LETTER AGREEMENT

No. R1-90-190-PGE

Pacific Gas and Electric Company
Industrial Relations Department
215 Market Street
San Francisco, California 94106
[415] 973-1125

International Brotherhood of
Electrical Workers, AFL-CIO
Local Union 1245, IBEW
P.O. Box 4790
Walnut Creek, California 94596
[415] 933-6060

Ronald L. Bailey, Manager or
David J. Bergman, Director and Chief Negotiator

Jack McNally, Business Manager

July 24, 1991

International Brotherhood of
Electrical Workers, AFL-CIO
P. O. Box 4790
Walnut Creek, CA 94596

Attention: Mr. Jack McNally, Business Manager

Gentlemen:

This letter cancels and supersedes our letter dated July 1, 1991 which transmitted attachments to Letter Agreement 90-190-PGE.

Submitted herewith is a revised ATTACHMENT 3 - Implementation Procedures for Rubber Gloving in response to Mr. Darrel Mitchell's memo of July 5, 1991. Mr. Mitchell's concerns have been addressed in Items 4, 7, and 8, with exception to Note 2 of Item 4 which Company agrees to discuss at a later date.

Pursuant to Letter Agreement 90-34-PGE, the Overview Committee met on August 20, 1990 to review the reports, recommendations and understandings reached by the Rubber Gloving and Barehanding Committees relative to Items B and C of the above mentioned letter agreement. After a thorough discussion and review, the Overview Committee reached agreement on the following items:

Attachment 1 - Rubber Gloving Agreement

Attachment 2 - Barehanding Agreement

Attachment 3 - Implementation Procedure for Rubber Gloving Training

Attachment 4 - Implementation Procedure for Barehanding Training

Attachment 5 - Cal/OSHA Variance for Rubber Gloving

Attachment 6 - Cal/OSHA Variance for Barehanding

It is further agreed that the proposed definitions and lines of progression of the classifications included in this agreement are not changed as a result of this letter agreement and any future amendments to the attachments listed above will be subject to negotiation between the parties. The recommendation of the Barehanding Committee as outlined in Item 1 of page 2 of their joint report is not adopted by the Overview Committee.

If you are in accord with the foregoing and attachments and agree thereto, please so indicate in the space provided below and return one executed copy of this letter to the Company.

Very truly yours,

PACIFIC GAS AND ELECTRIC COMPANY

By _____
Director and Chief Negotiator

The Union is in accord with the foregoing and attachments and it agrees thereto as of the date hereof.

LOCAL UNION NO. 1245, INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS, AFL-CIO

August 1, 1991

By _____
Business Manager

Pacific Gas and Electric Company

215 Market Street
San Francisco, CA 94106
415/972-7000

March 2, 1990

Attachment 1

Local Union No. 1245
International Brotherhood of
Electrical Workers, AFL-CIO
P. O. Box 4790
Walnut Creek, CA 94596

Attention: Mr. Jack McNally, Business Manager

Gentlemen:

Pursuant to the provisions of Letter Agreement 89-129 in an attempt to mutually establish satisfactory resolutions to the long-standing difference of opinion relative to the initiation and/or expansion of the barehanding and rubber gloving work procedures, an Ad Hoc Negotiating Committee consisting of Willie Bouzek, II, Loran Davis, Ron Fitzsimmons, Daniel Mayo, Darrel Mitchell, Cary McDermott, Jack McNally, Ken Richards, Daniel Robertson, Howard Stiefer, and Arlis Watson for the Union; and David Bergman, Rick Doering, Rod Maslowski, Ron Morris, Jim Pope, and Byron Tomlinson for the Company met to discuss the issues.

On February 13, 1990, the parties reached a tentative agreement subject to further negotiations concerning the specific application of the procedures and a favorable response from Union's affected membership.

Additionally, in the event agreement is reached, the parties will jointly seek a variance from Cal/OSHA to allow both procedures to be performed on the PG&E system in accordance with terms of the parties' agreement.

