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VIA US MAIL AND ELECTRONIC MAIL
(BDCP.COMMENTS@NOAA.GOV)

Mr. Ryan Wulff, NMFS
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

Re: *Pacific Gas and Electric Company – Comments on Bay-Delta Conservation Plan and Draft Environmental Impact Report/Environmental Impact Statement*

Dear Mr. Wulff:

Pacific Gas and Electric Company (PG&E) appreciates the opportunity to review the California Department of Water Resources' (CDWR) Draft Bay-Delta Conservation Plan (BDCP) and the associated Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS). PG&E looks forward to working with CDWR staff on this important infrastructure project for the state of California.

Because the BDCP is a significant infrastructure project, it is likely to impact PG&E's existing electric and gas infrastructure. PG&E is proud to serve 15 million gas and electric customers in California, from Bakersfield to the Oregon border. Given PG&E's vast service territory, a project of the size and scope of the BDCP will need to be closely coordinated with PG&E's existing and planned infrastructure, and PG&E's operations and maintenance activities will also need to be considered.

In addition to managing potential impacts of the BDCP on its infrastructure, PG&E understands that CDWR may request that PG&E provide some or all of the power supply needs of the project, which could include the temporary power for the construction/tunnel boring process or the permanent needs of the new pumping stations. Meeting these needs would likely require development of new infrastructure and require substantial lead time and coordination with multiple other entities, including the California Public Utilities Commission (CPUC) and the California Independent System Operator Corporation (CAISO). We appreciate CDWR's willingness to work with PG&E on these issues and early engagement of PG&E in the planning process could help avoid project delays.

PG&E provides the following comments to assist the project in addressing these issues comprehensively and efficiently. We have been in communication with CDWR regarding these issues and encourage the project to continue working closely with potentially affected utilities in a collaborative manner. PG&E will be able to provide more specific comments about necessary mitigation of impacts to utility infrastructure once the project plan has been further defined.

I. Cost, Permitting, and Planning

The BDCP project proponents (Proponents) are responsible for costs associated with the relocation and protection of existing PG&E facilities to accommodate construction and operation of the new water conveyance facilities proposed in Conservation Measure 1 (CM-1), as well as those affected by any future restoration activities within the proposed Restoration Opportunity Areas (ROAs). These costs include utility relocation and protection activities associated with the gas and electric distribution and transmission systems, including planning activities, grid reliability studies, engineering studies, environmental studies, environmental permitting, land acquisition, and any other activities necessary to comply with all requirements and standards to ensure safe, reliable energy and meet all environmental obligations. Because utility relocations typically require long lead times to plan, permit, and execute, and are not feasible in all cases, the Proponents are encouraged to consult with PG&E early and often during the planning and design phases for the new CM-1 facilities, as well as for the future restoration projects as these are proposed.

While it is not yet clear to what extent PG&E facilities will play a role in providing temporary construction power to the project, or any new permanent facilities to serve the project's operational needs once it is built, PG&E has been working with the Proponents and other potential power providers to conduct system impacts studies and other analyses to determine the least impactful, most environmentally sound configuration for new or upgraded electric transmission facilities. As a general principle, these costs would also be the responsibility of the project.

II. California Public Utilities Commission Jurisdiction

Section 20.2.2 of Chapter 20 (Public Services and Utilities) of the Draft EIR/EIS should include reference to the California Public Utilities Commission (CPUC) General Order (GO) 131-D, which governs the siting of electric facilities constructed by CPUC-regulated investor-owned utilities like PG&E. PG&E will need to comply with GO 131-D requirements prior to constructing any new electric facilities that might be required to serve the project, or relocating existing electric facilities.

PG&E is subject to the jurisdiction of the CPUC and must comply with CPUC GO 131-D in connection with the construction or modification of electric facilities (e.g., transmission lines, substations, switchyards, etc.). In most cases where PG&E's electric facilities are under 200 kV and are related to a larger project (e.g., electric generation plant), GO 131-D exempts PG&E from obtaining an approval from the CPUC provided its planned facilities have been included in the larger project's California Environmental Quality Act (CEQA) review, the review has included circulation with the State Clearinghouse and review by the CPUC, and the project's lead agency finds no significant unavoidable environmental impacts as a result of construction of the electric

facilities. PG&E may proceed with construction once PG&E has filed notice with the CPUC and the public as to the project's exempt status, and the public has had a chance to protest PG&E's claim of exemption. If PG&E facilities are not adequately evaluated in the larger project's CEQA review, or if the project does not qualify for the exemption because the lead agency has concluded that the electric facilities will result in a significant unavoidable impact, PG&E may need to seek approval from the CPUC (e.g., Permit to Construct (PTC)), which could take 18 months or more, although it could take less time than that in cases where another lead agency has already conducted an environmental review that includes PG&E's facilities.

