 concern are created fields of low intensity arising from alternating current sources, including
29 transients and pulses from different devices and switches. In analogy with chemicals,
30 scientists had originally used field strength (or, intensity) as the measure of dose. However,
31 laboratory experiments on cells and tissues indicate that field strength may not be the sole or
32 even the appropriate measure of dose. For example, in some experiments, the effect depends
33 on field strength as well as the way in which the field patterns vary in time (referred to as
34 waveforms, including pulses and transients). In some other experiments, the waveform matters
35 more than the magnitude of field strength.

36
37 In addition, current biophysical theories, which consider the field strength as the
38 relevant dose measure hold that there should be no significant effects from the EMFs
39 encountered in most daily environments because their field strengths are too small. Certain
40 alternative theories that have been proposed are still in their infancy, and remain to be tested
41 experimentally.

42
43 The uncertainties therefore include the measure of dose, the health endpoints of
44 significance, and the incomplete science surrounding the mechanism by which these fields
45 affect biology. Given these, and the vital nature of electric power, it is not clear whether re-
46 routing or redesign of electric power systems is appropriate. However, given the indications

1 of deleterious health effects, and public concern about these risks because of the pervasiveness
2 of these fields in our everyday environment, it has become an issue in the planning of power
3 delivery and use systems.

4
5 The California Department of Health Services (CDHS) has taken a pioneering step in
6 policy formulation by initiating projects that examine how to shape policy and decision-making
7 in the face of these uncertainties, and to do so with considerations of economic equity and
8 environmental justice. This appendix described the results of these considerations, which
9 were partly based on some analytical work of the “Power Grid and Land Use Policy Analysis”
10 project, partly on a workshop “Ethical and Environmental Justice Considerations in
11 Electromagnetic Fields Policy.”

12
13 The purpose of the workshop was to identify the ethical and environmental justice
14 considerations, and incorporate their considerations into the tool. Environmental justice issues
15 are not automatically subsumed in policy analyses. The most widely accepted policy analysis
16 tools of cost-benefit analysis, and the legal and ethical frameworks in which policies generally
17 operate aggregate populations in ways that do not take into account historical patterns of racial
18 and economic discrimination. These two types of discrimination are often interrelated because
19 of the frameworks and methodologies that have been employed historically in the making of
20 decisions and policies.

21
22 The US Environmental Protection Agency defines environmental justice (EJ) as
23 follows:

24
25 *“Environmental Justice is the fair treatment and meaningful involvement of*
26 *all people regardless of race, color, national origin, or income with respect to*
27 *the development, implementation, and enforcement of environmental laws,*
28 *regulations, and policies. Fair treatment means that no group of people,*
29 *including racial, ethnic or socioeconomic groups should bear a disproportionate*
30 *share of the negative environmental consequences resulting from industrial,*
31 *municipal, and commercial operations or the execution of federal, state, local,*
32 *and tribal programs and policies.” (US Environmental Protection Agency, 1997)*
33

34 Implementing EMF mitigation alternatives like the ones analyzed in the draft final report
35 “Power Grid and Land Use Policy Analysis” raises profound equity and environmental
36 justice questions, including:

- 37
38 1. Is the distribution of EMF risks and electricity benefits fair, or is the risk
39 concentrated on a few while the benefits accrue to all electricity users?
40 2. Do some social groups (especially poor people and communities of color) carry a
41 higher burden of EMF exposure than others?
42 3. Should residents whose properties near power lines have depreciated, be
43 compensated?
44 4. Who benefits from EMF mitigation and who should pay?

- 1 5. In light of the uncertainties surrounding a possible EMF-health link, what should be
2 the guiding principles for making decisions (e.g., cost-benefit, prudent avoidance,
3 precautionary action)?
- 4 6. How can EMF mitigation decisions be made to provide special protection for the
5 most vulnerable, most susceptible, the poor, and people of color?
6

7 The first two questions refer to the distribution of risks and benefits and can, to some
8 extent, be answered by analysis. The GIS analysis described in chapter 2 of the draft final
9 report, for example, provides some evidence of distributional inequities. The third and
10 fourth questions involve moral and ethical issues related to responsibility, restitution, and
11 fairness in re-distributing risks, costs, and benefits. The last two questions raise fundamental
12 issues of environmental justice and moral obligations.
13

14 The analytical tools and computer models developed for the power grid and land use
15 policy analysis project cannot answer these questions. The tools were developed largely
16 from a utilitarian perspective to provide the highest net social benefit. To address the ethical
17 and environmental justice issues, we therefore held a workshop with experts in the fields of
18 environmental justice, ethics, law, economics, and risk assessment. In this appendix, we
19 will attempt to combine lessons and insights gained from the analysis and the lessons learned
20 from the workshop to provide policy makers with insights on these issues that go beyond a
21 simple utilitarian view of the EMF issue.
22

23 Perhaps the most fundamental lesson learned in the workshop was that distributional
24 equity and environmental justice are related, but also fundamentally different. We can assess
25 equity (questions 1-4) by examining and evaluating the distributional implications of EMF
26 mitigation measures. Environmental justice, on the other hand, involves fundamental
27 principles of moral obligations to poor people and communities of color. Environmental
28 justice asks not only for fairness, but also for special treatment of people that have carried a
29 larger burden of environmental impacts than others. It is indicative that some proponents of
30 environmental justice environmental justice as a “movement” and refer to the political and
31 administrative processes to make it succeed. They also regard the derivation of guidelines
32 from abstract ethical principles with suspicion.
33

34 In line with this distinction (equity vs. environmental justice), we will first discuss
35 distributional issues and questions. Subsequently, we will summarize the conclusions from
36 the environmental justice workshop.
37

38 **D.2 Equity Issues**

39 *Distribution of EMF Exposures*

40 Electricity and EMFs surround all of us, almost everywhere, almost all the time.
41 Therefore, if EMF poses a hazard, we are all at risk. However, EMF exposure
42 measurements and models make it clear that, when considering the sources of EMFs in the
43 power grid, living near of transmission lines creates the highest levels of exposure, followed
44
45

1 by primary distribution lines, followed by secondary distribution lines¹ and net currents from
2 home grounding systems.

3
4 **Table 1: Typical Exposures from Different Power Grid Sources**

5

6 Source	Range of Exposures
7	
8 230 kV Transmission Line	50-60 mG at 50 feet
9 115 kV Transmission Line	10-30 mG at 50 feet
10 69 kV Transmission Line	10-15 mG at 50 feet
11 Primary Distribution Line	3-5 mG at 50 feet
12 Net Current in Home	2-6 mG

13

14 The number of exposed people differs, however, dramatically for these three
15 sources. There are about 2,500 miles of transmission lines (of a total of 43,000 miles) that
16 run through residential areas. Assuming an average of 100 homes adjacent to a transmission
17 line per mile, and 3 people per home, this would mean that about 750,000 people are
18 exposed to high fields from transmission lines in California. If we extrapolate the sample of
19 homes near primary distribution lines (Chapter 2 of the draft final report) to California, we
20 would estimate that about 19% of all homes are within 50 feet of primary (three phase)
21 distribution line. This would mean that almost one fifth of the population of California (6
22 million people) live in elevated fields. According to a report by the Electric Power
23 Research Institute 10% of all homes (1 million homes in California) have elevated fields due
24 to net currents on water pipes used as a grounding system. With three people per home, 3
25 million people in California would therefore live in elevated fields due to these types of
26 currents in their home.

27
28 If one assumes that EMF risks increases with exposure, 2.5% of the population of
29 California have the highest risk (transmission lines), while almost a third of the population
30 have some risk (distribution lines and net currents in homes), and two thirds have no or little
31 risk from the power grid.

32
33 To determine whether some social groups, especially the poor and communities of
34 color, carry a larger burden of EMF exposure than others, we re-examine the results from the
35 GIS study (Chapter 2 of the draft final report). These results suggest that there is no over-
36 representation of poor people or people of color near transmission lines.

37
38

¹ While we did not model exposures from secondary distribution lines directly, the highest levels of these exposures are likely to be experienced at the service drop. The fields created by these lines were included in estimating the field profiles in the home grounding model.

Table 2: Socio-Demographic Characteristic of People Living Near Transmission Lines and in California (from 1990 Census)

	Within 500 ft of a			California
	230 kV Line	115 kV Line	69 kV Line	
Percent Black	3.00%	3.40%	2.30%	7.40%
Percent Hispanic	20%	17.90%	21.60%	25.40%
Household Income	\$29,283	\$35,567	\$34,704	\$36,000

This interpretation has to be qualified by a methodological limitation of the GIS analysis. The census data on which this analysis was based came from the block group level, which typically includes 1,000 people. The area of a block group varies by population density, which can be as low as 2,000 per square mile for suburban areas (e.g., Irvine, California) to 10,000 per square mile (e.g., Long Beach, California) or higher for densely populated urban areas. Thus, at one extreme (2,000 people per square mile), the block group area would be larger than the buffer area used in the GIS analysis (0.5 square miles for the block group vs. 0.18 square mile for the buffer). To apply the census data for these larger areas, one must assume that the distribution of population characteristics is homogenous throughout the block group area. In an extremely inhomogeneous case, it might be possible, for example, for all blacks to live within the 500 foot buffer and none outside.

At the other extreme, it is possible that the block group area fits entirely into the 500-foot buffer. This would be the case, when the population density exceeds approximately 5,500 per square mile. In this case, the entire block group data would be applicable. In the mixed cases of multiple block groups intersecting the 500 foot buffer area, the census estimates were averages weighted by area within the buffer. Thus a block group that intersected only 10% of the buffer area would get 1/10th of the weight of a block group one that intersected 100% of the buffer area.

In spite of these caveats, the GIS analysis suggests that Blacks, Hispanics, and the poor are not over-represented in areas near transmission lines. While not conclusive, it would be very difficult to explain such a persistent pattern by an inhomogeneous distribution of the population within block groups.

Even if the poor and communities of color do not carry any additional burden of EMF exposure, a case can be made that they are at higher risk and thus deserve special protection. There is evidence (see Mohai and Bryant, 1992, 1995) that these social groups are exposed to higher levels of toxics and other cancer causing agents. If EMF exposure is a cancer promoter, they may therefore be more susceptible to developing cancer due to EMF exposure.

In summary, the answers to questions 1 and 2 are:

1. While the benefits of electricity are shared by all Californians, only about 1/3 of the population carry the burden of potential EMF risks, and only 2.5% carry the burden of the largest EMF exposures from the power grid system.

2. There is no evidence that communities of color or poor people are over-represented in areas near transmission lines.
3. There is some evidence that people in poor communities and communities of color are exposed to higher cancer causing agents (other than EMF) and thus may be more susceptible to cancer promotion.

Property Values

Property values are a key equity concern of residents living near power lines. Many homeowners are convinced that their properties have depreciated substantially due to the EMF issue and the resulting reluctance of buyers to purchase a home near powerlines, especially near transmission lines. This depreciation may have occurred regardless of whether EMF poses a real hazard or not, since buyers' preferences are often determined by perceptions and fears rather than facts. Homeowners who have this concern consider the past depreciation as a loss and they want this loss to be explicitly counted in the policy analysis. At the minimum, they would like to see the loss of property values clearly identified as an offset to the cost of mitigation, instead of as a perceived "windfall" for property owners with currently depreciated home values. Some homeowners prefer this "past loss" framing and like to see property value impacts represented as follows:

1. For overhead line configurations, the past property value depreciation should be counted as a loss, rather than as the status quo;
2. For undergrounding powerlines, property appreciation should not be counted as a gain for the homeowners, but as restitution that brings the owner back to the status quo.

This framing of the problem is in contrast to the utilitarian perspective, which looks into the future and considers past losses as "sunk cost." A major reason for the utilitarian framing is that one should be concerned about the future social benefits, not about the past. Also, it would be practically impossible to track all past losses, e.g. past fatalities due to pole crashes, fires, and electrocutions and penalize the status quo with these losses. While the utilitarian view is firm on considering the future and not the past, it is neutral on the issue of whether to count future gains in property values, e.g. through undergrounding, as a "gift" to the homeowner or as an act of restitution.

In the Chapter 8 of the draft final report, we used the utilitarian frame of the property values concern. However, we want to be clear that this framing allows the consideration of part or all future gains as restitution for past losses. Recognizing the desire of homeowners to frame the past losses as real social losses in the policy analysis, we have provided a user's option in the "Settings" menu of the models developed for this project, which lets users switch the framing of property values. Of course, for all scenarios that involve new construction, property losses to existing homes are always counted as losses.

Figures 1 and 2 show the results of this switch in frame for one scenario (69 kV Transmission Line Retrofit). In Figure 1 undergrounding is credited with a property

1 appreciation of about 11 million dollars. In Figure 2 overhead lines are penalized with a
2 past property values depreciation of \$11 million dollars. In this analysis we did not credit
3 any property values appreciation (or reduction of property values loss) to the options of
4 raising the pole height or split phasing, since these options are unlikely to change the
5 perceptions and fears of potential buyers (split phasing may actually increase concerns, since
6 it doubles the number of lines).

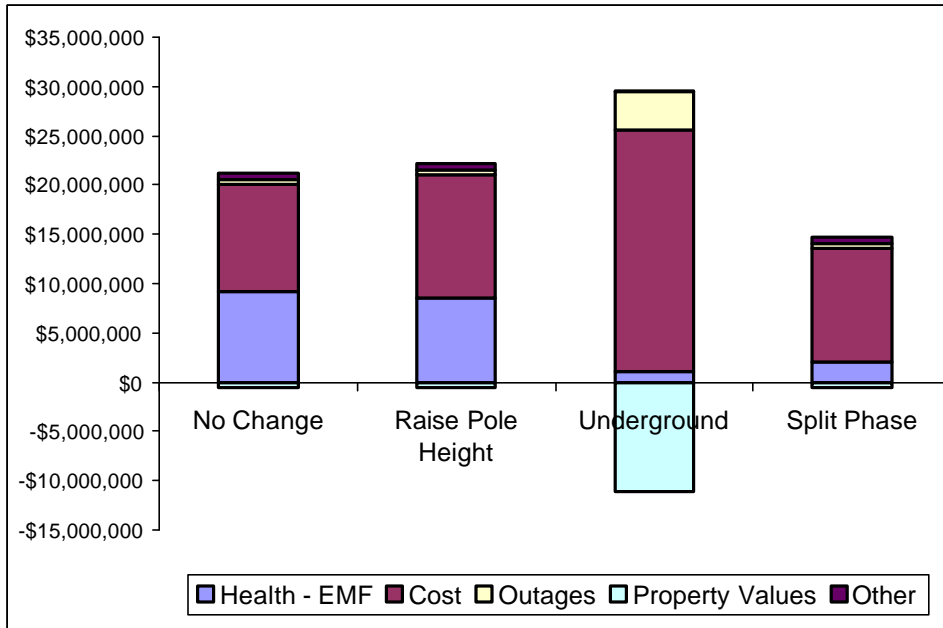
7
8 Both figures tell the same story in terms of net social benefits: Undergrounding is
9 slightly preferable over doing nothing, but split phasing the line is preferable to both
10 undergrounding and doing nothing. But the figures evoke different concepts of equity: Figure 1
11 makes it appear that homeowners obtain a windfall as a result of undergrounding (though this is
12 not labeled as such), while Figure 2 makes clear that overhead lines have created property
13 losses that are restituted with the undergrounding option.