The tentative agreement consists of the following:

A. OVERVIEW COMMITTEE

A permanent Overview Committee consisting of three members appointed by Union and three members appointed by Company shall be established to meet on a regular basis. The Overview Committee will provide overall guidance, review issues of system-wide concern (e.g., EMF, safety issues), resolve issues, and have the ability to cancel either application for cause. For example, cause would exist if it was demonstrated that safety was being compromised on a continuing system-wide basis, or electromagnetic fields were proven to create health risks. In addition, the Overview Committee will have the ability to suspend the application of this agreement at a specific location for cause, including the failure of Company to maintain a full complement of live line tools on all line trucks in service or an exempt supervisor requiring bargaining

unit personnel to utilize these work procedures when the involved journeymen did not reach a consensus to do so. The Overview Committee will also review response to injuries and accidents and the availability of and access to medical facilities including burn centers.

The Overview Committee will also be responsible for resolving difference of opinion among other working committees established by this agreement and shall review experiences in such areas as accidents, safety rules, procedures, equipment, etc.

B. RUBBER GLOVING COMMITTEE

A committee shall be established comprised of eight members appointed by Union and eight members appointed by Company to develop mutually acceptable safety rules, work procedures, training programs, certification procedures, training programs for instructors, appropriate equipment to be utilized, required complement of distribution live line tools, appropriate involved construction, construction to be exempted, crew size and complement, and inclement weather prohibitions. Additionally, the Committee shall approve the selection of the instructors to be used for the initial two-year training period at a centralized training facility. Rubber gloving procedures shall be limited up to and including 21KV, phase to phase and only to overhead facilities.

C. BAREHANDING COMMITTEE

A Barehanding Committee comprised of five members appointed by Union and five members appointed by Company will be established to address the same issues outlined under the Rubber Gloving Committee section above but applicable to barehanding. Barehanding procedures shall be limited to 230 and 500KV, phase to phase.

D. EMF COMMITTEE

A joint committee comprised of three members appointed by Union and three members appointed by Company shall be established to review available data and material related to electromagnetic fields. The committee may develop and monitor data specifically related to PG&E employees and work procedures.

E. APPLICATION

Rubber gloving training of incumbent journeyman will be limited to volunteers in the following classifications:

- **In the Distribution Unit: 0740 Electric Crew Foreman, 0739 Electric Crew Foreman, 2535 Transmission Troubleman, 2540 Troubleman, 1100 Lineman, 1103 Unassigned Lineman, 1109 Utility Lineman - Oakhurst.**

- In General Construction: 0650 Subforeman A, 0653 Subforeman B, 1100 Lineman.

Incumbent journeyman who elect not to volunteer for rubber gloving training will not lose any current established rights such as bidding, demotion, overtime rights, etc. Incumbent journeyman who volunteer for the training may subsequently revert to "grandfather" status, thereby forfeiting the possibility of performing the expanded gloving procedures and the accompanying premium pay.

Barehanding training of the previously listed incumbent journeymen will only be offered to a limited number of volunteers as listed above in DBU and GC and to employees who subsequently bid into DBU's Transmission Department.

The parties agree to negotiate amendments to the appropriate apprenticeship programs to require rubber gloving certification for future journeyman and to establish the necessary provisions for a Transmission Department in the Distribution Business Unit. Company will establish 15 additional positions to facilitate the establishment of such a department.

The bargaining unit journeyman at the job site, by consensus opinion, shall exclusively determine whether to perform the work with live line tools or utilize the rubber gloving or barehanding procedures. A violation of this provision by the Company could result in a one-year suspension of this agreement at the involved headquarters. The Company will retain the authority to detemine whether the work will be performed energized.

F. RETENTION OF LIVE LINE TOOLS

Company shall maintain a full complement of live line tools on all line trucks in service. A suspension of this agreement for 12 months shall occur for a failure to maintain a full complement of live line tools at a headquarters (or General Foreman's area in General Construction). The suspension may be avoided if the Company corrects the violation within 15 days following written notification to the Division Manager (or General Foreman in General Construction) by Union's Business Representative of a violation. However, a second notice of a proven violation in any 12-month period will result in a one-year suspension at that headquarters (or General Foreman's area in General Construction) regardless of whether the first violation was corrected within 15 days.

G. JOB SECURITY

No layoffs for lack of work will occur in the Electric T&D Department if PG&E is contracting work normally performed by Electric T&D employees. If any layoffs for lack of work occur in the Electric T&D Department, all journeymen in the above listed classifications will be offered Section 206.13 recall rights for 60 months, and recall shall occur prior to resuming contracting of Electric T&D work.

No layoffs for lack of work of journeymen will occur in the Line Department of General Construction while PG&E is contracting any work involving rubber gloving or barehanding.