When PG&E's transmission lines are designed for immediate or eventual operation at 200 kV or more, GO 131-D requires PG&E to obtain a Certificate of Public Convenience and Necessity (CPCN) from the CPUC unless one of the following exemptions applies: the replacement of existing power line facilities or supporting structures with equivalent facilities or structures, the minor relocation of existing facilities, the conversion of existing overhead lines (greater than 200 kV) to underground, or the placing of new or additional conductors, insulators, or their accessories on or replacement of supporting structures already built. Obtaining a CPCN can take 18 months or more, although it could take less time than that in cases where another lead agency has already conducted an environmental review that includes PG&E's facilities.

III. Planned and Unplanned PG&E Projects

PG&E also recommends that the Proponents consult with PG&E concerning planned and potential future PG&E facility improvements and expansion plans. It is recommended that the Proponents should identify and evaluate early on with PG&E potential future impacts to PG&E facilities and the potential for those facilities to accommodate future electricity and gas demand.

IV. Access and Maintenance

PG&E owns and operates electric and gas transmission lines and distribution facilities, substations and other PG&E facilities and properties along the proposed project boundaries. To promote the safe and reliable maintenance and operation of utility facilities, the CPUC has mandated specific clearance requirements between utility facilities and surrounding objects or construction activities. To ensure compliance with these standards, the Proponents should coordinate with PG&E early in the development of their project plans. Any proposed development should provide for unrestricted utility access and prevent easement encroachment where possible that might impair the safe and reliable maintenance and operation of PG&E's facilities. The proposed tunnel mud spoil storage locations appear to potentially conflict with several PG&E facilities, if not closely coordinated. These material storage areas should not be located in such a way as to prevent PG&E access to overhead or underground facilities, or conflict with regulatory standards for line clearance, vegetation management, and other requirements.

In addition to the need to avoid intersecting gas pipelines in siting the project's facilities, the construction and dewatering activities have the potential to detrimentally impact PG&E's facilities. For example, studies may need to be performed to ensure that vibration from the tunnel boring

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activities or ground subsidence does not detrimentally impact the reliability and safety of the gas transmission and distribution facilities.

Also of interest are the habitat restoration projects proposed in the ROAs. The ROA areas overlap with many PG&E facilities, and proposals to create habitat pose many concerns for PG&E's ability to access and maintain our facilities. For example, PG&E facilities are developed and constructed for the particular environment that they are situated in. Inundation of currently dry areas resulting in submersion of portions of PG&E electric structures, including transmission or distribution poles, could require replacement with new poles developed for a wet environment in addition to presenting new access challenges. Likewise, earthwork and ground disturbance, including inundation, could create subsidence or other impacts affecting underground gas pipelines, requiring engineering testing and possibly modifications/replacement. In addition, modifications to waterways to create navigable waters could require raising the height of overhead lines to comply with regulatory requirements, incurring significant costs. As the ROAs are only being reviewed in the EIR/EIS at a programmatic level, proposed habitat restoration projects would require separate environmental review, and PG&E should be consulted with at the earliest opportunity to determine the feasibility and costs of probable relocations or retrofits of utility facilities.

V. Utility Coordination

The Draft EIR/EIS states in the Public Service and Utilities Section that the Proponents "would work with utility owners during the final engineering design and construction of the project to relocate utilities or protect them in place." There are many requirements that must be satisfied in either relocating or protecting utility infrastructure, including, for example CPUC General Orders 95, 112-E, and 131-D, North American Electric Reliability Corporation reliability standards, and CAISO outage scheduling, planning, approval, and other requirements. In addition, there may be other permits and authorizations required by resource agencies in the design and construction of utility facilities including but not limited to incidental take authorization for federal- or state-listed species (U.S. Fish and Wildlife Service, California Department of Fish and Wildlife), Clean Water Act section 401 water quality certification (California Regional Water Quality Control Boards), Clean Water Act section 404 permit (U.S. Army Corps of Engineers), Streambed Alteration Agreement (California Department of Fish and Wildlife), and concurrence with the cultural resource findings by the California State Historic Preservation Officer. To ensure satisfaction of these requirements and minimize delays, PG&E recommends that the Proponents coordinate with PG&E during all project phases including the environmental document/project report, permitting, engineering and design, right-of-way acquisition, and construction phases.