14
15 To complicate matters even more, one has to distinguish three types of homeowners:

- 16
17 1. Homeowners who bought the home before the powerline was built,
- 18 2. Homeowners who bought the home after the powerline was built, but before EMF
19 became an issue;
- 20 3. Homeowners who bought the home after the powerline was built and after EMF
21 became an issue.

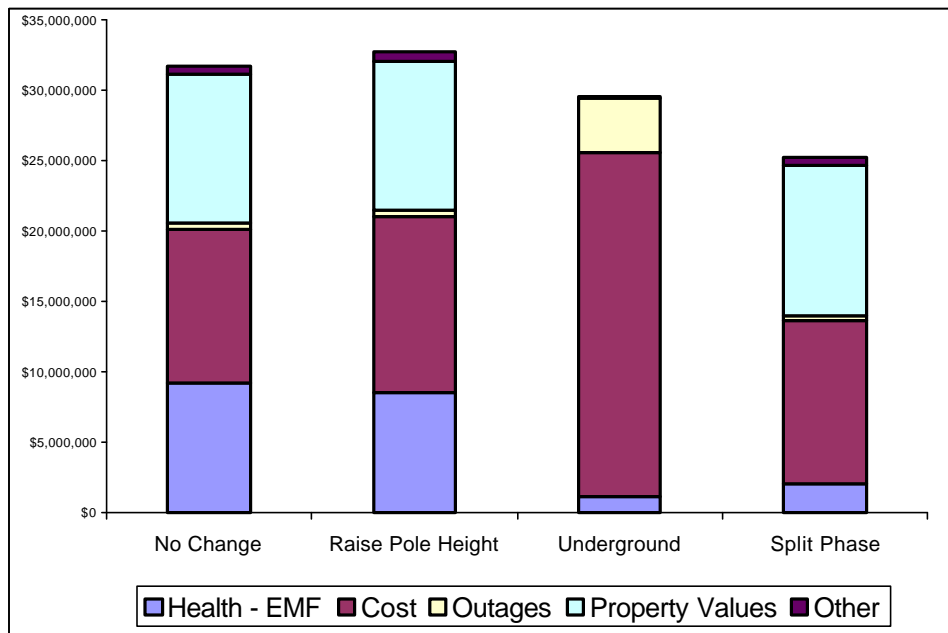
22
23 Homeowners in category 1 experienced both the regular depreciation of the home due
24 to aesthetics, noise, and radio interference and possibly a depreciation due to the EMF
25 concerns. They would claim restitution in the full amount of depreciation minus the
26 compensation that they may have received. For them, undergrounding would be the
27 appropriate form of restitution. They would, however, obtain a small “windfall,” if they had
28 been compensated for the expected depreciation due to aesthetics, noise, and radio
29 interference.

30
31 Homeowners in category 2 bought a depreciated house knowing of the usual
32 powerline impacts. They would have experienced a possible depreciation due to the EMF
33 concerns, but not the full depreciation due to powerlines. These homeowners would claim
34 restitution for the property depreciation due to EMF concerns only. They would obtain a
35 “windfall” when undergrounding leads to an appreciation of the home that exceeds the sum of
36 the depreciations due to regular powerline impacts and EMF.



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Figure 1: Frame of Property Values as Appreciation Due to Undergrounding
(The Y-Axis Shows the Total Equivalent Costs of Mitigation Options)



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Figure 2: Frame of Property Values as Past Losses Due to Overhead Lines
(The Y-Axis Shows the Total Equivalent Costs of Mitigation Options)

1 Homeowners in category 3 bought a depreciated house knowing the usual powerline
2 impacts and presumably knowing the EMF concerns. It would be unreasonable for them to
3 claim restitution due to the usual powerline impacts, and very difficult to make a case of
4 restitution because of EMF concerns. They would obtain a “windfall” when undergrounding
5 the line leads to appreciation both due to the elimination of the usual powerline impacts and
6 due to EMF.

7
8 There is, of course, the fourth category of former owners of homes near powerlines
9 who sold their homes at depreciated prices. At one time they were in one of the three
10 categories above, but depending on when they sold, they would claim that they sold for less
11 either because of the usual powerline impacts, EMF, or both. They would claim that the
12 “windfalls” obtained by the current owners should be transferred to them.

13
14 In summary, a current homeowner living near a powerline can only claim losses due
15 to the portion of the line effect that occurred after he or she bought the house. Furthermore,
16 the past homeowner can legitimately claim that any “windfalls” be passed back on to him or
17 her.

18
19 Practically, implementing a system of claims and restitution is, of course, extremely
20 difficult, if not impossible. No one knows what portion of the possible depreciation is
21 attributable to EMF and what portion is attributable to non-EMF issues. Our models
22 parametrized these portions, usually splitting the overall depreciation in half. Furthermore, it
23 is extremely hard to track the different categories of homeowners, and even harder to track
24 past homeowners and their categories. About 54% of all homeowners own their homes for
25 less than ten years (US Census Bureau, 1990). Since the debate about EMF began in the US
26 in 1979, each house has probably experienced at least two changes of ownership. Assuming
27 a 50% rate of turnover in 10 years, only 25% of current homeowners lived in their houses
28 prior to the EMF debate. This means that most of the benefits of undergrounding could be
29 claimed by the remaining 75% of homeowners that have moved since 1979.

30
31 Furthermore, any system of claims and restitution would have to be based on
32 scientifically sound estimates of property values appreciations or depreciations, due to both
33 EMF and non-EMF impacts. While our analyses indicate that property value impacts in the
34 10-20% change can matter for the final decision, it does not answer how much impact exists.
35 The project did include a feasibility study to determine the opportunities, limitations, and
36 costs of such a property values study. To perform this feasibility study, we requested two
37 study proposals, one by a respected real estate appraisal firm in Southern California and one
38 by a resource economist familiar with the EMF issue and property value studies (see
39 Appendix D). The real estate appraisers proposed a fairly simple appraisal methodology
40 that had methodological weaknesses and was unlikely to disentangle EMF and non-EMF
41 effects. This study, estimated at about \$279,000 would not be able to answer to the property
42 values questions raised above. The resource economist proposed a much more elaborate
43 study design for \$800,000. But even he admits that there are many limitations that make it
44 difficult to disentangle EMF and non-EMF effects.

45

1 In summary, the answer to question 3 (should residents whose properties near power
2 lines have depreciated, be compensated?) is not at all straightforward. It depends on a sound
3 and scientific determination of the amount of depreciation due to both EMF and non-EMF
4 effects and on tracking the tenure of the homeowners with respect to the time periods during
5 which depreciation may have occurred.

6
7 ***Who Benefits from EMF Mitigation and Who Should Pay?***
8

9 Many of the EMF mitigation measures are fairly inexpensive and quite effective in
10 reducing exposure – e.g., split phasing, compact delta configurations, and optimal phasing.
11 These costs could conceivably be absorbed by the ratepayers, since, in real terms, they
12 would amount to a very slight rate increase (see Chapter 11 of the draft final report). In
13 contrast, the cost of undergrounding is substantial and would require a significant rate
14 increase, if financed over a reasonably short period of time (e.g., ten years).

15
16 There are four sources of possible payments for EMF mitigation: Ratepayers,
17 shareholders (in case of investor owned utilities), taxpayers (in case of municipal utilities),
18 and beneficiaries of EMF mitigation. Shareholders would pay by reduced profits, if the cost
19 of mitigation were not passed through to the ratepayers.

20
21 According to a basic principle of environmental justice, the “polluter” should pay.
22 Utilities will not accept the “polluter” role, unless there is convincing evidence that EMF
23 exposure poses a hazard. In that case, utilities will transfer the payment to ratepayers,
24 shareholders, or taxpayers, and most likely to a mix of them. The main problem with
25 applying this principle is, of course, the uncertain state of EMF research.

26
27 The beneficiaries of EMF mitigation are those currently exposed to a potential health
28 risk and, in the case of undergrounding, those who benefit from property values appreciation
29 and improved quality of life. Cheap, relatively cost-effective solutions primarily benefit
30 those with health risks. Undergrounding benefits both groups.

31
32 If EMF poses a health hazard, it would be fair that utilities (and, by implication,
33 ratepayers, shareholders, and taxpayers) pay to reduce the risks to relatively few (2.5% at
34 the highest exposure level and up to 1/3 at moderate levels) in order to provide the
35 electricity benefits to many (at least 2/3 of the population) who are not affected by powergrid
36 EMF exposure.

37
38 It is much more difficult to judge the benefits of home value appreciation to property
39 owners. If it is true that a large percentage of homeowners have bought their houses after the
40 EMF debate began (and thus benefited from presumably lower prices), the appreciation
41 benefits of undergrounding becomes a “windfall” to most of these homeowners. Since it is
42 impractical to transfer that windfall to the previous homeowners who sold at depreciated
43 values, this windfall is real and could be judged to be unfair. A possible solution is to
44 obtain co-payment for undergrounding from the homeowners who are likely to experience
45 this benefit. Consider undergrounding a distribution line, for example. Most homeowners
46 would agree that the aesthetic and property values implications of undergrounding are worth

1 some payment. If undergrounding a one-mile stretch of distribution lines cost \$1 million, and
2 if 100 homes participate, the costs per home are \$10,000, which may well be offset by the
3 property values benefits².
4

5 In summary, the answer to the fourth question (who benefits from EMF mitigation and
6 who should pay?), like the answer to the third one is complex. Beneficiaries are those with
7 reduced health risks, and those who benefit from property values appreciation (in case of
8 undergrounding). It is fair that all beneficiaries of electricity production (ratepayers,
9 shareholders, and taxpayers) should pay for EMF mitigation to reduce health risks, if EMF is
10 shown to be a hazard. It is less clear who should pay for undergrounding. Solutions that
11 involve a mix of payments by ratepayers, shareholders, and taxpayers, and property owners
12 may be the most fair in this case.
13

14 **D.3 Summary of Presentations at the Environmental Justice Workshop**

15
16 Up to this point we have discussed distributional and equity issues related to EMF
17 mitigation. As stated in the introduction, environmental justice requirements go beyond these
18 distributional issues. The remainder of this appendix summarizes the presentations and
19 discussions in the workshop, “Ethical and Environmental Justice Considerations in
20 Electromagnetic Fields Policy,” conducted as part of the Power Grid and Land Use Policy
21 Analysis Project described in the draft final report. This workshop was designed to gather
22 views and advice on the ethical and environmental justice factors from experts in the field of
23 environmental justice, economics, law, and risk assessment.
24

25 The workshop schedule is shown in Appendix D.1. The participants in the workshop
26 included experts in the fields listed above, project personnel, members of the Stakeholders
27 Advisory Committee, and members of the California Department of Health Services. A list of
28 the panel of experts is given in Appendix D.2.
29

30 The following sections of this appendix summarize of the presentations and discussion
31 to draw lessons for the conduct and products of the Power Grid and Land Use project. The
32 final section highlights the general environmental justice and ethical questions as well as those
33 specific to each of the four policy analysis modules and the relevant criteria.

² One of the authors of this report (von Winterfeldt) helped to form an assessment district to finance the undergrounding of half a mile of a primary distribution line, which obstructed some views and was considered unsightly by most neighbors. The total cost of \$300,000 was shared by about 20 homeowners at a cost of \$15,000 each. The costs were financed by a special city bond with annual payments of about \$1,500 for fifteen years. The home values in the neighborhood were about \$400,000 at the time, and von Winterfeldt’s home value was estimated to increase by at least 5%, or \$20,000. Like von Winterfeldt, most homeowners considered this to be a good deal, since there was not only an increase in home value but also an improvement in the quality of life.

1 ***Framing the Ethical Considerations in the Project***³

2
3 The ethical questions in the Power Grid and Land Use project revolve around EMF
4 exposures, risk, and cost-effective and fair options for the benefits of the use of electricity
5 without incurring undue health risks and mitigation costs. This is complicated by the scientific
6 uncertainty in the problem. The predominantly utilitarian view of cost-benefit analysis tends to
7 sum up the costs without considerations of unequal distribution of effects.

8
9 The central issue for policy analysis is to find cost-effective and fair options for
10 mitigation of potential health risks from EMF exposure, given the uncertainty in the science and
11 health effects, the need for electric power, and the costs that any retrofitting, rebuilding, or re-
12 routing would involve.

13
14 There is a diverse group of stakeholders with different interests, needs, and
15 perspectives. For example, as we look at residences, the renter's perspectives may be
16 different from that of the homeowner's. We are interested in ethical, not only legal solutions.
17 Ethical choices in resolution of the issues means, for example: involving all dimensions of the
18 problem to frame the problem fairly; taking care not to aggregate factors in any way that would
19 lose any perspective in the interest of economic efficiency; and being aware of ethical
20 implications that may be embedded even in technical choices such as that of the metric for
21 comparing different options.

22
23 ***Economic Framework for Policy Analysis***⁴

24
25 There is a clear need for policy analysis to address the various aspects concerning
26 potential health risks of EMF exposure. The issues are complicated, there are many tradeoffs
27 and multiple effects that occur over time. Policy analysis and relevant decision making tools
28 should advance public interest.

29
30 Criteria for a good policy are:

- 31
32
- 33 • efficiency
 - 34 • equity
 - 35 • administrative simplicity
 - 36 • goal attainment
 - 37 • transparency

38 In general, application of these principles ensures desirable outcomes. In situations of
39 risk, society operates under certain heuristics in determining how many resources to spend in
40 averting risk. For example, consider the case of a disaster where a person is lost in a boat
41 accident in a storm. Society usually spends a large amount of resources relative to routine
42 spending in "saving a life" to save this individual. In the event of a second incident, society

³ Summary of introductory remarks by Raymond Neutra, California Department of Health Services

⁴ Summary of remarks by Lester Lave

1 may think of recovering part of the expense incurred. But now if a third and a fourth person are
2 in similar situations so that these incidents increase in frequency, society usually decides to
3 spend less and less incrementally on each additional life to be saved. For example, the second
4 such incident if it comes close to the first in the same location, may elicit less expense, and the
5 third still less, end so on. This is an important consideration in issues of environmental
6 justice.