H. CERTIFICATION

PG&E will certify PG&E employees for rubber gloving and barehanding work. Contractor employees utilized by PG&E to perform any rubber gloving or barehanding work must first be certified by IBEW, Local 1245, to perform such work through the IBEW/NECA Joint Apprenticeship Training Program.

I. COMPENSATION

Company agrees to train all employees in the above listed classifications that volunteer for rubber gloving and a select number of volunteers in the above listed classifications for barehanding. Volunteers for training will be solicited by Company at a date agreed to by the Overview Committee upon completion of the design of the rubber gloving training and certification program and receipt of a Cal/OSHA variance. Upon volunteering for training, eligible employees will receive a 3% increase in their weekly wage rate in the form of a premium. An additional 3% increase will be paid when employees begin training or two years after the initial volunteering date, whichever is earlier. Company will determine the sequence of headquarters to be involved in the training and the sequence of volunteers, by seniority, to be given the training. All subsequent journeymen who become certified to perform rubber gloving and all future journeymen shall also receive the 6% premium above their weekly base rates. The premium will continue to be 6% above the weekly base rate after future wage increases are applied, and the premium will be included in the determination of any future payments, such as bonuses or incentive pay, that would be determined by gross or base pay and shall also be applicable to all straight time paid, overtime paid, pension determination, LTD determination, life insurance payments, 401K Plan contributions, etc.

In the event a volunteer does not successfully complete the rubber gloving training or otherwise decides not to participate, they will no longer receive the premium.

If you are in accord with the foregoing and agree thereto, please so indicate in the space provided below and return one executed copy of this letter to Company.

Very truly yours,

PACIFIC GAS AND ELECTRIC COMPANY

By Rick B. Bradford
Manager of Industrial Relations

The Union is in accord with the foregoing and it agrees thereto as of the date hereof.

LOCAL UNION NO. 1245, INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS, AFL-CIO

March 3, 1990

By Jack McLaughlin
Business Manager

JOINT RUBBER GLOVE COMMITTEE

1. SAFETY RULES:----------(6-21-90)--Tentative Agreement
2. WORK PROCEDURES:----------(6-21-90)--Tentative Agreement
3. APPROPRIATE EQUIPMENT TO BE UTILIZED:-(6-14-90)--Tentative Agreement
4. APPROPRIATE INVOLVED CONSTRUCTION:----(6-19-90)--Tentative Agreement
   a. Construction to be exempted:-------(6-19-90)--Tentative Agreement
5. COMPLEMENT OF LIVE LINE TOOLS:--------(5-03-90)--Tentative Agreement
6. CREW SIZE AND COMPLEMENT:-------------(5-03-90)--Tentative Agreement
7. TRAINING PROGRAMS:----------(6-21-90)--Tentative Agreement
   a. Journeyman Certification:----------(5-01-90)--Tentative Agreement
   b. Apprentice Lineman Certification:--(5-01-90)--Tentative Agreement
   c. Instructors:----------(6-21-90)--Tentative Agreement
      1. Qualifications:----------(5-03-90)--Tentative Agreement
      2. Selection Process:----------(6-21-90)--Tentative Agreement
      3. Training for Instructors:-------(6-21-90)--Tentative Agreement
8. INCLEMENT WEATHER PROHIBITIONS:-------(6-13-90)--Tentative Agreement

ACCIDENT PREVENTION RULES

RUBBER GLOVING OVERHEAD DISTRIBUTION VOLTAGES

5,000 THRU 21,000 VOLTS

RULE

601. SCOPE

(a) **These rules shall apply to all crews engaged in Rubber Glove work involving voltages 5,000 thru 21,000 volts nominal phase to phase. This section shall not supersede accepted safe work rules.**

(b) Rubber Glove work on voltages above 5,000 volts shall be done by utilizing the principles of "INSULATE and ISOLATE".

1. The worker is "insulated" by using approved rubber gloves.

2. The worker is "isolated" by using an approved insulating aerial device with bucket liners or insulated work platform, which is also an additional layer of insulation.

602. GENERAL

(a) **For the purpose of these rules, "certified" Rubber Glove personnel are those who have successfully completed appropriate company training.**

(b) The term "energized lines", as used in this section, is defined as a conductor or apparatus energized at 5,000 volts thru 21,000 volts, nominal phase to phase.