VI. Electric and Magnetic Fields (EMFs)

One area of the Draft EIR/EIS that should be corrected to avoid misinforming the public is the discussion of EMFs. To assist CDWR to appropriately discuss EMFs in a manner consistent with the approach taken by other CEQA lead agencies including the CPUC, we have provided below a summary of reports regarding possible health effects of EMF, a discussion of how EMF has

generally been addressed under the California Environmental Quality Act (CEQA), and a description of the EMF exposure reduction measures that could be incorporated into the design of electric transmission projects necessitated by the project, if required by the CPUC.

EMF is a term used to describe electric and magnetic fields that are created by electric voltage (electric field) and electric current (magnetic field). Power frequency EMF is a natural consequence of electrical circuits, and can be either directly measured using the appropriate measuring instruments or calculated using appropriate information. Attachment A: Electric and Magnetic Fields provides a detailed explanation of EMF.

A. Possible Health Effects of EMF

The possible effects of EMF on human health have come under scientific scrutiny. Hundreds of EMF studies have been conducted over the last 20 years in the areas of epidemiology, animal research, cellular studies, and exposure assessment. There is a consensus among the medical and scientific communities that there is insufficient evidence to conclude that EMF causes adverse health effects. Neither the medical nor scientific communities have been able to provide any foundation upon which regulatory bodies could establish a standard or level of exposure that is known to be either safe or harmful. As a result, the CPUC and the California Department of Health Services (CDHS) have not concluded that exposure to magnetic fields from utility electric facilities is a health hazard.

A number of nationally recognized multi-discipline panels have performed comprehensive reviews of the body of scientific knowledge on EMF. Attachment A, Electric and Magnetic Fields, summarizes reports from the National Institute of Environmental Health Sciences, National Research Council/National Academy of Sciences, World Health Organization, International Agency for Research on Cancer, American Cancer Society, and American Medical Association. These reports conclude that insufficient scientific evidence exists to warrant the adoption of specific health-based EMF mitigation measures.

B. EMF and the California Environmental Quality Act

EMF are matters of public interest but not regarded as potentially significant physical, environmental effects under the California Environmental Quality Act (CEQA). Section 15145 of the CEQA Guidelines states that if a lead agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact. This CEQA Guidelines section is relevant to EMF because there is ongoing scientific study of long-term health risks from EMF exposure, with no definitive evidence that exposure to EMF adversely affects public health. As summarized in Attachment A: Electric and Magnetic Fields, many reports have concluded that the potential for health effects associated with EMF exposure is too speculative to allow the evaluation of impacts or the preparation of mitigation measures. Correspondingly, the CPUC has repeatedly recognized that EMF is not an environmental impact to be analyzed in the context of CEQA because (1) there is no agreement among scientists that EMF does create a potential health risk, and (2) there are no defined or adopted CEQA standards for defining health risk from EMF. See, e.g., CPUC Decision No. 04-07-027 (Jul. 16, 2004); Delta DPA Capacity

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Increase Substation Project Final MND and Supporting Initial Study (November 2006), A.05-06-022, section B.1.14.1, page B-31, adopted in D.07-03-009 (March 1, 2007).

C. EMF Measures Required by the CPUC

While the CPUC has repeatedly recognized that EMF is not an environmental impact to be analyzed in the context of CEQA, in response to scientific uncertainty and public concern regarding EMF, the CPUC issued Decision D.06-01-042, which specifically requires PG&E and other utilities to consider “no-cost” and “low-cost” measures, where feasible, to reduce magnetic field exposure from new or upgraded utility facilities. Appendix A: Electric and Magnetic Fields provides background on the CPUC’s process to arrive at the decision.

To comply with CPUC requirements, two main “no-cost” and “low-cost” measures have been considered in the design of transmission projects:

- The first measure considered is optimal phasing. Optimal phasing involves inverting the phasing of one circuit on the same towers so that the magnetic fields emitted by the circuits cancel each other out more effectively.
- The second measure is increasing height of the line by increasing tower height.

PG&E would comply with the CPUC’s “no-cost, low-cost” EMF reduction policy with respect to any electric facilities necessitated by construction of the project.

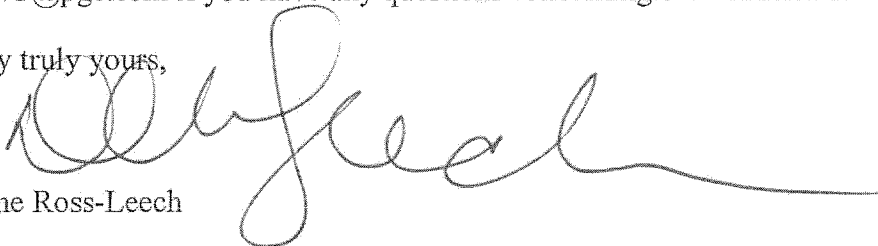
Consistent with the authorities discussed above, we recommend that CDWR refrain from assessing EMF exposure as a potential environmental effect in the Final EIR/EIS, and instead include a discussion of the issue in an informational appendix to the Final EIR/EIS that could include some or all of the information discussed and cited in Appendix A to this letter.