7 *Environmental Justice Defined*⁵

8

9 Environmental Justice is a response to the broad, deep-rooted and systemic inequities
10 in the imposition of the hazards of environmental pollution on poor and minority communities.
11 Environmental racism is “the unequal protection against toxic and hazardous waste exposure
12 and systematic exclusion of people of color from environmental decisions affecting their
13 communities.” Environmental equity “refers to the equal protection of environmental laws.”
14 (Quotes are from Bryant, 1995, p.5)

15

16 Environmental protection, legislated through the National Environmental Policy Act of
17 1970 nevertheless institutionalized unequal protection. This occurred through various routes,
18 ranging from indifference to siting of risky technological facilities in neighborhoods already
19 burdened with a disproportionate share of environmental pollution, to using cost-benefit and
20 risk assessment paradigms to rationalize the continuation of such siting. These assessments did
21 not take inequities in population distribution of environmental hazards into account. The siting
22 of polluting facilities often exploited the economic vulnerability of disenfranchised
23 populations. Legal avenues open to such populations placed the burden of proof of harm on the
24 victims of exposure, exacerbating the inequity.

25

26 Systematic correction of this inequity is at the root of the concept of environmental
27 justice (EJ). Environmental Justice “embraces the principle that all people and communities
28 are entitled to equal protection of our environmental, health, employment, housing,
29 transportation, and civil rights laws. Environmental Justice is defined as the fair treatment and
30 meaningful involvement of all people regardless of race, color, national origin, or income with
31 respect to the development, implementation, and enforcement of laws, regulations and
32 policies.” An environmental justice framework therefore redefines environmental protection
33 as a right, and disparate protection and impact as discrimination. The EJ framework
34 recognizes the historically imposed disproportionate impact of unequally exercised
35 environmental protection, and dictates that the burden of proof of harm is on the polluters
36 rather than the victims, adopts a public health model of prevention, and redresses the
37 disproportionate impact through targeted action and resources. The major elements of
38 environmental justice are:

39

- 40 • equal enforcement of laws and regulations
- 41 • identifying and eliminating discriminatory practices and policies
- 42 • addressing environmental, health, and socioeconomic disparities

⁵ Summary of remarks by Robert Bullard. Quotes attributed to Bullard refer to the presentation at the workshop. See also References.

- 1 • disease prevention, pollution prevention and right-to-know
- 2 • occupational safety and health of workers
- 3 • community empowerment
- 4 • access to planning and decision making

5
6 Schools, residences and workplaces that constitute the natural and social environment
7 for most of one's lives are all sites directly influenced by the EMF issue, and considerations of
8 line design and siting. The environmental inequities manifest in various ways:

- 9
- 10 • distribution of benefits vs. burdens
- 11 • residential housing pattern
- 12 • land use and facility siting
- 13 • disparate education and awareness'
- 14 • access to planning and decision making
- 15 • unequal power arrangements

16
17 Ethical considerations, specifically in the case of EMF facility siting and land use include:

- 18
- 19 • distribution of benefits vs. burdens
- 20 • environmental and economic justice
- 21 • scientific uncertainty and precautionary principle
- 22 • informed consent
- 23 • disproportionate and cumulative impacts
- 24 • social equity

25
26 Equity considerations fall under three categories: procedural, geographic, and
27 sociological. Procedural equity asks if the decision-making process is fair, equitable, and
28 consistent among different populations. This would include the participation of all affected
29 parties in the decision making process. Geographic equity looks particularly at the location of
30 facilities that may constitute added EMF exposure, and asks if these are distributed in some
31 spatial locations in preference to others. Sociological considerations would examine if the
32 distribution of exposure, mitigation, and related costs are unequal, burdening some population
33 groups more than others.

34
35 While the above ethical and equity considerations prescribe how to ensure fairness and
36 justice for each process, environmental justice considerations have an added aspect: the
37 historical overburdening of certain populations must also enter into the considerations. These
38 historical patterns and continuing policies imply that there need to be added considerations
39 about disproportionate health impacts. These include aspects of exposure as well as of the
40 methods and assumptions used for calculating and mitigating impacts:

- 41
- 42 • cumulative and multiple impacts
- 43 • intergenerational equity impacts
- 44 • risk burdens and current exposure levels
- 45 • assumptions in calculating impacts

- vulnerable and at-risk populations
- access to and quality of health care

Executive Order 12898: “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”, issued by President Clinton on February 11, 1994 stated that “ each federal Agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health effects of its programs, policies, and activities on minority populations and low-income populations in the United States...”. In April 1996, EPA’s office of Environmental Justice released the “Environmental Justice implementation Plan” and in 1997, the guidance document for incorporating EJ concerns in compliance analyses. For this purpose, the EPA Office of Environmental Justice defined:

“Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic or socioeconomic groups should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.”⁶

Approaching an environmental issue such as EMF exposure in an EJ framework then implies that any project integrate the above EJ principles so that it is part of the methodology and plan of mitigation, ensure that the data used contain the necessary disaggregation and detail, and include stakeholders in the design and implementation of the plan as well as in developing appropriate, culturally-sensitive communication and outreach. The entire process should be open and accessible to all stakeholders. Openness and clear communication means that it is necessary to clarify all parts of the process including clear identification of data sources, uncertainties, assumptions, and details of the technical design and analysis parts of the project. Any message for communication should include stakeholders in its development, not just as recipients.

The analysis should include that of equity of impacts. In case of disparate impacts due to placement of facilities, or at-risk, vulnerable populations, mitigation efforts should address these explicitly. A monitoring, mitigation, and evaluation plan should be established, and there needs to be periodic feedback on impacts. There should be plans for addressing should unforeseen gaps arise in analysis, data or mitigation strategy.

Moral Considerations and Questions in Environmental Justice⁷

Several different moral considerations and several kinds of questions for social policy are available to guide our thinking on issues of environmental justice. Among these are principles

⁶ USEPA, *Interim Final Guidance for Incorporating Environmental Justice Concerns in EPA’s NEPA Compliance Analyses*, September 1997

⁷ Summary of remarks by Carl Cranor

1 of equal protection, distribution of risks and burdens associated with an activity, and autonomy
2 and informed consent. These may be elaborated as follows:

- 3
- 4 1) Is the risk naturally occurring or introduced by human activity?
 - 5 2) There is a strong presumption of equal protection from invasions by others, including
6 agents that cause deleterious health effects. This is supported by legal and ethical
7 principles, particularly by the Eggshell Skulls Principle, and by a presupposition of the
8 Fair Equality of Opportunity Principle.
 - 9 3) We should consider the distribution of benefits and burdens associated with an activity.
10 The relevant questions here include:
 - 11 • Do the benefits and burdens accrue to the same group of people?
 - 12 • Do they accrue to different groups?
 - 13 • Are the benefits and burdens appropriately comparable?
 - 14 • Do they accrue to groups that are already among the worst off in the community?
 - 15 • Are there any unusual benefits or burdens that attach to specific communities such
16 as low income communities or communities of people of color?
 - 17 4) We should consider if the persons affected by a social policy (and especially those
18 adversely affected by it) participate (*knowingly?*) in the decisions that led to their being
19 affected.

20 *Natural and human-induced exposures.* In evaluating exposures, it is necessary to
21 distinguish between naturally occurring toxic exposures such as arsenic in water, and those
22 caused by human activities. This distinction poses two distinct social issues:

- 23 1) For both cases, what responses should we have to those who are threatened? How much
24 should we protect them?
- 25 2) For humanly caused exposures, what principles do we use to guide or adjudicate exposures
26 to toxic substances caused by one group of people and imposed upon another?

27 *Presumption of equal protection.* The tort and criminal law assures equal protection for
28 all, including susceptible subpopulations. The “Eggshell Skulls Principle” is a principle
29 deeply embedded in our legal system. The various facets of this principle are:

- 30 • Tort law sets public standards for conduct that results in harm to others which is
31 “reasonably foreseeable” at the time of action, and is ‘within the scope of the risk
32 created’. If the defendant is liable, the victim can receive compensation for
33 injuries even the injury happens because of a concealed physical condition (e.g.,
34 pregnancy) , or because of a latent disease or susceptibility to disease (such as
35 psychotic predispositions) to produce consequences that the defendant could not
36 reasonably anticipate. The person with the ‘eggshell skull’ is one ‘who suffers
37 death where a normal person would have had only a bump on the head’. The
38 defendant is liable even when the specific results are unforeseeable (such as hair
39 loss from fright). The defendant is, however, liable “only for the extent to which
40 the defendant’s conduct has resulted in an aggravation of the pre-existing condition,
41 and not for the condition as it was...”
- 42 • The criminal law sets public standards of conduct which are enforced by a public
43 agency. Typically, a guilty defendant is punished for violations of the criminal law
44

1 even when this was beyond the defendant's intent. For example, in a robbery case
2 in which an obese, unhealthy victim died of a heart attack as a result of stress, a
3 California Court held that the robber was guilty of the victim's death, and takes his
4 victim as he finds him.

5
6 The eggshell skull principle therefore suggests that both the tort law and the criminal
7 law seek to protect not just those whose injuries are "reasonable foreseeable" or those that are
8 "intended", not just the upper 95% of the population but also the most vulnerable, most
9 susceptible, and even those with very rare vulnerabilities. Such protections are not designed to
10 protect all of us no matter what particular susceptibilities we might have over which we have
11 no control. Thus the tort law seeks to correct unjust invasions of others' interests, and the
12 criminal law punishes invasion of those interests. Environmental health administrative law
13 seeks to prevent some of those invasions from occurring in the first place, for example, to
14 prevent EMFs from invading people's interests.

15
16 The ethical principle for environmental protection emerges in analogy with the above
17 principles: If the healthy are entitled to preventive measures to protect them from invasion of
18 their interests, others who might be more susceptible to disease have equal standing to be
19 similarly protected. This requires equal protection on an exposure-by-exposure basis, with
20 equal standing for the healthy and the susceptible for protection from cumulative exposures.

21 *Distribution of benefits and burdens associated with an activity.* Three questions that
22 arise are:

- 23
- 24 • Are the beneficiaries of an activity the same ones who bear the costs or burdens of
25 the activity? Do they bear burdens to the same extent that they receive benefits
26 from the activity?
 - 27 • Are the beneficiaries of the activity different from those who bear the costs or
28 burdens of the activity?
 - 29 • Are the benefits and the burdens appropriately comparable, with those receiving
30 greater benefits bearing the greater burdens?
- 31

32 In addition to these considerations of proportionate burden for a specific activity,
33 principles of justice also take into account the antecedent well-being or ill-being of those to
34 whom risks and benefits are distributed. Environmental justice considerations fall in this
35 category as many risks of harm from toxic substances fall on those who are not particularly
36 well-off in the community, often low-income or minority communities.

37
38 *Meaningful participation and informed decision making.* Every person has a right to
39 participate in decisions that affect one's life. Meaningful participation involves participation
40 in decisions in a fully informed way. This participation has to be meaningful in that the risk
41 bearer has been privy to decisions, which led to risk-creation and risk-exposure. Where
42 common principles are necessary and to everyone's advantage, they are to be worked out from
43 the viewpoint of a suitably defined initial situation of equality in which each person is fairly
44 represented (Rawls). This principle of Justice involves the following aspects:

- 1 • Each person in the moral community has equal standing and respect and therefore
2 participates in choosing common principles.
- 3 • Any such principle would have to be greatly constrained and specified for the
4 situation in question, but again it creates a presumption in favor of participating in
5 decisions over matters that have substantial impacts on one's life.
- 6 • The background conditions of a principle are different than are the background
7 conditions on many voluntary risk-exposures and risk-taking.

8 *Significance of these Moral Principles for EMF Exposure and Environmental*
9 *Justice.* EMFs result from human activities and appear to pose risks, thus, what principles do
10 we use to guide and adjudicate exposures to such substances caused by one group and imposed
11 upon another?

12
13 Research suggests that acquired susceptibility factors “can have a profound impact on
14 ... vulnerability to ... adverse health effects.” (Sexton , 1997) . Many of these factors are
15 related to socio-economic status, and include:

- 16
17 • Quality-of-life factors:
 - 18 • access to health care
 - 19 • preexisting disease
 - 20 • psychosocial stress (e.g., caused by unemployment, underemployment, poverty,
21 inadequate living working conditions, language problems, can all reduce host
22 resistance to adverse health effects)
 - 23 • exposure to multiple environmental agents may cause increased susceptibility
24 or may produce more than additive effects.
- 25 • Lifestyle factors: nominally under a person's control but strongly influenced by
26 socio-economic status.
 - 27 • nutrition: inadequate diet may impair host defense mechanisms
 - 28 • fitness
 - 29 • alcohol and tobacco use
 - 30 • illicit drug use
 - 31 • sexual behavior

32
33 These factors result both in increased exposure to environmental pollutants and in
34 increased susceptibility to diseases from exposures. Thus, not only should low socio-
35 economic communities and communities of people of color have protections equal to those of
36 everyone else, it may be necessary to find compensatory measures to reduce health effects of
37 multiple exposures and to compensate for some of the socio-economically induced
38 susceptibilities in order to approach the goal of equal protection.

39
40 For EMF exposures this means:

- 41
42 • There exists compensatorily lower exposures to EMFs in low-income communities
43 or communities of people of color, compared with middle or high-income
44 communities, if they have susceptibility to the disease in question. Compensatory

1 steps may have to be taken also to ensure that there are not additional susceptibility
2 problems that are exacerbated by EMF exposures. This may be necessary to
3 provide equal protection.

- 4 • People should have a say in deciding whether there is a risk to which one is to be
5 exposed and what kind of a risk it should be. To do this autonomously, one should
6 be fully informed.