(c) All Rubber Glove work on voltages at 5,000 thru 21,000 volts nominal phase to phase requires a minimum of two certified Rubber Glove persons with a trained ground person.

1. The "Ground Person" for a Rubber Glove Crew shall be a regular employee and trained in the following:

    a. First Aid
    b. Cardiopulmonary Resuscitation
    c. Radio Procedures
    d. Aerial Lift Operations:
        1. Upper Controls
        2. Lower Controls
        3. Aerial Rescue Procedures

(d) During the time an employee is working on "energized lines" above 5,000 volts nominal phase to phase, another employee in close proximity shall act primarily as an observer to prevent accidents.

(e) Personnel shall confine their work to one phase and shall not make simultaneous contact with any part of the structure or any other phase.

(f) Certified Rubber Glove Journeymen at the job site, by consensus opinion, shall exclusively determine whether to perform the work with live line tools or utilize Rubber Glove procedures.

(g) The person in charge of the crew at the job site can overrule a consensus opinion of the certified Rubber Glove Journeymen who have elected to use the Rubber Glove work procedure.

(h) **Weather conditions for the day shall be considered. If inclement weather develops after work has begun and the job must be completed, the Live Line method can be used or the circuit may be deenergized. Inclement weather will be determined by the Foreman and crew.**

602. GENERAL (continued)

(i) During the tailboard briefing a "Non-test" will be considered prior to Rubber Gloving voltages above 5,000 volts.

(j) Illumination shall be provided as needed to perform the work safely.

(k) Handlines shall be attached to the pole or aerial device and shall not be supported from the lip of the bucket or "energized lines". Handlines must be clean, dry and in good repair.

(l) All rope making direct contact with "energized lines" in excess of 5,000 volts shall be approved live line rope.

(m) At no time will any other work be done on a pole while Rubber Gloving on "energized lines" is in progress.

(n) At no time will any Rubber Glove work above 5,000 volts be done directly from the pole or structure.

(o) Only approved devices shall be used for picking up or dropping load.

603. USE OF APPROVED RUBBER PROTECTIVE EQUIPMENT

(a) The term "rubber" as used in these rules includes all protective cover-up equipment, including gloves fabricated from natural or synthetic rubber and various types of plastic rated for the voltage to be worked.

(b) "Contact area" as used in this section is defined as any area where any part of the body or any conducting object can be brought closer than twenty eight (28) inches to any "energized lines", regardless of the use of rubber protective equipment.

(c) Lineman's rubber gloves shall be put on before entering the "contact area" and shall not be removed until the employee is completely out of this area.

(d) Employees in the contact area shall not touch or work on any exposed "energized lines" except when working from an approved insulated aerial device or insulated platform wearing lineman's rubber gloves.

(e) Rubber sleeves are not required but at the option of the employee will be issued and may be used.

(f) When work is being performed on or near "energized lines", all energized conductors, grounded conductors, or guy wires in the work area within reach of any part of the body or aerial device shall be covered with rubber protective equipment, except that portion of the conductor or apparatus on which the employee is working.

(g) In applying rubber protective equipment, an employee shall always cover the nearest and lowest conductors first. In removing rubber protective equipment, the reverse order shall be followed. Protective equipment should be applied from a position below the conductor when possible.

(h) Intentional contact shall not be made with "energized lines" or rubber protective equipment with any part of the body except with rubber gloves.

604. CARE OF APPROVED RUBBER PROTECTIVE EQUIPMENT

(a) Rubber gloves shall never be worn inside out or without approved protectors. They shall be exchanged at any time they become damaged or suspect.

(b) Approved protectors shall not be worn except when in use with rubber gloves.

(c) Rubber gloves shall be inspected for corona cracks and bruises, and shall be given the roll air and air/water tests (see data section) at least once each day while in use, at the beginning of the work period and at any other time when their condition is in doubt.

(d) When not in use, rubber protective equipment shall be protected from mechanical and chemical damage, and shall always be stored in the containers provided and nothing else placed therein. Protective equipment shall not be laid on the ground or other contaminated surfaces unless a tarp or other such device is used.

(e) High voltage rubber goods should not be left on "energized lines" for extended periods of time (i.e. overnight). Should this be deemed necessary, they must not be depended upon to protect the employee. They must be removed, cleaned and visually inspected before re-use, and if suspect, submitted for electrical test.

(f) Rubber protective equipment shall be submitted for tests as required, or any time they become suspect.