VII. CONCLUSION

PG&E is committed to working with the BDCP Proponents on the proposed water conveyance facilities and related facilities while maintaining its commitment to provide safe, reliable and affordable gas and electric service to PG&E customers. We look forward to working with the Proponents to help advance these important goals for California.

Please contact Valerie Winn by telephoning 415-973-3839 or emailing her at VJW3@pge.com if you have any questions concerning our comments.

Very truly yours,



Diane Ross-Leech

Attachment A

Attachment A: Electric and Magnetic Fields

The California Public Utilities Commission (CPUC) and the California Department of Health Services (CDHS) have not concluded that exposure to magnetic fields from utility electric facilities is a health hazard. Many reports have concluded that the potential for health effects associated with electric and magnetic field (EMF) exposure is too speculative to allow the evaluation of impacts or the preparation of mitigation measures.

EMF is a term used to describe electric and magnetic fields that are created by electric voltage (electric field) and electric current (magnetic field). Power frequency EMF is a natural consequence of electrical circuits, and can be either directly measured using the appropriate measuring instruments or calculated using appropriate information.

Electric Fields

Electric fields are present whenever voltage exists on a wire, and are not dependent on current. The magnitude of the electric field is primarily a function of the configuration and operating voltage of the line and decreases with the distance from the source (line). The electric field can be shielded (i.e., the strength can be reduced) by any conducting surface, such as trees, fences, walls, buildings, and most types of structures. The strength of an electric field is measured in volts per meter (V/m) or kilovolts per meter (kV/m).

Magnetic Fields

Magnetic fields are present whenever current flows in a conductor, and are not dependent on the voltage present on the conductor. The strength of these fields also decreases with distance from the source. However, unlike electric fields, most common materials have little shielding effect on magnetic fields.

The magnetic field strength is a function of both the current on the conductor and the design of the system. Magnetic fields are measured in units called Gauss. However, for the low levels normally encountered near power systems, the field strength is expressed in a much smaller unit, the milligauss (mG), which is one thousandth of a Gauss.

Power frequency EMF is present where electricity is used. This includes not only utility transmission lines, distribution lines, and substations, but also the building wiring in homes, offices, and schools, and in the appliances and machinery used in these locations. Typical magnetic fields from these sources can range from below 1 mG to above 1,000 mG (1 Gauss).

Magnetic field strengths diminish with distance. Fields from compact sources (i.e., those containing coils such as small appliances and transformers) decrease in inverse proportion to the distance from the source cubed. For three-phase power lines with balanced currents, the

magnetic field strength drops off inversely proportional to the distance from the line squared. Fields from unbalanced currents, which flow in paths such as neutral or ground conductors, fall off inversely proportional to the distance from the source. Conductor spacing and configuration also affect the rate at which the magnetic field strength decreases.

The magnetic field levels of PG&E's overhead and underground transmission lines will vary depending upon customer power usage. Magnetic field strengths for typical PG&E transmission line loadings at the edge of rights-of-way are approximately 10 to 90 mG. Under peak load conditions, the magnetic fields at the edge of the right-of-way would not likely exceed 150 mG. There are no long-term, health-based state or federal government EMF exposure standards. State regulations for magnetic fields have been developed in New York and Florida (150 mG and 200 mG at the edge of the right-of-way). However, these are based on limiting exposure from new facilities to levels no greater than existing facilities.

The strongest magnetic fields around the outside of a substation come from the power lines entering and leaving the station. The strength of the magnetic fields from transformers and other equipment decreases quickly with distance. Beyond the substation fence, the magnetic fields produced by the equipment within the station are typically indistinguishable from background levels.

Possible Health Effects

The possible effects of EMF on human health have come under scientific scrutiny. Concern about EMF originally focused on electric fields; however, much of the recent research has focused on magnetic fields. Uncertainty exists as to what characteristics of magnetic field exposure need to be considered to assess human exposure effects. Among the characteristics considered are field intensity, transients, harmonics, and changes in intensity over time. These characteristics may vary from power lines to appliances to home wiring, and this may create different types of exposures. The exposure most often considered is intensity or magnitude of the field.