7 ***Legal Aspects of EMF Issues***⁸

8 *EMF and Public Concerns.* Power lines, consumer products, and the workplace
9 are major sources of human exposure to electromagnetic fields (EMF). The public has
10 increasingly expressed concern about the possible health risks of such exposure,
11 particularly from power lines. As a result, numerous studies have been undertaken over the
12 last decade to address this concern. Laboratory and clinical research indicates that certain
13 EMF exposures induce several physiological changes, such as increasing the flow of
14 calcium through cell membranes and reducing the secretion of melatonin. However, these
15 studies have not produced an understanding of the biological mechanisms involved or of
16 the health implications of such changes. Epidemiological studies have yielded inconsistent
17 and inconclusive findings. Thus, experts at this time view the health effects of EMF as
18 scientifically uncertain, or de minimis at most. They recommend further research and
19 suggest that utilities, which generate EMF, adopt modest, precautionary strategies to
20 minimize human exposure until more is known and sounder, more extensive strategies can
21 be devised.⁹

22
23 Nevertheless, public concerns about health risks continues to grow and is reflected in
24 litigation across the nation, as claimants seek compensation from utilities for personal injury
25 and property value reduction. In addition, minority groups who claim that they suffer a
26 disproportionate share of the risks posed by industrial air and water pollution and toxic
27 wastes, now point to the alleged health risks posed by power line EMF as yet another example
28 of environmental injustice from the discriminatory siting of industrial facilities. Although
29 studies have shown that many such groups in urban, low-income regions are indeed exposed to
30 more pollutants and have more toxic waste facilities in their midst, evidence of health risks
31 due to EMF exposure and discriminatory siting of power systems is lacking at this time.¹⁰

⁸ Summary of remarks by Michael Baram. This has since been published: Michael Baram, Electromagnetic Fields: Health Risks and Environmental Justice, *Toxics Law Reporter*, Volume 13, No.19, October 7, 1998. The text here is a reproduction of this entire article.

⁹ See, for example, D. Moeller, *Environmental Health*, Harvard Univ. Press (1997); M. Linet, et al, "Residential Exposure to Magnetic Fields and Acute Lymphoblastic Leukemia in Children", *N.E. J. of Medicine*, v. 337, n.1 (July 3, 1997); *Possible Health Effects of Exposure to Residential Electric and Magnetic Fields*, Commission on Life Sciences, National Research Council (1996); and miscellaneous EMF publications by G. Morgan et al, Carnegie Mellon University. Also see California studies discussed in *San Diego Gas and Electric v. Superior Court* (Covalt, 920 P. 2d 669 (1996)).

¹⁰ See, for example, R. Bullard, "Anatomy of Environmental Racism and the Environmental Justice Movement", and V. Been, "Locally Undesirable Land Uses in Minority Neighborhoods: Disproportionate Siting or Market Dynamics", in *Foundations of Environmental Law and Policy*, R. Revesz, ed., Oxford University Press (1997); which focus on the prevalence of toxic waste disposal sites and lead paint

1 *Mechanisms for Addressing Public Concerns.* Public concerns about
2 technological risks to human health are usually dealt with by the courts, regulatory
3 agencies, and the marketplace. Persons who have been injured or put at increased risk can
4 seek compensation by suing those whose products or activities caused their harms under
5 various common law liability doctrines (e.g. negligence, nuisance), and if successful,
6 recover damages and possibly secure injunctive relief to stop the harmful activity.
7 Successful outcomes in the courts also have the potential to deter others from engaging in
8 similarly harmful activities, and thereby help prevent similar risk to other persons. But
9 success depends on whether the doctrines apply to the victim's exposure circumstances,
10 whether the defendant owed a duty of care to the victim, and the victim's ability to prove
11 causation.

12
13 The regulatory option is available to those who want to prevent a health risk. Their
14 first step is to stimulate a legislative response (a statute) which establishes a regulatory
15 program to address the risk, and the next step is to petition, press or sue the implementing
16 agency to enact and enforce protective standards, permit requirements or other risk control
17 measures for the risk-creating parties to comply with. The efficacy of this option is dependent
18 on many factors, including the agency's need for findings of fact about EMF health risk and the
19 criteria and methodology used by the agency to set risk limitations.

20
21 Concerned persons can also express preferences in the marketplace for alternative
22 services or products, which are safer, and thereby prompt the commercial provider of more
23 harmful services or products to voluntarily reduce the risks they create. Obviously much
24 depends on the ability of these persons to purchase service or product alternative, which are
25 functionally and economically equivalent.

26
27 Minority groups suffering environmental discrimination also have the opportunity to
28 secure remedies in the courts, agencies, and marketplace. They can assert Constitutional rights
29 of equal protection, civil rights against discrimination, and rights to environmental justice
30 under federal and state policies. Success will depend on agency and judicial interpretation of
31 these broad doctrines and the ability of such groups to meet evidentiary requirements.

32
33 In the marketplace, these groups can express preferences for equivalent services and
34 products which do not arise from discriminatory procedures or produce disproportionate
35 burdens. Here, success will obviously depend on the availability of such alternatives and the
36 purchasing power that the groups can muster.

37
38 Thus far, persons concerned about health risks from power line EMF have failed to
39 secure compensation for personal injury from the courts, have secured relatively weak
40 responses from legislators and regulators, and failed to demonstrate marketplace power.
41 Groups concerned about injustice have failed to secure change through the marketplace, but
42 have recently received significant support from the Clinton administration and secured
43 favorable decisions in agencies and courts. Although EMF has not been involved in these

poisoning in minority neighborhoods. Also see Siting of Hazardous Waste Landfills and Their Correlation with Racial and Economic Status of Surrounding Communities, U.S General Accounting Office (1983).

1 developments, the foundation has been laid for addressing disproportionate exposure to EMF
2 as a form of environmental injustice.

3 *EMF Risk Litigation.* A survey of court decisions across the states indicates that
4 persons seeking damages for injuries or increased risk allegedly caused by EMF in suits
5 against utilities have been unsuccessful in virtually all instances¹¹. In these suits, plaintiffs
6 sought damages under various state common law liability doctrines (e.g. negligence,
7 nuisance, trespass, etc.). In doing so, they had to convince the court that the chosen liability
8 doctrines were applicable and then provide sufficient evidence for the judge or jury acting
9 as fact-finder to determine that it was more likely than not that the defendant (e.g. utility)
10 breached a duty of care it owed to the victim under the applicable doctrine, and that it was
11 a reasonable medical probability that this breach was the proximate cause of the victim's
12 injury.

13
14 Among the reasons why these suits have failed are:

- 15
16 • Judicial unwillingness to find that trespass and nuisance doctrines apply to EMF
17 exposure situations because EMF is "intangible" and has "no known or proven
18 health effects"; thus it cannot be legally characterized as "invasive" for purposes of
19 trespass theory, or as "causing unreasonable interference with the plaintiff's use and
20 enjoyment of his property" for purposes of nuisance theory.
- 21
22 • Judicial and jury determinations that defendant utilities did not breach a duty of due
23 care owed the plaintiff by not warning him or her or not taking other affirmative
24 measures to lessen EMF exposure, and were thereby not negligent, because
25 uncertainty about the health effects of EMF obviated any need for the utility to take
26 such actions.
- 27
28 • Plaintiff's inability to prove that it was more likely than not, or a reasonable
29 medical probability, that his or her injury was caused by EMF from the defendant's
30 power lines because of substantial scientific uncertainty about the health effects of
31 EMF.
- 32
33 • In California, state law restricts judicial jurisdiction over EMF cases which could
34 lead to damage awards for harms when such awards would conflict with or
35 otherwise interfere with Public Utilities Commission regulation of utilities. PUC
36 studies have thus far concluded that power line EMF is not a proven source of
37 health risks.¹²

¹¹ See discussion in M. Lowe, R. Roeker, "Claims for Bodily Injury Due to Electromagnetic Fields: Shocking Result", Boston Bar Journal (Nov/Dec. 1994), and the following cases: Jordan v. Georgia Power, 466 S.E. 2d 201 (Ga. App., 1995); Glazer v. Florida Power and Light, 1997 WL 20517 (Fla. App., 3 Dist., 199,7); Ford v. Pacific Gas and Electric, Cal. App., No A073596 (1218/97); Zuidema v. San Diego Gas and Electric Cal. Super. Ct., No. 638222 (4123193)

¹² Ford v. Pacific Gas and Electric, note 3 supra. Also see San Diego Gas and Electric v. Superior Court, Note 1, supra.

1 Thus, personal injury lawsuits involving EMF exposure face numerous obstacles due to
2 scientific uncertainty. However, property seems to be more protectable than health. Courts in
3 several states have ordered compensation for landowners who establish that public fear of
4 EMF health risks posed by nearby power lines has devalued their property, without requiring
5 that the owners prove that the fears are reasonable in light of available scientific evidence.¹³

6 *EMF Risk Regulation.* State regulators of electric utilities have hesitantly
7 responded to public concerns about EMF health risks. Some have done nothing and a few
8 have set system design standards or initiated research programs. The most advanced
9 (California, Colorado, Wisconsin, etc.) have enacted "prudent avoidance" policies which
10 authorize utilities to take relatively modest, low cost measures to educate the public and
11 reduce exposure from new power lines.¹⁴ These precautionary policies serve two
12 purposes: they enhance public awareness of EMF uncertainties and stimulate possibly
13 protective actions by the public and utilities and they officially define an economically
14 feasible level of due care for utilities to exercise which will help to immunize utilities
15 from liability for negligence (i.e. fact of due care) in future law suits.¹⁵

16
17 California's version of "prudent avoidance" developed in 1992-93 authorizes the
18 conduct of studies to develop methods for addressing potential health effects of EMF generated
19 by utilities, and expenditures of up to four percent of a utility project's costs on mitigation
20 methods that "significantly reduce EMF" from the project.¹⁶ Other states calling for "prudent
21 avoidance" seem to be taking a case by case approach for new power lines, but it appears that
22 neither California nor these other states have addressed what policy should be applied to EMF
23 from existing power lines. Thus, an incomplete patchwork of tentative regulatory actions is
24 found across the states, largely due to scientific uncertainty about health effects, and economic
25 uncertainty about how much utilities should spend in response to public perception of risk and
26 who should ultimately pay for these precautionary expenditures.

27 *Environmental Justice Developments.* The environmental justice movement
28 claims that racial and ethnic minorities bear disproportionate environmental health risks
29 due to discrimination in agency and business decision-making. Studies showing that
30 minorities have greater exposure to toxic waste sites and lead-painted premises are offered
31 in support of these charges, and new facilities which would add to their risk burden are
32 strongly opposed. These claims have been disputed by other studies finding a more
33 equitable allocation of risks across society, property values and market dynamics as the

¹³ "The overwhelming majority rule today is that a decline in the value of remaining property resulting from the public's fear of power lines is compensable without regard to the reasonableness of that fear because the reasonableness of the fear is irrelevant to the loss suffered by the property owner." J. Porter, C. Langer, "Electromagnetic Fields: Courts Deal with EMF's Effect on Property Values", Massachusetts Lawyers Weekly (Feb. 27, 1995) p.B-I. Also see R. Thiemann, "Property Devaluation Caused by Fear of Electromagnetic Fields: Using Damages to Encourage Utilities to Act Efficiently", N.Y. University Law Review, v. 71, p.1386 (Nov. 1996).

¹⁴ L Bogardus, "Recovery and Allocation of Electromagnetic Field Mitigation Costs in Electric Utility Rates", Fordham Law Review, v. 62, p. 1705 (April 1994).

¹⁵ Discussed in "The Management of Electricity and Magnetic Fields", Task Force Report, Hydro-Quebec, Canada (April 1996).

¹⁶ Note 6, supra, at p.1715.

1 root causes of disparate impacts on low-income persons, and neutral decision-making
2 devoid of racism.¹⁷

3
4 Proponents of environmental justice initially invoked the Equal Protection Clause of
5 the 14th Amendment of the U.S. Constitution in lawsuits to stop the siting of waste disposal
6 facilities and other sources of risk in minority areas, but were denied by the courts because
7 they could not meet the judicial requirement of proving that intentional discrimination was
8 involved, or that race was a motivating factor, in the siting decision-process.¹⁸ Suits have
9 subsequently been brought under Title VI of the Civil Rights Act which requires that "no
10 person...shall, on the grounds of race, color, or national origin, be excluded from participation
11 in, be denied the benefits of, or be subject to discrimination under any program or activity
12 receiving federal funds." ¹⁹ This strategy is proving to be more successful, now that the Clinton
13 administration has taken the position that the Act prohibits use of federal funds by federal or
14 state agencies when discriminatory intent is involved, or alternatively, when adverse
15 disproportionate effect is shown to be the result.

16
17 President Clinton's 1994 Executive Order on Environmental Justice²⁰ provides that
18 each federal agency must identify and address "disproportionately high and adverse human
19 health or environmental effects of its programs, policies and activities on minority...and low
20 income populations"; develop "an environmental justice strategy" for its policies, rule-making
21 and enforcement programs; and implement the strategy to the extent "practicable and
22 appropriate." Federal agencies are now responding by adapting their own permit programs to
23 the Order and the Act.

24
25 For example, in May 1997, the Nuclear Regulatory Commission Licensing Board
26 rejected an application for a uranium enrichment facility in predominantly black Claiborne
27 Parish, Louisiana, possibly the first federal permit denial on environmental justice grounds.²¹
28 The Nuclear Regulatory Commission, in April 1998, upheld the Board's ruling, in part,
29 because adverse impacts of the project on minority citizens had not been adequately
30 considered. However, it reversed that part of the Board's ruling which called for thorough
31 inquiry into possible discrimination in the siting process because it found that this would
32 exceed current legal and policy requirements. Appeals and further proceedings are
33 anticipated.²² Then in September 1997, EPA revoked permits for a polyvinyl chloride plant in
34 Denton, another black community in Louisiana, which is home to twelve chemical plants.²³

¹⁷ Note 2, supra.

¹⁸ Leading cases included: Washington v. Davis, 426 U.S. 229 (1976); Village of Arlington Heights v. Metropolitan. Housing Development Corp., 429 U.S. 252 (1977); Bean v. Southwestern Waste Mgmt. Corp., 482 F. Supp. 673 (S.D. Texas 1979); aff'd. without op. 782 F.2d 1038 (5th Cir. 1986); RfSE v. KaY, 768 F. Supp. 1144 (E.D. Va. 1991); NAACP v. Gorsuch, No. 82-768-CIV-5 (E.D. NC, Aug. 10, 1982); and East Bibb Twiggs Neighborhood Assoc. v. Macon-Bibb County Planning & Zoning Commission, 706 F. Supp. 880 (M. D. Ga), aff'd. 896 F. 2d 1264 (11th Cir. 1989).

¹⁹ Section 601 of Title VI, 42 U.S.C. § 2000d (1994).