605. USE AND CARE OF APPROVED INSULATED AERIAL DEVICES

(a) No aerial device will be used for Rubber Glove procedures involving voltages above 5,000 volts unless it has a current dielectric certification sticker/label affixed to the vehicle near the lower boom controls.

(b) Aerial devices used for Rubber Gloving above 5,000 volts shall have both upper and lower controls.

(c) Bucket liners shall have a current dielectric certification sticker/label affixed to the outer surface.

(d) Aerial devices used for Rubber Glove procedures above 5,000 volts require an approved bucket liner and pan.

(e) At no time shall the insulated boom or bucket on aerial devices contact unprotected conductive or grounded objects when an employee in the aerial device is Rubber Gloving "energized lines".

(f) Extreme care shall be taken when handling conductive objects near "energized lines". Conductive objects carried inside the bucket of an aerial device shall not extend above the lip.

(g) Conductive objects should not be allowed to hang on the outside of the bucket.

(h) Immediately prior to using aerial devices for high voltage Rubber Glove work, all insulated portions shall be visually inspected and wiped clean. Anything which will adversely effect the insulation of the device shall be removed, including insulator washing hoses, rope and cable.

(i) Whenever any work is performed on an aerial device that could effect its insulating qualities, it shall be electrically tested before being returned to service.

(j) Lower controls shall not be operated unless permission has been obtained from the employees in the bucket. Exception: Emergency situations

(k) When not in use, buckets with liners shall be covered to keep the inside clean, free of moisture and debris.

606. USE AND CARE OF TOOLS

(a) Hydraulic hoses shall be non-conductive and orange in color. They shall be wiped clean and visually inspected prior to use.

(b) Hydraulic tool hoses used for work on "energized lines" shall be submitted for a dielectric test or replaced any time they become suspect.

(c) Only hydraulic tools connected to the boom tip tool circuit will be permitted to make contact with "energized lines". This does not preclude the use of self contained hydraulic hand tools. Employees shall avoid body contact with hoses.

(d) Electric tools and their power cords shall be removed from the bucket when working on "energized lines".

(e) When using fiber strap hoists, an approved insulated link stick shall be installed between the hoist and any other surface with a different potential. Fiber strap hoists must be kept clean, dry and in good repair.

(f) When using the winch line of material handling aerial devices on "energized lines", an approved link stick must be used.

607. COMBINATION RUBBER GLOVE/LIVE LINE TOOL METHODS

(a) When work is to be accomplished through both the use of Live Line Tools and Rubber Gloving procedures, the contact area must be observed. The use of Live Line Tools in conjunction with Rubber Glove procedures is to be limited to situations where the safety margins are not decreased by the introduction of Live Line Tools into the Rubber Glove environment.

Note: The following are minimum combinations allowed when aloft.

1. Two certified employees in an aerial device or on insulated platforms.

2. One certified employee in an aerial device and one certified employee on an insulated platform.

* 3. One certified employee in an aerial device using Rubber Gloves and one certified employee on the pole utilizing Live Line Tools.

Each employee follows work rules for the work method used.

Note: The following combination is not allowed.

One certified employee on the pole utilizing Live Line Tools and one certified employee on an insulated platform utilizing Rubber Gloves.

(b) At no time will Rubber Glove work above 5,000 volts be done except from an aerial device or insulated platform.

* **Additional manpower should be considered when deemed necessary by the nature of the work at hand.**

RUBBER GLOVE WORK PROCEDURES

FOR OVERHEAD DISTRIBUTION VOLTAGES

5,000 THROUGH 21,000 VOLTS

1. The term "energized lines" as used in this section, is defined as a conductor or apparatus energized above 5,000 volts thru 21,000 volts, nominal phase to phase.

2. Rubber Glove work on voltages above 5,000 volts shall be done by utilizing the principles of "INSULATE and ISOLATE".

   a. The worker is "insulated" by using rubber protective equipment.

   b. The worker is "isolated" by using an approved insulating aerial device with bucket liners or insulated work platform, which is also an additional layer of insulation.

3. Personnel shall confine their work to one phase and shall not make simultaneous contact with any part of the structure or any other phase.

4. Weather conditions for the day shall be considered. If inclement weather develops after work has begun and the job must be completed, the Live Line method can be used or the circuit may be deenergized. Inclement weather will be determined by the Foreman and crew.