There is a consensus among the medical and scientific communities that there is insufficient evidence to conclude that EMF causes adverse health effects. Neither the medical nor scientific communities have been able to provide any foundation upon which regulatory bodies could establish a standard or level of exposure that is known to be either safe or harmful. Laboratory experiments have shown that magnetic fields can cause biologic changes in living cells, but scientists are not sure whether any risk to human health can be associated with them. Some studies have suggested an association between surrogate measures of magnetic fields and certain cancers while others have not.

California Public Utilities Commission Decision Summary

Background

On January 15, 1991, the CPUC initiated an investigation to consider its role in mitigating the health effects, if any, of electric and magnetic fields from utility facilities and power lines. A working group of interested parties, called the California EMF Consensus Group, was created by the CPUC to advise it on this issue. It consisted of 17 stakeholders representing citizens groups, consumer groups, environmental groups, state agencies, unions, and utilities. The Consensus Group's fact-finding process was open to the public, and its report incorporated concerns expressed by the public. Its recommendations were filed with the Commission in March 1992.

In August 2004 the CPUC began a proceeding known as a “rulemaking” (R.04-08-020) to explore whether changes should be made to existing CPUC policies and rules concerning EMF from electric transmission lines and other utility facilities.

Through a series of hearings and conferences, the Commission evaluated the results of its existing EMF mitigation policies and addressed possible improvements in implementation of these policies. The CPUC also explored whether new policies are warranted in light of recent scientific findings on the possible health effects of EMF exposure.

The CPUC completed the EMF rulemaking in January 2006 and presented these conclusions in Decision D.06-01-042:

- The CPUC affirmed its existing policy of requiring no-cost and low-cost mitigation measures to reduce EMF levels from new utility transmission lines and substation projects.
- The CPUC adopted rules and policies to improve utility design guidelines for reducing EMF, and provides for a utility workshop to implement these policies and standardize design guidelines.
- Despite numerous studies, including one ordered by the Commission and conducted by the California Department of Health Services, the CPUC stated “we are unable to determine whether there is a significant scientifically verifiable relationship between EMF exposure and negative health consequences.”
- The CPUC said it will “remain vigilant” regarding new scientific studies on EMF, and if these studies indicate negative EMF health impacts, the Commission will reconsider its EMF policies and open a new rulemaking if necessary.

In response to a situation of scientific uncertainty and public concern, the decision specifically requires PG&E to consider “no-cost” and “low-cost” measures, where feasible, to reduce exposure from new or upgraded utility facilities. It directs that no-cost mitigation measures be undertaken, and that low-cost options, when they meet certain guidelines for field reduction and cost, be adopted through the project certification process. PG&E was directed to develop, submit and follow EMF guidelines to implement the CPUC decision. Four percent of total project budgeted cost is the benchmark in implementing EMF mitigation, and mitigation measures should achieve incremental magnetic field reductions of at least 15%.

Reviews of EMF Studies

Hundreds of EMF studies have been conducted over the last 20 years in the areas of epidemiology, animal research, cellular studies, and exposure assessment. A number of nationally recognized multi-discipline panels have performed comprehensive reviews of the body of scientific knowledge on EMF. These panels’ ability to bring experts from a variety of disciplines together to review the research gives their reports recognized credibility. It is standard practice in risk assessment and policymaking to rely on the findings and consensus opinions of these distinguished panels. None of these groups have concluded that EMF causes adverse health effects or that the development of standards were appropriate or would have a scientific basis.

Reports by the National Research Council/National Academy of Sciences, American Medical Association, American Cancer Society, National Institute of Environmental Health Sciences, World Health Organization, International Agency for Research on Cancer, and California Department of Health Services conclude that insufficient scientific evidence exists to warrant the adoption of specific health-based EMF mitigation measures. The potential for adverse health effects associated with EMF exposure is too speculative to allow the evaluation of impacts or the preparation of mitigation measures.

National Institute of Environmental Health Sciences

In June of 1999, the federal government completed a \$60-million EMF research program managed by the National Institute of Environmental Health Sciences (NIEHS) and the Department of Energy (DOE). Known as the EMF RAPID (Research And Public Information Dissemination) Program. In their report to the U.S. Congress, the NIEHS concluded that:

The NIEHS believes that the probability that ELF-EMF exposure is truly a health hazard is currently small. The weak epidemiological associations and lack of any laboratory support for these associations provide only marginal, scientific support that exposure to this agent is causing any degree of harm.

The NIEHS report also included the following conclusions:

The National Toxicology Program routinely examines environmental exposures to determine the degree to which they constitute a human cancer risk and produces the 'Report on Carcinogens' listing agents that are 'known human carcinogens' or 'reasonably anticipated to be human carcinogens.' It is our opinion that based on evidence to date, ELF-EMF exposure would not be listed in the 'Report on Carcinogens' as an agent 'reasonably anticipated to be a human carcinogen.' This is based on the limited epidemiological evidence and the findings from the EMF-RAPID Program that did not indicate an effect of ELF-EMF exposure in experimental animals or a mechanistic basis for carcinogenicity.