²⁰ Executive Order 12, 898 (2/11/94)

²¹ In the Matter of Louisiana Energy Services, Docket No. 70-3070-ML, LBP-97-8 (May 1, 1997)

²² Environment reporter, P. 2645 (4/10/98).

²³ As widely reported in the media. See J. Balter, "Environmental Justice: Its Time Has Come", Risk Management Review, Wharton (Spring 1998).

1 In addition, federal agencies have been developing generic policies to assure that
2 neither discriminatory intent nor disproportionate effect figure in permit decisions by state and
3 local recipients of federal funds. EPA, which awards grants annually to many state and local
4 agencies that administer environmental programs under federal statutes, has established an
5 office of Civil Rights to handle environmental justice complaints. Because of the multiplicity
6 of these complaints, (47 since September 1993), most of which arise from state permit
7 decisions²⁴, EPA has now established an Interim Guidance for Investigating Title VI
8 Administrative Complaints Challenging Permits.²⁵

9
10 EPA's Guidance provides that Title VI creates for state and local recipients of federal
11 funding from EPA, "a non-discrimination obligation that is contractual in nature in exchange for
12 accepting Federal funding", and that "all programs and activities" of the recipient are subject to
13 Title VI, "including those...that are not EPA-funded." If discrimination or disproportionate
14 adverse effect is found by EPA in the recipient's permit program and voluntary compliance is
15 not subsequently achieved, the Guidance provides that: EPA will take steps "to deny, annul,
16 suspend or terminate EPA funding", and "may use other means...to obtain compliance,
17 including referring the matter to the Department of Justice (DoJ) for litigation." EPA also
18 warns that DoJ may seek an injunction against the non-complying recipient, and that
19 individuals may file private actions to enforce Title VI.

20
21 The Guidance outlines a five step procedure for EPA investigation of complaints,
22 which involves:

- 23
- 24 • "identifying the affected population" ("that which suffers the adverse impacts of the
25 permitted activity") by doing "proximity analysis",
 - 26 • "determining the demographics of the affected population" (its racial and/or ethnic
27 composition),
 - 28 • determining the "universe of other permitted facilities" under the recipient's
29 jurisdiction and the racial/ethnic composition of the population affected by those
30 permits in order to establish cumulative burdens. Also to be considered are impacts
31 from "residual pollution" (that which is not prevented by standards and permits)
32 and "other cognizable impacts",
 - 33 • "conducting a disparate impact analysis",
 - 34 • "determining the significance of the disparity".
- 35

36 Thus, avoiding disproportionate adverse environmental effects on minority populations
37 is a new requisite for EPA and for state and local recipients of federal funding. If such effects
38 are found: and it is "not possible or practicable" to modify the permit or its project in order to
39 mitigate the effects, EPA take back of funds and referral of the matter to DoJ will follow unless
40 EPA finds a "governmental interest justification", or approves a "supplemental mitigation
41 project" put before it by the agency or permit applicant.

42

²⁴Environment Reporter, p. 2504 (2124198)

²⁵ The Interim Guidance was made public by EPA on Feb. 10, 1998 and is available from the agency's website at <http://es.epa.gov/oeca/oej/titlevi.html>. EPA has invited comments until May 6, 1998 and plans to enact the final version soon thereafter.

1 Recent developments indicate that federal courts may be willing to accept the
2 propositions that Title VI is violated by decisions which produce disproportionate adverse
3 effects (health risks) on minorities, and that such persons have a private right of action to
4 enforce Title VI requirements.
5

6 In City of Chester v. Seif, a federal Court of Appeals held in 1997 that residents of the
7 predominantly black city could bring suit under Title VI to revoke a Pennsylvania agency
8 permit because of its discriminatory effect on the residents. The permit would authorize the
9 siting of a sixth toxic waste processing facility in Chester. In so holding, the Court also
10 accepted the residents' contention that the discriminatory effect was a sufficient basis for the
11 action in lieu of proving discriminatory intent by the agency.²⁶ Although the Appeals Court did
12 not get to the merits of the suit, the agency revoked the permit. However, it is now seeking
13 review of the Court's decision in the U.S. Supreme Court on grounds that, by establishing a
14 private right of action, the decision allows private parties to bypass agency enforcement
15 procedures established by Title VI.²⁷
16

17 Similarly, in Bryant v. N. J. Department of Transportation, a federal district court held
18 that black residents of Atlantic City, whose homes would be destroyed by a federally-funded
19 highway project, had standing to sue and could thereby proceed with their private suit to stop
20 the project because their claim of disparate impact "falls within the zone of interests protected
21 by Title VI as implemented by...USDOT regulations." In rejecting the state's attempt to dismiss
22 the suit for lack of standing, the court did not address the merits of the claim, but placed the
23 case on an accelerated track for trial on the merits.²⁸
24

25 These developments indicate that environmental justice is being transformed from an
26 aspirational concept to legally-enforceable administrative procedures and private rights.²⁹
27 Thus, minority complaints of disproportionate exposure to EMF from power line projects are
28 foreseeable. State regulators of utilities could contest such claims by showing that they do not
29 receive federal funds and are thereby exempt from federal regulations implementing Title VI,
30 or by arguing that scientific uncertainty about EMF obviates claims that EMF causes health
31 risks, disproportionate or otherwise. However exempting power lines from the environmental
32 justice requirements which apply to other facilities and projects, some of which pose risks
33 which are also speculative (such as risks from a facility which meets federal and state
34 standards), would create a special standard for utilities which would be publicly and
35 politically unacceptable, and likely to stimulate outrage, followed by lawsuits or legislation to
36 eliminate the exemption.
37

²⁶ 132 F.3d 525 (3dc Cir. 1997).

²⁷ Environment Reporter, p. 2654 (4/10/98)

²⁸ 1998 WL 133758,(D.N.J.3118198)

²⁹ Top officials of state environmental agencies have called for EPA to withdraw the Interim Guidance and enact a more "workable" policy, in a resolution by the Environmental Council of the States. The resolution was based on fears that the Guidance ;will "clearly disrupt the management of environmental permit programs" carried out by the states, produce conflicts with state and local land use law, interfere with state brownfields initiatives and urban redevelopment policies, and impose unfunded mandates. Environment Reporter, p. 2601(417/98).

1 Finally, it should be noted that although Title VI protections apply to racial and ethnic
2 minorities, the Clinton Executive Order and EPA's guidance apply to "minority populations
3 and low-income populations." Presumably, low-income whites would be accorded the same
4 protection as low-income blacks or Hispanics under federal agency policies implementing
5 Title VI unless a court addressing this amplification of Title VI by the Executive branch finds it
6 to be "ultra-vires" and therefore invalid as an unauthorized use of Executive discretion.

7 *Conclusions.* Public concerns about EMF health effects and environmental justice
8 cannot be ignored despite continuing scientific uncertainties. Since the courts and the
9 marketplace are not capable of fully responding to these concerns, we must look to
10 regulatory agencies for an appropriate response, particularly state agencies which regulate
11 electric utilities and their effects on public health.

12
13 Leading state regulators initially responded to concerns about EMF health effects by
14 enacting "prudent avoidance" policies, a response which is morally and legally appropriate
15 because it promises that utilities will use "due care" in addressing public health concerns.
16 However, more specific state guidance is needed to assure that utilities adequately perform on
17 this promise when developing new power projects. In addition, guidance is needed for
18 reducing EMF exposure from existing power systems. Research and public education programs
19 are beginning to provide information, which regulators can use to provide such guidances.

20
21 In addition, how much utilities should spend on prudent avoidance and the extent to
22 which utilities should be permitted to recover these expenditures from customers, are open
23 questions at this time. These questions raise ethical dilemmas because of scientific uncertainty
24 about health effects, and consequent technical uncertainties regarding the efficacy of any
25 specific prudent avoidance measures.

26
27 Given the likelihood that utilities will be authorized by state regulators to recover a
28 major portion of prudent avoidance expenditures from customers, further ethical dilemmas
29 arise regarding how the recoverable costs should be assigned to customers. Should new
30 project prudent avoidance costs be assigned only to those customers who will be served by the
31 new power line and benefit from its reduced EMF, or be assigned to all customers? Should the
32 costs of retrofitting existing systems for prudent avoidance be charged only to those
33 low-income persons whose EMF exposure is reduced, or again be assigned to all customers?

34
35 Resolution of these ethical dilemmas in a democratic society obviously requires public
36 hearings and participation in regulatory decision-making,³⁰ and ultimately, holding regulators
37 and legislators politically accountable. Thus, state regulators, bereft of scientific certainty and
38 rational solutions for designating and assigning expenditures, need to create new approaches
39 for implementing prudent avoidance, as California is now attempting with its "Power Grid and
40 Land Use Policy Analysis Project. "

41
42 Assuming that courts continue to find that environmental justice is privately enforceable
43 against disproportionate impacts, state regulators should infuse their "prudent avoidance"

³⁰ See The Model Plan for Public Participation, EPA, Office of Environmental Justice, 300K-96-0~3
(Nov.1996).

1 policies with principles for preventing both intentional and inadvertent discrimination in order
2 to assure that minorities and low-income population sectors are not disproportionately
3 exposed to EMF from new power projects. Concomitantly, existing disproportionate exposure
4 conditions need to be remedied. Thus "prudent avoidance" should be redefined as, for
5 example:

6
7 The exercise of due care by the owners and operators of power systems for purposes of
8 minimizing public exposure to EMF created by such systems, and assuring that the cumulative
9 exposure of any minority group or other population sector to EMF from existing and new
10 power systems is not disproportionate.

11
12 And it would follow that due care could then be defined as: Economically and
13 technically feasible precautionary actions, based on what is known and knowable about
14 methods of minimizing public exposure, and methods of preventing disproportionate
15 cumulative exposure of any minority group or other population sector; such as:

- 16
- 17 • warnings and self-protective instructions for persons exposed,
- 18 • diligent research and EMF monitoring efforts,
- 19 • routing of new power lines and use of protective engineering and design options,
20 reengineering and rerouting existing power lines, and collaborative efforts with
21 manufacturers of products which cause EMF exposure in residences and
22 workplaces, and with regulators of such products (e.g. Consumer Product Safety
23 Commission, Occupational Safety and Health Administration), in order to foster
24 new product designs and use instruction which lessen EMF exposure.
- 25

26 Finally, procedural and economic aspects of implementing such amplified "prudent
27 avoidance" policies would need to be addressed by requiring, for example, that utility project
28 planning and state agency decision-making and permitting be transparent, exclude
29 discriminatory values and assumptions, and prevent disproportionate cumulative exposure of
30 any minority or other population sector. Furthermore, public hearings be held and viewpoints
31 of affected persons be addressed, in determining prudent avoidance expenditures, utility cost
32 recovery, and the allocation of the costs to be recovered among utility customers.

33
34 Building such an amplified policy of "prudent avoidance" and diligently implementing
35 it cannot be done on an ad hoc or piecemeal basis. State regulators will need to take a holistic
36 approach to the challenge of addressing EMF health risk and environmental justice concerns in
37 order to meet their societal responsibilities.

38 ***Environmental Justice Analysis***

39
40 This section contains the summaries of two presentations on the features of
41 environmental inequities. Paul Mohai presents evidence of patterns of siting of treatment,
42 storage and disposal facilities and property values that systematically influence minority and
43 low-income communities in a disproportionately negative manner. Rae Zimmerman explores
44 means of conducting environmental justice analyses with respect to exposures to deleterious
45 agents, causing inequitable and involuntary health risks.

1 *Empirical Features of Environmental Injustice*³¹. Fair treatment of communities
2 involves not only fairness in social and locational processes such as siting of facilities but
3 also in ensuring that the outcomes of these processes not place a disproportionate burden of
4 health and economic risks on these communities. Positively stated, Environmental Justice
5 means equitable distribution of benefits including access to clean environment and
6 environmental protection. Since early 1970's, studies have used different types of
7 methodologies to identify and characterize environmental inequities. In 1992, Mohai and
8 Bryant (1992) published a review of 15 such studies, which provide empirical and
9 systematic data concerning the distribution of environmental hazards by race and income. It
10 was found that all but one of these studies demonstrated inequities in the distribution of
11 environmental hazards based on race. Furthermore, in the majority of cases where it was
12 possible to weigh the relative importance of race and income, race tended to be a better
13 predictor than income of where disproportionate burdens of environmental hazards are
14 located. In 1994, Benjamin Goldman expanded this type of meta-analysis to 64 studies and
15 arrived at similar outcomes and conclusions (Goldman, 1994). These and other studies
16 consistently show that nationally, poor and minority communities are more likely to live
17 near polluting facilities and be employed in risky occupations (Wright, 1992). Table 1
18 lists the empirical studies that show the association of environmental hazards with income
19 and race (Mohai and Bryant, 1992). Figure 1 shows a result of a study done in the Detroit
20 area that shows the disproportionate number of minorities and poor living near a
21 commercial hazardous waste site (Mohai and Bryant, 1992).

22
23 Race has been found to be an independent factor, not reducible to socioeconomic
24 status, in predicting air pollution, and the siting of municipal landfills, incinerators, and toxic
25 waste dumps (Mohai and Bryant, 1992; Goldman 1994). Nearly all national studies conclude
26 that race is a more influential factor than poverty in predicting the location of hazardous
27 facilities. The United Church of Christ Study of 1987 which had a significant impact in
28 bringing the problem of environmental racism to national attention, concludes (United Church
29 of Christ, 1987: xiii): "Race proved to be the most significant among variables tested in
30 association with the location of commercial hazardous waste facilities. This represented a
31 consistent national pattern. Communities with the greatest number of commercial hazardous
32 waste facilities had the highest composition of racial and ethnic residents. In communities with
33 two or more facilities or one of the nation's five largest landfills, the average minority
34 percentage of the population was more than three times that of communities without facilities...
35 In communities with one commercial hazardous waste facility, the average minority percentage
36 of the population was twice the average minority percentage of the population in communities
37 without such facilities..." Benjamin Chavis, then executive director of the Commission for
38 Racial Justice of the United Church of Christ, coined the term "environmental racism" to
39 describe this fact.

40
41 Three possible explanations exist for disproportionate environmental burdens on
42 people of color:
43

³¹ Summary of Remarks by Paul Mohai

1 Partly, the economic explanation addresses mobility. It claims that poor people
2 and people of color (because they are disproportionately poor) lack the financial means to
3 buy out of polluted neighborhoods and into environmentally more desirable ones. In
4 addition, because polluted areas are undesirable, property values are depressed, thus
5 making such areas affordable (i.e., "attractive") to the poor and people of color. In
6 addition, because property values tend to be lower where poor and people of color live,
7 such areas may be attractive to industries seeking to lower their location costs.