5. Certified Rubber Glove Journeymen at the job site, by consensus opinion, shall exclusively determine whether to perform the work with live line tools or utilize Rubber Glove procedures.

6. The person in charge of the crew at the job site can overrule a consensus opinion of the certified Rubber Glove Journeymen who have elected to use the Rubber Glove work procedure.

7. All approved rubber protective equipment should have the appropriate ASTM markings, in addition to having a valid test date before being used.

8. **Rubber gloves and sleeves shall be rated class "2". All other rubber protective equipment shall be rated class "2" or higher.**

9. Protective equipment shall be submitted for tests as required, or any time they become suspect.

Gloves	06 months
Sleeves	12 months
Blankets	12 months
Line Hose	12 months
Insulator Hoods	12 months
Hot Jumpers	12 months
Aerial Devices	12 months
Digger Derrick Booms (This frequency, first year only)	06 months
Bucket Liners	12 months

10. All rubber protective equipment shall be visually inspected prior to use.

11. Rubber gloves shall be visually inspected and given the roll air and air/water tests prior to each work period.

12. Rubber gloves and sleeves shall never be worn inside out.

13. Rubber gloves shall never be worn without approved protectors.

14. Rubber sleeves are not required when working from an insulated aerial device, or insulated work platform. At the option of the employee they will be issued and may be used.

15. Rubber protective equipment installed on "energized lines" in excess of 5,000 volts shall be done only when working from an approved aerial device or insulated work platform.

16. In applying rubber protective equipment, an employee shall always cover the nearest and lowest conductors first. In removing rubber protective equipment, the reverse order shall be followed. Protective equipment should be applied from a position below the conductor when possible.

17. Poles, brackets, cross-arms and all associated hardware in the immediate work area shall be covered with approved protective equipment to prevent employees from contacting grounded surfaces.

18. When work is to be done on or near "energized lines" all energized conductors, grounded conductors, or guy wires, in the work area within reach of any part of the body or aerial device shall be covered with rubber protective equipment, except that portion of the conductor or apparatus on which the employee is to work.

19. Intentional contact shall not be made with "energized lines" or rubber protective equipment with any part of the body except with rubber gloves.

20. Energized conductors shall not be moved without being properly controlled.

21. Vehicles with booms in the elevated position near "energized lines" shall be properly barricaded.

22. Aerial devices/digger derricks used for Rubber Gloving voltages above 5,000 volts shall have both upper and lower controls. A minimum distance of 3 ft. of the insulated boom must be extended on digger derrick trucks to meet the dielectric capabilities required for rubber gloving. The insulated portion of the boom will be marked, and shall not be retracted to a position that would allow metal parts at the boom tip to come within 3 ft. of metal parts of the lower boom while working on "energized lines".

23. Immediately prior to using aerial devices for high voltage Rubber Glove work, all insulated portions shall be visually inspected and wiped clean. Anything which will adversely effect the insulation of the device shall be removed, including insulator washing hoses, rope or cable.

24. While working from a bucket of an aerial device or digger derrick, all employees shall guard against the static and induced electrical charges that may be present on metal parts at the boom tip.

25. While working from an approved aerial device, the operator shall notify the other employee prior to moving.

26. **Approved insulating aerial devices shall not be used for Rubber Glove procedures involving voltages above 5,000 volts unless it has passed a dielectric test, and a sticker/label is affixed to the vehicle near the lower boom controls indicating compliance.**

PG&E Logo	ANSI A92.2 Paragraphs 5.4.3.2 (5)(a)(b) 5.4.3.4 (5)(b)

Table 2
Category "C"

DC Dielectric Boom Test
56 KV / 3 Min. / 56 Micro. Amps. Max.

Upper Boom Leakage_____Micro. Amps.

DC Chassis Insulating System Test
50 KV / 3 Min. / 50 Micro. Amps. Max.

Chassis Insulating System
Leakage_____Micro. Amps.