The NIEHS agrees that the associations reported for childhood leukemia and adult chronic lymphocytic leukemia cannot be dismissed easily as random or negative findings. The lack of positive findings in animals or in mechanistic studies weakens the belief that this association is actually due to ELF-EMF, but cannot completely discount the finding. The NIEHS also agrees with the conclusion that no other cancers or non-cancer health outcomes provide sufficient evidence of a risk to warrant concern.

Epidemiological studies have serious limitations in their ability to demonstrate a cause and effect relationship whereas laboratory studies, by design, can clearly show that cause and effect are possible. Virtually all of the laboratory evidence in animals and humans and most of the mechanistic work done in cells fail to support a causal relationship between exposure to ELF-EMF at environmental levels and changes in biological function or disease status. The lack of consistent, positive findings in animal or mechanistic studies weakens the belief that this association is actually due to ELF-EMF, but it cannot completely discount the epidemiological findings.

The NIEHS suggests that the level and strength of evidence supporting ELF-EMF exposure as a human health hazard are insufficient to warrant aggressive regulatory actions; thus, we do not recommend actions such as stringent standards on electric appliances and a national program to bury all transmission and distribution lines. Instead, the evidence suggests passive measures such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. NIEHS suggests that the power industry continue its current practice of siting power lines to reduce exposures and continue to explore ways to reduce the creation of magnetic fields around transmission and distribution lines without creating new hazards. We also encourage technologies that lower exposures from neighborhood distribution lines provided that they do not increase other risks, such as those from accidental electrocution or fire.

U.S. National Research Council/ National Academy of Sciences

In May 1999, the National Research Council/ National Academy of Sciences, an independent scientific agency responsible for advising the federal government on science, technology, and medicine, released its evaluation of the scientific and technical content of research projects conducted under the U.S. EMF RAPID Program, concluding that:

The results of the EMF-RAPID program do not support the contention that the use of electricity poses a major unrecognized public-health danger. Basic research on the effects of power-frequency magnetic fields on cells and animals should continue, but a special research-funding effort is not required. Investigators should compete for funding through traditional research-funding mechanisms. If future research on this subject is funded through such mechanisms, it should be limited to tests of well-defined mechanistic hypotheses or replications of reported positive effects. If carefully performed, such experiments will have value even if their results are negative. Special efforts should be made to communicate the conclusions of this effort to the general public effectively.

The following specific recommendations are made by the committee:

1. The committee recommends that no further special research program focused on possible health effects of power-frequency magnetic fields be funded. Basic research on the effects of power-frequency magnetic fields on cells and animals should continue but investigators should compete for funding through traditional research funding mechanisms.
2. If, however, Congress determines that another time-limited, focused research program on the health effects of power-frequency magnetic fields is warranted, the committee recommends that emphasis be placed on replications of studies that have yielded scientifically promising claims of effects and that have been reported in peer-reviewed journals. Such a program would benefit from the use of a contract-funding mechanism with a requirement for complete reports and/or peer-reviewed publications at program's end.
3. The engineering studies were initiated without the guidance of a clearly established biologic effect. The committee recommends that no further engineering studies be funded unless a biologic effect that can be used to plan the engineering studies has been determined.
4. Much of the information from the EMF-RAPID biology program has not been published in peer-reviewed journals. NIEHS should collect all future peer-reviewed information resulting from the EMF-RAPID biology projects and publish a summary report of such information periodically on the NIEHS Web site.
5. The communication effort initiated by EMF-RAPID is reasonable. The two booklets and the telephone information line are useful, as is the EMF-RAPID Internet site. There are two limitations to the effort. First, it is largely passive, responding to inquiries and providing information, rather than being active. Second, much of the information

produced is in a scientific format not readily understandable by the public. The committee recommends that further material produced to disseminate information on power-frequency magnetic fields be written for the general public in a clear fashion. The Web site should be made more user-friendly. The booklet *Questions and Answers about EMF* should be updated periodically and made available to the public.

World Health Organization

The World Health Organization (WHO) established the International EMF Project in 1996 to investigate potential health risks associated with exposure to electric and magnetic fields (EMF). A WHO Task Group recently concluded a review of the health implications of extremely low frequency (ELF) EMF.