8
9 The racial discrimination explanation advances the reason that housing
10 discrimination further limits the mobility of people of color, trapping them in
11 environmentally polluted neighborhoods even when they have the financial means to move
12 elsewhere. Furthermore, because of possible lack of commensurate concern for people of
13 different ethnic/racial backgrounds, decision makers may consciously and deliberately
14 target people of color communities for society's wastes and other undesirable land uses
15 and ignore their need for clean, safe environments.

16
17 The political explanation argues that inequitable siting occurs because siting
18 decisions follow a "path of least resistance", i.e., facilities tend to be sited where
19 opposition to these facilities is expected to be the weakest. Low-income and people of
20 color communities may end up with a disproportionate share of undesirable facilities
21 because their political clout and their ability to mobilize to keep such facilities out may be
22 less than that of white and affluent communities. Political clout is a function of financial
23 and political resources, mobilization, and representation. Such resources include money to
24 hire consultants, lawyers, lobbyists, etc. They also involve such things as access to
25 information, access to decision makers, time, time flexibility, and others. The poor and
26 people of color typically do not have available to them the resources available to more
27 affluent, white individuals and groups. The lack of resources constrains the ability of
28 individuals and groups to mobilize. The ability to mobilize is important in getting attention
29 and response from decision makers; this follows the squeaky wheel principle. However,
30 political influence or clout is also conditioned by political representation; i.e., the extent to
31 which individuals and groups have persons in decision making positions that share their
32 backgrounds and concerns, who are aware of the problems of affected groups, understand
33 the problems, and are motivated to act on their behalf. The poor and people of color have
34 not only been historically underrepresented in government but they are also
35 underrepresented on corporate boards which make policy decisions.

36 *Urban Environmental Justice.*³² As the project is concerned with land use and
37 planning including siting of EMF facilities, it is relevant to examine the analyses that are
38 conducted to examine dimensions of environmental justice. Activities for which
39 Environmental justice analyses may be conducted for various activities conducted include:

- 40
41 • facility location/siting decisions
42 • waste cleanup operations
43 • sources of pollution discharges

³² Summary of remarks by Rae Zimmerman

- access to environmental services

As environmental injustice often results from location of facilities, *proximity analysis* is a technique suitable for environmental justice analysis. This analysis uses proximity to a hazard as a surrogate for exposure and/ or health risks. Conditions under which proximity is a good surrogate for exposure are:

- location of the source is known
- the source is as close to being a single point as possible rather than a loosely defined area
- pattern of spatial migration of the contaminant is known.

Proximity analysis has several advantages. It is analytically simple, and can be conducted with relatively few, often easily measured parameters. It is a systematic framework for the population base for the evaluation of:

- baseline conditions
- remedial alternatives
- locational and facility scenarios at a single location
- location
- cross-comparisons among different locations and facility subsystems

Disadvantages of the analysis are that the proximity surrogate requires exact locational data on hazard source, errors in location can produce errors in population characterization, and that the predetermined distance from the hazard source are not necessarily reflective of spatial and temporal distribution of exposure.

Several criteria are used for defining who is potentially impacted. These criteria are: activity of the population, proximity to source, exposure, and socio-economically defined sub-populations, sensitivity criteria such as health status, and combinations of the above. The components of the first four - activity, proximity, exposure and sub-population - may be listed as follows:

- Population Activity
 - resident populations
 - workers
 - transient population (coming to area for shopping, recreation, education)
- Proximity of population to:
 - site
 - waste transport areas
 - off-site exposure areas such as contaminated water supplies
- Exposure
 - duration : recent vs. long-term, continuous vs. intermittent
 - nature and level of toxicity
 - outcome of exposure : acute vs. chronic

- 1 • Socioeconomic description of sub-population
- 2 • racial and ethnic groupings
- 3 • income or wealth
- 4 • gender
- 5 • age

6
7 Various issues of information classification and correctness arise in defining sub-
8 populations based on race and ethnicity. For example, there is the possibility of self-
9 reporting bias and incorrectness in biological information. Criteria used for classification
10 such as blood quantum, physical features or ancestry may also produce errors. Inconsistent
11 classification can lead to incorrect values for health indicators.

12
13 Criteria used to define spatial boundaries and levels of aggregation for an equity
14 analysis are distance, aggregated by various measures such as blocks, tracts, zip codes,
15 municipalities, etc. Geographic Information Systems techniques are increasingly used. Each
16 of these may produce errors. The size of sites - points vs. areas is another example of
17 aggregation that may introduce error into the analysis.

18
19 Proximity analysis should therefore promote consistency in classification of groups
20 or individuals. To ensure that the right boundaries for a region is taken, it may be useful to
21 do sensitivity analyses for alternative distances and aggregation levels. It is important to be
22 explicit about assumptions and conduct sensitivity analyses for alternative assumptions. It is
23 also necessary to refine the concept of community in this analysis, and clearly delineate the
24 area and community on whom the impact is felt.

25 ***Issues of Process, Expertise, and Public Participation***³³

26
27 The EJ movement is as much about procedural equity, democratic decision making, as
28 about achieving any substantive goals. The “*How*” questions of risk management are as
29 important as what is decided, especially where there is uncertainty about data. All persons,
30 groups have the right to participate as equal partners at every level of decision making -- needs
31 assessment, planning, implementation, enforcement, evaluation. Therefore, considerations of
32 environmental justice should not be just an add-on, or afterthought, designed to simply get
33 public buy-in to a predetermined decision.

34 *Issues of Participation.* In practice, low-income communities and communities of
35 color have been unable to participate on equal terms with industry and government, at
36 various levels governmental decision making. This includes local land use siting and
37 permitting decisions; deciding appropriate cleanup levels for Superfund sites; setting of
38 environmental standards at national level. The executive EJ order is reflective of this
39 historic fact and mandates collection of information assessing and comparing risks borne
40 by low-income, minority communities.

41
³³ Summary of remarks by Clifford Rechtschaffen

1 Numerous factors in the design of the process of eliciting and implementing
2 occasions for public participation act as structural barriers to true participation. Among
3 these are:

- 4
5 1. Factors such as when meetings are held, where, what language, what documents are
6 available, to how agencies perceive community groups. For instance, the Chief of
7 OEHHA has said that right-to-know information should not be provided to citizens
8 directly exposed because they did not know how to interpret it.
9
- 10 2. Decisions are often highly technical, and reliant on expertise. Community groups lack
11 technical resources and lawyers. Even when they are represented, agency staff does not
12 take information as seriously. Surveys of environmental agency staff indicate that they
13 are more likely to view industry-generated data as reliable. This problem is
14 exacerbated because environmental standard setting is often conducted at the national
15 level, in which case, the process is distant, technical, and user-unfriendly.
16
- 17 3. The general move toward privatization of public resources, and market-based
18 incentives provide even less opportunity for public review and input. For example, in
19 emissions trading, there is no public review of sales or of permits. Vapor recovery rule
20 for marine loading terminals is avoided by cash for clunkers trades, and evidence from
21 a whistleblower in this instance indicates that the program is a fraud and that the
22 regulatory agency has been aware of it and has not acted to halt it. These concerns are
23 highlighted with a move toward energy deregulation with decisions even more remote
24 from public input. With this, the decisions are no longer made by a state agency, but by
25 private, nonprofit organization. This means that provisions of Title VI of the Civil
26 Rights Act are not applicable.
27

28 The EJ movement considers enhanced public participation inviolate. While this makes
29 it harder to manage the process, (democracy is sometimes messy!) there have been a number of
30 moves in the right direction. Structural improvements to enhance public participation are
31 found in a variety of sources such as: the CEQ draft EJ guidance; NEJAC Model Plan Public
32 Participation; Principles of Environmental Justice set forth by People of Color Leadership
33 Summit in 1991; and, Recommendations of Environmental Justice Committee of CalEPA
34 Comparative Risk Project.
35

36 Innovative approaches are needed to overcome linguistic, institutional, economic,
37 cultural barriers to effective participation. Proactive outreach strategies that can help include:
38 posters, exhibits, non-mainstream media such as ethnic radio stations, local newspapers,
39 churches, community and civic associations, and telephone hotlines.
40

41 Working directly with affected groups is important, and should include for example,

- 42
- 43 • translation of important documents to make information readily accessible and
44 understandable, such as providing summaries and facts in layman's language
- 45 • personal interviews to capture non-verbal comments

- 1 • holding meetings in convenient, culturally appropriate forums with attention to
2 details such as provision of transportation and child care; time of day/year should
3 accommodate needs of the community, and working people (not rush hour, work
4 schedules, dinner hours)
- 5 • provide information in most timely manner
- 6 • Site specific community advisory boards
- 7 • Money for community groups, citizens to hire their own risk assessors or to help
8 with technical assistance in the interpretation of data. This is particularly important
9 in the present case with clearly stated EMF data.

10
11 On a broader level, involvement must be reconceived, participation must be designed
12 in at every level – needs, plans, evaluation – and not merely involvement at the end of the
13 process in the form of public hearings or notice and comment on proposed rules, or a few
14 meetings in which agency presents information. Citizens should be included in all meetings at
15 all stages of the process. Citizens (people of color, low-income citizens) should have greater
16 representation on agency review panels, scientific advisory boards.

17
18 Collaborative partnerships, such as broad based task forces that have been used to
19 draft lead poisoning prevention statutes, develop solutions to regional air quality problems in
20 Northeast, draft industry-wide pollution control standards pursuant to Clinton's common sense
21 initiative. The idea in every case is to reach consensus as part of decisionmaking process.
22

23 Deregulation has led to decisions about power generation being in hands of a remote
24 federal agency (the Federal Energy Regulatory Commission - FERC), transmission (the
25 Independent System Operator - ISO) and increasingly being driven by the market³⁴. Very little
26 authority is retained in the hands of state regulatory officials. The ISO is not politically
27 accountable -- also presumably not subject to CEQA, or to Title VI, right to know laws. There
28 are no open meeting requirements, no public process for its decisions, and these decisions are
29 not challengeable in court. Substantively, the ISO is driven by market concerns, in particular
30 by the need to ensure reliability of service, a need that is likely to be acute in early uncertain
31 stages of deregulated market. This could become de facto a mandate not to balance health and
32 safety concerns. In this climate of deregulation the question arises: How do citizens challenge
33 decisions? How do non-market concerns get injected into decision?

34 *Processes of Decision-Making and Analytical Techniques.* A related issue of
35 concern arises even with traditional agency decision making process. Most environmental
36 policy is set through informal rulemaking, which is probably how EMF policy will be
37 determined. There is a misfit between traditional agency decision making and EJ
38 concerns:
39

- 40 • Over past 20-25 years the administrative process has been very pluralistic, and
41 many argue that with an accommodation of competing interest groups (surrogate
42 political process), the product is a mix of predominating preferences. Overall the
43 objective is utilitarian – to maximize social utility by maximizing preferences of

³³ 'Generation: FERC; transmission: ISO; distribution: PUC

1 participating groups. The agency is a neutral umpire, not trying to advocate:
2 position, generate preferences. Others argue that public choice theory best explains
3 agency rulemaking process -- agencies most responsive to interest groups that
4 maximize their political well-being³⁵
5

- 6 • It is not simple to inject EJ concerns into this process. EJ advocates are not just
7 another special interest group competing for attention but presenting a
8 fundamentally different claim. The utilitarian framework does not respond well to a
9 purely ethical claim. One cannot measure the utility of environmental justice; EJ
10 interest is not the same as balancing interests to achieve efficiency. Tradeoffs that
11 concentrate pollution generating activities in some locales to yield net economic
12 benefit, or even net environmental benefit over larger area are not acceptable.
13

14 Both cost/benefit analysis and risk assessment present problems in this respect as well.
15 Cost/benefit analysis is limited. As traditionally practiced, it does not ask about distribution of
16 risks/benefits, justification for actions, or whether risks are preventable. Non-quantifiable
17 costs/benefits such as the benefit of achieving justice, are not included in traditional
18 cost/benefit analysis. Related concerns arise also with risk assessment, comparative risk
19 assessment. Risk assessment looks only at population risk, not distribution of risks, who
20 receives benefits and who bears burdens. Risk assessment asks the wrong questions. It does
21 not question the need for incurring risks³⁶, but rather starts from a premise that accepts
22 presence of risk as a given rather than looking at avoiding risk altogether or looking at
23 alternative processes and products, i.e. pollution prevention. Risk assessment does not ask
24 basic questions: Can this risk be avoided? or, What are benefits of action? Comparative risk
25 assessment further assumes that limited resources are available for environmental protection.
26

27 Several aspects of the risk assessment process give cause for concern in light of equity of
28 the populations under consideration.
29

- 30 • Numerical risk figures often presented in risk assessment suggest a scientific
31 certainty that does not exist. This is misleading in situations where the audience
32 may not realize the underlying premises of the numbers.
33
- 34 • In the case of carcinogens, there are significant uncertainties about hazard
35 identification, exposure information, model assumptions, dose-response curves,
36 scaling factors, and confidence limits. In the case of reproductive toxicants, there
37 is a critical assumption of threshold for dose-response. The National Academy of
38 Sciences has cited 50 points at which decision makers must select between
39 different plausible scientific judgments about uncertain data.

³⁵ Public choice theory dictates that politicians act in self-interest to maximize reelection chances, rather than as motivated by public interest. Small, well-organized special interest groups have disproportionate impact on policymaking. (Special interest groups have incentives to organize, public's interests are too diffuse to organize).

³⁶ Bullard: EJ framework brings to the surface ethical and political questions of "who gets what, why and in what amount, who pays for, and who benefits from, technological expansion?"

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- Risk assessment procedures and data selection reflect biases of decision makers, yet is presented as if they are objective processes.
 - Risk assessments are based on 70kg white male and do not consider special population characteristics.
 - Risk assessments look only at population risk, not distribution of risks, who receives benefits and who bears burdens, and need for incurring risks. As Bullard has pointed out, the EJ framework brings to the surface ethical and political questions of "who gets what, why and in what amount? Who pays for, and who benefits from, technological expansion?" This set of questions is outside the realm of risk assessment.
 - Risk assessment asks the wrong questions. It starts from a premise that accepts the presence of risk as a given rather than looking at avoiding risk altogether or looking at alternative processes and products, i.e. pollution prevention. The method does not ask the basic question: can this risk be avoided? Comparative risk assessment assumes that limited resources are available for environmental protection. Risk assessment also fails to ask what the benefits of action are.
 - Risk assessment is a highly specialized decision making tool, technical, and resource intensive. The time required for good assessment often leads to regulatory paralysis.
 - In the case of comparative Risk Assessment: 1.Risks may not truly be comparable, especially for different health endpoints. Different populations may be at risk from different activities; risk of most diseases varies by age; multiple environmental and genetic factors may interact to cause disease. This is especially important when considering the risk of populations whose baseline health of living conditions have not been considered in the risk assessment. 2. Some risks are controllable, amenable to pollution prevention, others are not.

32 *Role of Experts and Expertise in EJ Considerations.* Another poor fit deals with
33 role of experts as traditionally conceived:

- 34
- 35
- 36
- 37
- 38
- 39
- 40
- 41
- EJ advocates have a different, far more skeptical view of experts, for a variety of reasons³⁷. Scientific decisions are far less objective than they purport to be. Thus, the risk assessment process is fraught with value judgments. Subjective policy judgments that masquerade as objective decisions that are the product of agency expertise have resulted in current pattern of low-income, communities of color bearing disproportionate share environmental harms. Since the advent of risk assessment in early 1980's, greater disproportionate siting has occurred.

³⁷ Other recent criticism of experts: inability to go beyond area of expertise to other disciplines; avoid unstudied areas for areas already studied; reduce multiple, complex risks to series independent, incomplete risks, hired gun.

- 1 • Misfit arises because of heavy reliance on expertise in the agency decision-making
2 process. At some point, EJ advocates do not want to rely on experts or even debate
3 technical issues, but rather follow imperative of justice because of several reasons:
4 • Expertise can't resolve conflicting preferences, distributional issues,
5 • Communities have special expertise about the context in which hazards occur.
6 Experts cannot make decisions without understanding of social realities
7 affecting communities.
8

9 *Context of Communities Facing Exposures.* The context of communities facing
10 exposures is an important EJ consideration. Exposure characteristics of persons have a
11 wide range of characteristics that need to be considered.

- 12
- 13 • Cumulative Exposures: Persons face multiple exposures -- home, community, and
14 workplace to individual chemical and to other chemicals. Background risks may be
15 higher because of neighborhoods. Likewise, communities may face multiple risks
16 such as toxic hot spots.
17
 - 18 • Synergistic risks. Recent findings show that several chemicals act synergistically in
19 the risks they impose. Examples are about disruptors, and other estrogenic
20 chemicals³⁸ about which information is still emerging.
21
 - 22 • Background Health Conditions/Risks: Studies show that the baseline health
23 conditions of disadvantaged populations are different. Factors to be considered
24 include the following observations:
25
 - 26 1. Mortality due to cancer is decreasing for all population groups except
27 blacks. Health indicators are on the whole worse across the board for
28 blacks.
 - 29 2. There is a variation in susceptibility to cancer depending on age, sex,
30 race, and ethnicity³⁹:
 - 31 (i). Genetic makeup
 - 32 (ii). Social and economic factors : include poverty, lack of adequate
33 medical care, poor nutrition, social structure (people of color have
34 higher birth rate, larger % children & women who are more susceptible
35 to adverse health effects), and use of alcohol, tobacco, drugs
 - 36 (iii). Poor, and people of color suffer greater health problems (asthma,
37 respiratory disease), and this may make them more vulnerable to
38 pollution

³⁸ Persons subject to pesticides endosulfan, dieldrin, toxaphene & chlordane showed 500-1000 increase in potency resulting in increased production of estrogen, linked to breast cancer. Other study shows 10 estrogenic chemicals combined at doses 1/10th of that required to produce adverse effect, combination produced adverse effect.

³⁹ Finkel: 5% of population may be 25 times more susceptible than average person

1 (iv). Exposure assessments have built-in assumptions that may not hold in
2 the case of certain populations: For example, EPA offices historically
3 used 20 grams/day for fish consumption estimates. While this may be
4 true for a population that gets fish just from supermarkets, it is not for
5 population where a significant fraction of the population consists of
6 subsistence fishers. Most risk assessments also assume that a population
7 consumes skinless, trimmed fillets; ethnic minorities are more likely to
8 eat fish with skin, and toxins concentrate in skin and fatty tissues.

- 9
- 10 • Agencies still do not incorporate cumulative/synergistic risks into permitting,
11 compliance, and cleanup decisions.
 - 12
 - 13 • These considerations are particularly critical because of the belief that EMFs may
14 act as copromoter of cancer, i.e aid or make possible growth of cancer initiated by
15 other chemical or physical agents that have initiated cancer process, started to
16 damage DNA⁴⁰.
 - 17

18 *Burden of Uncertainty of EMF Risk under Various Control Scenarios.* In the
19 case of EMFs it is important to ask who bears the burden of the scientific uncertainty (or,
20 incomplete knowledge) in the risk assessment and decision making scenario. A recurring,
21 critical theme in environmental regulation, the search for certainty can be paralyzing. Who
22 bears uncertainty should turn on who has access to information and who benefits from the
23 activity. Evidence suggests that we do not even know correct exposures to test for yet.
24 This lack of certainty means one can not speak of a safe level, and this contributes to
25 anxiety and fear.

26 *Impacts of Considerations of Aesthetics.* Any retrofitting of the current power line
27 configurations done on the basis of aesthetics is also likely to have differential impacts on
28 low-income neighborhoods. The perception of the neighborhood as degraded influences
29 decision makers, and it may be perceived as a “dumping ground” for less desirable ways
30 of retrofitting. For instance, undergrounding as a field mitigation strategy may improve
31 aesthetics and property values. It may not be the strategy of choice that decision makers
32 may make for low-income neighborhoods. Instead, they may choose limitations on land use
33 nearby lines and this could lead to lower tax base, and further reduction of property values.

34 *Disclosure to Public.* Clear disclosure of the risk, uncertainty and related
35 decision-making promotes autonomy, citizen power and advances democratic decision-
36 making. Publicizing what is known even without knowing answers and solutions, brings
37 the public into the debate and educates them. It is important to do this in a meaningful,
38 helpful, non-condescending way. This is to be contrasted with Prop. 65 warning
39 experience where the public received meaningless warnings filled with disclaimers,

⁴⁰ Possible mechanism: change functioning cells, rate growth cells, activities enzymes, receptor molecules, production hormones. Other possible impacts: reproductive hazards, depression, Alzheimer’s disease.

1 information that trivializes risk, and fails to put it into context. The OEHHA chief said that
2 the public did not need good warnings, and could not understand the information.

3 *Incentives from Private Tort Law?* The California Supreme Court held that
4 common law actions are preempted by state regulatory efforts to regulate health and safety
5 concerns from power lines. Tort law is a poor fit for this case anyway due to the
6 following reasons:

- 7
- 8 • Trespass requires more than intangible intrusion, and must be perceptible by the
9 senses,
- 10 • Courts have held that reduction in property values due to public's fear of EMF
11 radiation from presence power lines is not cognizable in nuisance unless fear is
12 reasonable,
- 13 • Cases for personal injury damages face causation hurdle,
- 14 • Fear of cancer claims are greatly limited by *Potter* , must be more probable than
15 not that the plaintiff would actually get cancer.
- 16

17 Courts have also held that reduction of property values due to public's fear is
18 compensable in condemnation actions, regardless of reasonableness.

19 *Risk Perception.* Risk perception is an important factor to consider as an aspect of
20 environmental justice. It is well known that risks cannot be reduced to numerical
21 characterizations. The public evaluates risk based on range of qualitative dimensions:
22 voluntariness, control, dreaded, delayed impacts, affects children, well understood (as
23 compared to automobile accident), who benefits, outrage factors that offend sense of
24 fairness⁴¹. The public places a higher value on prevention.

25

26 Perceptions of risk differ by gender and race. Women perceive greater risk from most
27 hazards than men, non-whites perceive greater risk than whites. Non-whites also benefit less
28 from society's technologies and have less power and control.

29

30 Several social psychological impacts arise from risk perception:

- 31
- 32 • Demoralization costs, costs-- social unrest, impaired incentives -- stemming from
33 perceived unfairness.
- 34 • "[E]xposure to toxic materials not only changes what people do, it also profoundly
35 affects how they think about themselves, their families, and their worlds. In short, it
36 represents a fundamental challenge to prior life assumptions." Edelman, et al.).
37 These "lifescape" changes include increased worries about health concerns,
38 feelings of loss of control over the present and future, the inversion of home as a
39 secure place, and a loss of trust in others.
- 40 • Exposure to toxic materials also stigmatizes affected individuals and results in
41 increased stress and individual and family mental health problems. Communities

⁴¹ Other factors affecting [inflating] perception of risk are the anchoring heuristic (maintain belief despite later evidence contrary), availability heuristic, representative heuristic

1 affected by toxic waste contamination show higher levels of mistrust, depression,
2 anxiety, demoralization, and fear of future disease.
3

4 *Characterization of the EJ Problem in California*⁴²

5
6 At the Environmental Law and Justice Clinic at Golden Gate University School of
7 Law, we provide legal assistance for low-income residents and communities of color
8 burdened with environmental hazards. I have also participated in the Cal-EPA Comparative
9 Risk Project, where an effort was made to analyze various risks posed to public health and
10 the environment. The Clinic focuses upon those facing multiple sources of pollution or living
11 in hot spots. We can get an overall idea of the problem in the U.S. by looking at the overall
12 use of chemicals in our society. 64,000 chemicals are produced, 12,000 in substantial
13 amounts. 23,000 facilities released 2.8 billion pounds of EPA-designated toxic chemicals in
14 1993. Because of the inequities described in the previous sections, low income communities
15 and communities of color receive the worst exposure to these chemicals.
16

17 *Case Study: Hunters Point.* Hunters Point is an example of such an affected
18 community. Of the population of 28,000 in Hunters Point, 62% are African-Americans,
19 22% Asian-Americans, 11% Whites, and 4% others. The multiple sources
20 disproportionately situated in the vicinity include air polluting facilities, hazardous waste
21 generators, leaky underground storage tanks, and abandoned waste sites. These include
22 Federal and State Superfund sites. A power plant is the biggest air polluter, and the
23 sewage treatment plant produces the biggest water discharges.
24

25 More than 30% of the Bayview-Hunters Point population has household income less
26 than \$15,000 as compared to the overall City's percentage of 18.8%. 46% of the household
27 incomes are below \$25,000.
28

29 Health Studies of the population show higher than expected rates of asthma, heart
30 disease, prostate, breast and cervical cancer. Risk assessment has been helpless to define the
31 source of disease. So, people in Hunters Point have come to point of view where they are not
32 interested in any strategy that increases risk, regardless of the benefits. In addition, they are
33 looking for a strategy that reduces their overall risk, fast. Incremental risk is unacceptable to
34 the community that is already so overexposed to health risks.
35

36 As the Hunters Point case shows, the inequitable distribution of burden requires the
37 assumption of worst case where there is uncertainty, or shift the burden of proof. Rather than
38 wait for scientific risk assessment which is uncertain at best, and does not lend itself to
39 identification and hence mitigation of the highest exposures, the desired strategy is risk
40 avoidance wherever possible even if it is based on an educated guess.
41

42 In the example of the rescue of people lost in the ocean mentioned earlier: the first
43 person is usually a high income person, society spares no effort to save them. The *second*
44 person is a middle income white person, and society says "this is costing a lot of money,

⁴² Summary of presentation by Alan Ramo

1 asks them to pay for the help. The third person is a person of color and society says, let's
2 do a risk assessment and see if the rescue is worth it. Is this what is happening with EMF
3 and undergrounding transmission and distribution lines?
4

5 EJ does not necessarily reject cost-benefit, or comparative risk analysis. It is a
6 matter of how and when those are applied. Because of the uncertainties and hence softness
7 in risk assessment, first one needs to ask if the risk can be avoided altogether. Thus
8 pollution prevention is more desirable rather than waste management by risk analysis.

9 *Application to EMF exposure.* The corresponding (pollution prevention) questions
10 for powerlines are:

- 11
- 12 • Will deregulation lead to additional transmission lines to eliminate
- 13 transmission congestion?
- 14 • Are there other, localizable sources of electricity such as solar or fuel cells that
- 15 could eliminate or minimize effects of distribution systems?
- 16 • Can potential exposure from their fields be cheaply controlled?
17

18 After this inquiry, begin risk assessment using a hot spot approach. The factors to be
19 assessed are:

20

21 A. For exposure and effects:

- 22
- 23 • Is the exposure: cumulative, additive, synergistic with other factors?
- 24 • Do the epidemiological studies show interaction with social factors of poverty
- 25 such as: access to medical care, smoking or drug use, poor diet, or other
- 26 stresses from poverty?
- 27 • Look for impacts of various kinds: respiratory, reproductive, liver or kidney
- 28 damage, birth defects.
29

30 B. Value Choices:

- 31
- 32 • Can you control it or is it voluntary?
- 33 • Is the risk potentially catastrophic in numbers or severity of the disease?
- 34 • Is it perceived by others as severe, interfering with property values, social
- 35 esteem, etc.?
36

37 C. Consider all information:

- 38
- 39 • Anecdotal or neighborhood surveys may reveal amount of disease and type
- 40 • Traditional risk assessment may be rejected as being based upon guesses about
- 41 extrapolation from animal, industrial, or white male-based studies
- 42 • Burden of proof on those seeking to expose the community, not on community
43

1 D. Assume worst case, unless proven otherwise. This stance:

- 2
- 3 • prompts studies
- 4 • protects people before it is too late
- 5 • allows reallocation of resources to potential public health threats such as health
- 6 effects of EMF. This reallocation is eminently affordable in a country that spends
- 7 huge amounts of money on maintaining and expanding the world’s largest arsenal of
- 8 nuclear weapons at a time when there is no real nuclear threat to the country.
- 9

10 E. In any cost-benefit analysis, be sure to include all benefits (property values, secondary

11 social values)

12

13 Finally, it is essential to watch out for false trade-offs. Money may be better spent here than

14 for other things.

15 **D.4 Summary and Conclusions**

16

17 In this final section, we summarize some of the conclusions of the environmental

18 justice workshop.⁴³ We should point out that not all conclusions of the workshop

19 participants are shared by all participants of the workshop or by all authors of this report.

20 However, decision-makers in public utilities commissions and in city councils should expect

21 stakeholders with an environmental justice perspective to espouse the views and

22 prescriptions summarized below. To make clear that these views and prescriptions are those

23 by environmental justice advocates and not necessarily by the authors, we put them into

24 italics.