A Task Group of scientific experts was convened in 2005 to assess any risks to health that might exist from exposure to ELF electric and magnetic fields. Previously in 2002, the International Agency for Research on Cancer (IARC) examined the evidence regarding cancer; this Task Group reviewed evidence for a number of health effects, and updated the evidence regarding cancer. The conclusions and recommendations of the Task Group are presented in a WHO report titled: “Extremely Low Frequency Fields Environmental Health Criteria Monograph No.238” and Factsheet No 322.

“New human, animal and in vitro studies, published since the 2002 IARC monograph, do not change the overall classification of ELF magnetic fields as a possible human carcinogen.”

“A number of other diseases have been investigated for possible association with ELF magnetic field exposure. These include cancers in both children and adults, depression, suicide, reproductive dysfunction, developmental disorders, immunological modifications and neurological disease. The scientific evidence supporting a linkage between ELF magnetic fields and any of these diseases is much weaker than for childhood leukaemia and in some cases (for example, for cardiovascular disease or breast cancer) the evidence is sufficient to give confidence that magnetic fields do not cause the disease.”

“the epidemiological evidence is weakened by methodological problems, such as potential selection bias. In addition, there are no accepted biophysical mechanisms that would suggest that low-level exposures are involved in cancer development. Thus, if there were any effects from exposures to these low-level fields, it would have to be through a biological mechanism that is as yet unknown. Additionally, animal studies have been largely negative. Thus, on balance, the evidence related to childhood leukaemia is not strong enough to be considered causal.”

“Policy-makers should establish an ELF EMF protection programme that includes measurements of fields from all sources to ensure that the exposure limits are not exceeded either for the general public or workers.”

“Government and industry should monitor science and promote research programmes to further reduce the uncertainty of the scientific evidence on the health effects of ELF field exposure.”

“Policy-makers, community planners and manufacturers should implement very low-cost measures when constructing new facilities and designing new equipment including appliances.”

“Changes to engineering practice to reduce ELF exposure from equipment or devices should be considered, provided that they yield other additional benefits, such as greater safety, or little or no cost.”

“When changes to existing ELF sources are contemplated, ELF field reduction should be considered alongside safety, reliability and economic aspects.”

International Agency for Research on Cancer

In June of 2001, the International Agency for Research on Cancer (IARC), a branch of the World Health Organization (WHO), evaluated the carcinogenic risk to humans of static and extremely low-frequency EMF. In October of 2001, the WHO published a Fact Sheet that summarized the IARC findings. Below is an excerpt from the fact sheet:

In June 2001, an expert scientific working group of IARC reviewed studies related to the carcinogenicity of static and ELF electric and magnetic fields. Using the standard IARC classification that weighs human, animal and laboratory evidence, ELF magnetic fields were classified as possibly carcinogenic to humans based on epidemiological studies of childhood leukaemia. Evidence for all other cancers in children and adults, as well as other types of exposures (i.e. static fields and ELF electric fields) was considered not classifiable either due to insufficient or inconsistent scientific information.

"Possibly carcinogenic to humans" is a classification used to denote an agent for which there is limited evidence of carcinogenicity in humans and less than sufficient evidence for carcinogenicity in experimental animals.

This classification is the weakest of three categories ("is carcinogenic to humans", "probably carcinogenic to humans" and "possibly carcinogenic to humans") used by IARC to classify potential carcinogens based on published scientific evidence. Some examples of well-known agents that have been classified by IARC are listed below:

Classification	Examples of Agents
Carcinogenic to humans (usually based on strong evidence of carcinogenicity in humans)	Asbestos Mustard gas Tobacco (smoked and smokeless) Gamma radiation
Probably carcinogenic to humans (usually based on strong evidence of carcinogenicity in animals)	Diesel engine exhaust Sun lamps UV radiation Formaldehyde
Possibly carcinogenic to humans (usually based on evidence in humans which is considered credible, but for which other explanations could not be ruled out)	Coffee Styrene Gasoline engine exhaust Pickled Vegetables ELF magnetic fields

DO ELF FIELDS CAUSE CANCER?

ELF fields are known to interact with tissues by inducing electric fields and currents in them. This is the only established mechanism of action of these fields. However, the electric currents induced by ELF fields commonly found in our environment are normally much lower than the strongest electric currents naturally occurring in the body such as those that control the beating of the heart.

Since 1979 when epidemiological studies first raised a concern about exposures to power line frequency magnetic fields and childhood cancer, a large number of studies have been conducted to determine if measured ELF exposure can influence cancer development, especially leukaemia in children.

There is no consistent evidence that exposure to ELF fields experienced in our living environment causes direct damage to biological molecules, including DNA. Since it seems unlikely that ELF fields could initiate cancer, a large number of investigations have been conducted to determine if ELF exposure can influence cancer promotion or co-promotion. Results from animal studies conducted so far suggest that ELF fields do not initiate or promote cancer.

However, two recent pooled analyses of epidemiological studies provide insight into the epidemiological evidence that played a pivotal role in the IARC evaluation. These studies suggest that, in a population exposed to average magnetic fields in excess of 0.3 to 0.4 μ T, twice as many children might develop leukaemia compared to a population with lower exposures. In spite of the large number data base, some uncertainty remains as to whether magnetic field exposure or some other factor(s) might have accounted for the increased leukaemia incidence.

Childhood leukaemia is a rare disease with 4 out of 100,000 children between the age of 0 to 14 diagnosed every year. Also average magnetic field exposures above 0.3 or

0.4 μ T in residences are rare. It can be estimated from the epidemiological study results that less than 1% of populations using 240 volt power supplies are exposed to these levels, although this may be higher in countries using 120 volt supplies.

The IARC review addresses the issue of whether it is feasible that ELF-EMF pose a cancer risk. The next step in the process is to estimate the likelihood of cancers in the general population from the usual exposures and to evaluate evidence for other (non-cancer) diseases. This part of the risk assessment should be finished by WHO in the next 18 months.

American Cancer Society

In the journal, *A Cancer Journal for Clinicians*, the American Cancer Society (ACS) reviewed EMF residential and occupational epidemiologic research in an article written by Dr. Clark W. Heath, Jr., ACS's vice president of epidemiology and surveillance research. Dr. Heath reviews 13 residential epidemiologic studies of adult and childhood cancer. Dr. Heath wrote:

Evidence suggesting that exposure to EMF may or may not promote human carcinogenesis is mostly based on...epidemiologic observations.... While those observations may suggest such a relationship for leukemia and brain cancer in particular, the findings are weak, inconsistent, and inconclusive.... The weakness and inconsistent nature of epidemiologic data, combined with the continued dearth of coherent and reproducible findings from experimental laboratory research, leave one uncertain and rather doubtful that any real biologic link exists between EMF exposure and carcinogenicity.

American Medical Association

The AMA adopted recommendations of its Council on Scientific Affairs (CSA) regarding EMF health effects. The report was prepared as a result of a resolution passed by AMA's membership at its 1993 annual meeting. The following recommendations are based on the CSA's review of EMF epidemiologic and laboratory studies to date, as well as on several major literature reviews:

- Although no scientifically documented health risk has been associated with the usually occurring levels of electromagnetic fields, the AMA should continue to monitor developments and issues related to the subject.
- The AMA should encourage research efforts sponsored by agencies such as the National Institutes of Health, the U.S. Department of Energy, and the National Science Foundation. Continuing research should include study of exposures to EMF and its effects, average public exposures, occupational exposures, and the effects of field surges and harmonics.
- The AMA should support the meeting of an authoritative, multidisciplinary committee under the auspices of the National Academy of Sciences or the

National Council on Radiation Protection and Measurements to make recommendations about exposure levels of the public and workers to EMF and radiation.

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BDCP1677

From: Jacobs, Lynn <LLJ0@pge.com>
Sent: Tuesday, July 29, 2014 5:15 PM
To: 'BDCP.comments@noaa.gov'
Subject: PG&E Comments on BDCP and EIR/EIS
Attachments: PG&E Comments on BDCP.PDF; CDWR_Attachment A.PDF

Importance: High

Good afternoon,

Attached are PG&E's comments on the Bay Delta Conservation Plan and draft EIR/EIS.

Thank you
Lynn

"Our lives begin to end the day we become silent about things that matter."

L. Lynn Jacobs

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Environmental Management Distribution
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From: Koo, Alyssa (Law) <ATK4@pge.com>
Sent: Wednesday, July 30, 2014 3:05 PM
To: 'BDCP.comments@noaa.gov'
Cc: Jacobs, Lynn
Subject: RE: PG&E Comments on BDCP and EIR/EIS
Attachments: PG&E Comments on BDCP.PDF; Corrected CDWR_Attachment A.pdf

Dear BDCP Comments:

PG&E inadvertently submitted an incorrect version of Attachment A that was referenced in PG&E's Comments on the Bay Delta Conservation Plan. Attached is the correct version of Attachment A. Please replace the version that was submitted yesterday with this Attachment A. For your convenience, I have also attached PG&E's original comments.

Please let us know if you have any questions.

Regards,
Alyssa

Alyssa T. Koo
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Pacific Gas and Electric Company
415-973-3386
Alyssa.Koo@pge.com

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Sent: Tuesday, July 29, 2014 5:15 PM
To: 'BDCP.comments@noaa.gov'
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