25

26 *The ethical imperatives implied in the definition of Environmental Justice (see EPA,*

27 *1997) should be embedded even in technical choices such as that of the metric for*

28 *comparing different options, of the treatment of the uncertainty, and choice of control*

29 *options. Inequity may result from the differential context and background exposures of the*

30 *communities affected, and from the processes of making and communicating the decisions*

31 *on control or prevention of exposure. Environmental Justice demands are interested in*

32 *actions that are pragmatic and results-oriented rather than in exploring the philosophical*

33 *structure, or hypothetical or actual cases in which their prescription would lead to*

34 *unacceptable results of compounded exposure.*

35

36 *1) Environmental Justice applies principles of equity to all populations.*

37

38 *Both the tort law and the criminal law seek to protect not just those whose injuries*

39 *are “reasonably foreseeable” or those that are “intended,” not just the upper 95% of the*

40 *population but also the most vulnerable, most susceptible, and even those with very rare*

41 *vulnerabilities. Thus the tort law seeks to correct unjust invasions of others’ interests, and*

42 *the criminal law punishes invasion of those interests. Environmental health administrative*

⁴³ These conclusions were summarized from notes provided by Raymond Neutra

1 law seeks to prevent some of those invasions from occurring in the first place, for example,
2 to prevent EMFs from invading people's interests.

3
4 *The ethical principle for environmental protection emerges in analogy with the*
5 *above principles: if the healthy are entitled to preventive measures to protect them from*
6 *invasion of their interests, others who might be more susceptible to disease have equal*
7 *standing to be similarly protected. This requires equal protection on an exposure-by-*
8 *exposure basis, with equal standing for the healthy and the susceptible for protection*
9 *from cumulative exposures.*

10
11 *A strong part of the EJ perspective is to accord a special moral and legal status to*
12 *communities of color because of a history of social, economic and environmental*
13 *discrimination. Title 6 of the Voting Rights Act gives a special legal status to such*
14 *communities and protects them from adding new environmental hazards or potential*
15 *hazards to their already disproportionate burden. Socially disadvantaged communities*
16 *and communities of color may be especially susceptible to added potential hazards because*
17 *of the above history. This is a further argument against adding EMF or other*
18 *environmental exposures to their already full plate of potential hazards. This could apply*
19 *to new EMF facilities even if the communities do not have a proven excess exposure to*
20 *EMF. The special moral, legal and biological status of communities of color means that*
21 *one should take preventive action with a lower degree of scientific certainty of a hazard*
22

23 *2) Principles of due care need to be enunciated and followed.*

24
25 *Following legal analysis of the issues, due care could be defined as economically*
26 *and technically feasible precautionary actions, based on what is known and knowable*
27 *about the methods of minimizing public exposure and the methods of preventing*
28 *disproportionate cumulative exposure of any minority group or other population sector.*
29 *This could include: warnings and self-protective instructions for persons exposed;*
30 *diligent research and EMF monitoring efforts; and, routing of new power lines and use of*
31 *protective engineering and design options; reengineering and rerouting existing power*
32 *lines; and, collaborative efforts with manufacturers of products which cause EMF*
33 *exposure in residences and workplaces, and with regulators of such products (e.g.*
34 *Consumer Product Safety Commission, Occupational Safety and Health Administration),*
35 *in order to foster new product designs and use instruction which lessen EMF exposure.*
36

37 *With regard to remediating existing EMF power grid exposures, due care means*
38 *that poor communities and communities of color should either be placed first in line, or*
39 *should have an equal chance at being first in line with other communities.*
40

41 *Finally, procedural and economic aspects of implementing such amplified "prudent*
42 *avoidance" policies would need to be addressed by requiring, for example, that*
43

- 44 • *utility project planning and state agency decision-making be transparent,*
45 *exclude discriminatory values and assumptions, and prevent disproportionate*
46 *cumulative exposure of any minority or other population sector; and that*

- 1
2 • *public hearings be held and viewpoints of affected persons be addressed, in*
3 *determining prudent avoidance expenditures, utility cost recovery, and the*
4 *allocation of the costs to be recovered among utility customers.*

5
6 *Building such an amplified policy of "prudent avoidance" and diligently*
7 *implementing it cannot be done on an ad hoc or piecework basis. State regulators will need*
8 *to take a holistic approach to the challenge of addressing EMF health risk and*
9 *environmental justice concerns in order to meet their societal responsibilities.*

10
11 3) *Methods of analysis, the data used, and decision making have to be appropriate.*

12
13 *EJ principles have to be part of the methodology and plan of mitigation. The data*
14 *used need to have the necessary disaggregation and detail. EJ advocates are not*
15 *sympathetic to guiding action through a hierarchy of general principles. In the case of*
16 *EMFs with a high degree of scientific uncertainty of hazard, EJ considerations would*
17 *lead to a precautionary principle, which prevents the additional exposure. Probabilistic*
18 *analysis may be a valuable technical exercise, but it is irrelevant and peculiar to*
19 *stakeholders whose primary concern is environmental justice.*

20
21 *Any analysis should consider the equity of impacts. In case of disparate impacts due*
22 *to placement of facilities, or at-risk, vulnerable populations, mitigation efforts should*
23 *address these explicitly. A monitoring, mitigation, and evaluation plan should be*
24 *established, and there needs to be periodic feedback on impacts. There should be plans for*
25 *addressing should unforeseen gaps arise in analysis, data or mitigation strategy.*

26
27 *The questions for powerlines need to proceed from a pollution prevention*
28 *philosophy taking precedence over a mitigation philosophy, especially for new siting. As*
29 *deregulation of electric power generation and distribution progresses, this becomes*
30 *increasingly important as a market approach does not take consideration of the*
31 *differential background exposure that people are already subjected to, or consider any*
32 *factors of equity and justice with respect to the distribution of risks and benefits.*

33
34 *Instead of relying purely on quantitative methods, a semi-qualitative method that*
35 *considers all information and places the burden of proof on the facility siting agent*
36 *rather than the community should be considered. In any method, the diversity of the*
37 *population exposed with respect to background data is a serious consideration. Any cost-*
38 *benefit analysis should include all benefits (property values, secondary social values).*
39 *While the health effect data on EMF is uncertain, much of the evidence points to the fact*
40 *that if EMF is harmful, it may be a co-promoter of effects such as cancer. This is*
41 *particularly important in environmental justice considerations because the populations*
42 *under discussion are already exposed to other agents that maybe initiators of the*
43 *diseases.*

44
45 *This puts a special obligation on the analysts and decision makers to do any*
46 *cost/benefit or risk/ benefit analysis with clear consideration of the background*

1 exposures. Socio-psychological factors such as the indirect effect of reduced property
2 values on social esteem of the community and risk perception should be considered. As
3 our understanding of the whole picture of exposure and effects of EMF is still emerging,
4 it is possible and just to design into studies an examination of factors such as
5 populations at risk, genetic predisposition, synergies with other common environmental
6 agents including socioeconomic factors as well as the spectrum of possible health
7 endpoints. In light of EJ principles, risk assessment would consider the possibility of
8 special vulnerability of poor people and communities of color. In calculating population
9 burden, these communities should be considered separately because of their total
10 exposure history and their risk reduction should afford them a special priority.

11
12 4) Policy and economic analysis needs to account for inequitable exposure history.

13
14 *EJ policy analysis should require data on unusual impacts of EMF on*
15 *communities of color and associations between EMF and other hazards. People without*
16 *the necessary resources will not have the necessary hazard information, and the market*
17 *mechanisms will not work to protect them from inequitable exposure. Government*
18 *should provide restitution to people of disadvantaged communities and communities of*
19 *color by affording them special protection. The traditional economic vision of scarce*
20 *resources allocated to status quo solutions, instead of considering pollution prevention,*
21 *increases the likelihood of dumping toxic materials inexpensively in poor communities*
22 *or communities of color. This means that in unavoidable situations such as siting an*
23 *undesirable facility (even of uncertain hazard), the government cannot force a random*
24 *allocation site or let purely market forces operate.*

25
26 *EJ principles would also differ from the economists' view that monetary*
27 *compensation can substitute for EMFs mitigation and alternate risk reduction*
28 *strategies. "Polluter pays," is still the appropriate principle, but this "payment" has to*
29 *be in terms of mitigation and prevention of exposure. Payment to prevent exposure is a*
30 *potential EJ issue. The business community will probably oppose rate hikes to cover*
31 *undergrounding. While it is fair that they should share in these costs, if they are*
32 *exempted it would be politically viable to have a residential rate hike to cover*
33 *undergrounding. This means that all stakeholders including business organizations*
34 *need to participate in the decisions on mitigation strategies.*

35
36 5) Special attention needs to be paid to clear communication and access to information and
37 decision making.

38
39 *Considerations of the autonomy in decision making of communities are also*
40 *central to ensure environmental justice. Stakeholders have to be included in the design*
41 *and implementation of the plan as well as in developing appropriate, culturally sensitive*
42 *communication and outreach. The entire process should be open and accessible to all*
43 *stakeholders. This includes complete, honest, clear and open communication of the facts*
44 *including the unknowns, the values and assumptions embedded in the choice of methods*
45 *for risk assessment, needs assessment and planning of siting, as well as details of the*

1 *technical design and analysis parts of the project. Any message for communication*
2 *should include stakeholders in its development, not just as recipients.*

3
4 *6) Equity and Environmental Justice are not synonymous.*

5
6 *There is a qualitative difference between that minority of EMF exposed people in*
7 *communities of color and the minority of EMF exposed people in affluent communities.*
8 *The former are exposed to EMF in the context of a history of discrimination, which all*
9 *main ethical systems decry.*

10
11 *The minority of EMF exposed people in affluent communities are recipients of*
12 *inequitable EMF exposure while others get only benefit from electricity. Some*
13 *mainstream libertarian ethical systems think that they should fend for themselves. Other*
14 *mainstream liberal ethical systems think that they have a moral claim on the majority for*
15 *equal protection. EJ would support equal protection for these people but sees their claim*
16 *and their situation as less serious than the moral claim and plight of the EMF exposed in*
17 *disadvantaged communities and communities of color. Considering the impact of EMF on*
18 *property values as benefit or restitution or restoration is an issue for property owners in*
19 *more affluent neighborhoods. It is not salient within the EJ framework.*

20

1 **D.5 References**

2 (Includes general references on Environmental Justice, other references are provided in the
3 footnotes)

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28 1992, pp. 114-125.

1

2 *NOTE: SOME GENERAL PRINCIPLES IN A TECHNOLOGICAL SOCIETY*⁴⁴

3

4 The attributes by which a series of options are judged include cost, potential benefits and a
5 series of “commandments”. Some are ethical, some are legal and some represent societal
6 norms. These ethical commandments are not included in the traditional commandments. They
7 result first, due to the potential of technologies to transcend space and time in their effects⁴⁵
8 and second, because of the assumption of equal protection for all as a component of social
9 justice.

10

11 These new commandments include:

12

- 13 a) You should make restitution to people who have been previously hurt.
14 b) You should clean up your own pollution.
15 c) If you trespass in a minor way against some vulnerable person who is thereby
16 unintentionally hurt in a serious way, you are responsible for the entire
17 consequences.
18 d) We all have the duty to pitch in to provide equal protection to all members of our
19 community even if this activity doesn't benefit us directly
20 e) If you protect people do it in a simple uncomplicated way.
21 f) Protect people in a way that is transparent and makes sense.

⁴⁴ Comments from Ray Neutra

⁴⁵ A lengthy discussion of the imperatives for a technological society has been discussed by Hans Jonas in the work cited in the bibliography.

1 *Appendix D.1: Workshop Participants*

2

3 **Panel Members**

4

5 Michael Baram, Center for Law and Technology, School of Law, Boston University

6 Jose Bravo, Environmental Health Coalition, San Diego

7 Robert Bullard, Environmental Justice Resource Center, Clark Atlanta University

8 Carl F. Cranor, Department of Philosophy, University of California-Riverside.

9 Lester Lave, Graduate School of Industrial Administration, Carnegie Mellon University

10 Paul Mohai, School of Natural Resources and Environment, University of Michigan

11 Alan Ramo, Environmental Law and Justice Clinic, Golden Gate University

12 Clifford Rechtschaffen, Environmental Law and Justice Clinic, Golden Gate University

13 Rae Zimmerman, Robert Wagner Graduate School of Public Service, New York University

14

15

16 **Host Participants**

17

18 Ray Neutra, California Department of Health Services, Oakland, CA

19 Detlof von Winterfeldt, Decision insights Inc, Irvine

20 Indira Nair, Department of Engineering and Public Policy, Carnegie Mellon University

21

1 *Appendix D.2: Workshop Agenda*

2
3 Ethical and Environmental Justice Considerations in
4 Electromagnetic Fields (EMF) Policy

5
6 **California Department of Health Services**

7 **2151 Berkeley Way**

8 **Berkeley, CA**

9 **(510) 540 2308**

10 Tuesday, March 24-Wednesday, March 25, 1998

11 8:00 a.m. – 5:00 p.m.

12
13
14
15
16 **Tuesday, March 24**

- 17
18 8:00 Arrival and Registration
19 8:30 Welcome (Raymond Neutra)
20 8:45 Workshop Objectives (Indira Nair)
21 9:00 Overview of the Project “Power Grid and Land Use Policy Analysis”
22 (Detlof von Winterfeldt)
23 9:45 *Coffee Break*
24 10:00 Panelists’ Presentations (with discussion, 30 min. each)
25 Michael Baram
26 Jose Bravo
27 Robert Bullard
28 Carl Cranor
29 12:00 *Lunch Break*
30 1:30 Panelists’ Presentations, continued
31 Lester Lave
32 Paul Mohai
33 Alan Ramo
34 3:00 *Coffee Break*
35 3:15 Panelists’ Presentations, continued
36 Clifford Rechtschaffen
37 Rae Zimmerman
38 4:15 General Discussion and Stakeholder Comments
39 5:00 Adjourn
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44 **Wednesday, March 25, 1998**

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- 2 8:30 Roundtable Discussion of Issues Raised During the Previous Day
- 3 9:30 Introduction of an EMF Mitigation Case with Environmental Justice Implications
- 4 (Detlof von Winterfeldt)
- 5 10:15 Discussion of the Case
- 6 10:45 *Coffee Break*
- 7 11:00 Group Discussion of the Case
- 8 12:00 *Lunch Break*
- 9 2:00 Summary of Results of Group Discussions
- 10 3:30 *Coffee Break*
- 11 3:45 Summing up and Stakeholder Comments
- 12 5:00 Adjourn