MV#_____

Tested By_____

Date Tested_____

BACKGROUND
"International Orange"

LETTERS
"Black"

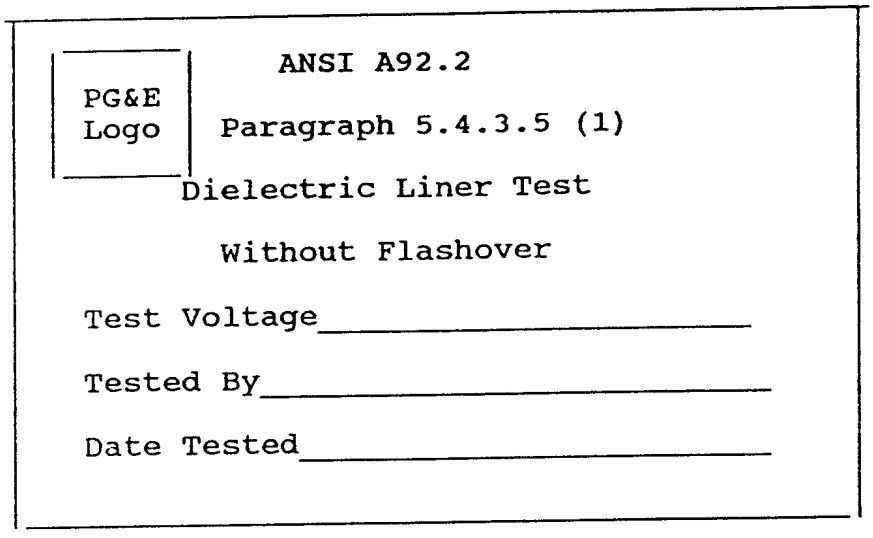
27. Insulated booms of aerial devices and digger derrick trucks shall pass a periodic dielectric test every 12 months and a sticker/label affixed to the vehicle near the lower boom controls indicating compliance. Failure of the Chassis Insulating System will not prevent the use of this vehicle for Rubber Gloving, however, it should be repaired as soon as practical. Digger Derrick Trucks will be tested every six months for the first year.

a. **Insulating devices shall have a periodic dielectric test performed in accordance with paragraph 5.4.3.2 (5)(a)(b) and 5.4.3.4 (5)(b) ANSI Standard A92.2 dated 1990.**

b. **A minimum distance of 3 ft. has been established for that portion of the insulated boom that must be extended on digger derrick trucks to meet the dielectric capabilities of the test. All conductive ropes or cables that bridge the insulated portion of the boom must be removed for this test.**

28. Buckets of aerial devices/digger derricks shall have bucket liners with a liner pan installed prior to Rubber Gloving voltages above 5,000 volts.

    a. Insulated bucket liners shall have a periodic dielectric test every 12 months performed in accordance with paragraph 5.4.3.5 of ANSI Standard A92.2 dated 1990. and a sticker/label affixed to outer surface.



29. At no time shall the insulated boom or bucket contact unprotected conductive or grounded objects, when an employee is gloving "energized lines".

30. Only approved Live Line Tools shall be used to operate all fused cutouts or disconnects unless they have been electrically bypassed.

31. Fiber strap hoists are approved for use on distribution voltages.

    301 - 21,000 volts..... Insulating link required

    An approved insulating link stick shall be installed between the hoist and any other surface with a different potential.

32. Only approved devices shall be used for picking up or dropping load.

33. Approved cutters with insulated handles, capable of cutting the conductor being worked, shall be in the work area.

34. The "Ground Person" for a Rubber Glove crew shall be a regular employee and trained in the following:

    a. First Aid
    b. Cardiopulmonary Resuscitation
    c. Radio Procedures
    d. Aerial Lift Operation:
        1. Upper Controls
        2. Lower Controls
        3. Aerial Rescue Procedures

35. When work is to be accomplished through the use of both Live Line Tools and Rubber Glove procedures, the contact area must be observed. The use of Live Line Tools in conjunction with Rubber Glove procedures is to be limited to situations where the safety margins are not decreased by the introduction of the live line tools into the rubber glove environment.

    Note: The following minimum combinations are allowed when aloft.

    1. Two certified employees in an aerial device or insulated platforms.

    2. One certified employee in an aerial device and one certified employee on an insulated platform.

  * 3. One certified employee in an aerial device using Rubber Gloves and one certified employee on the pole utilizing Live Line Tools.

    4. Each employee follows work rules for the work method used.

    Note: The following combination is not allowed:

    One certified employee on the pole utilizing Live Line Tools and one certified employee on an insulated platform utilizing Rubber Gloves.

  * Additional manpower should be considered when deemed necessary by the nature of the work at hand.

36. At no time will Rubber Glove work above 5,000 volts be done except from an aerial device or insulated platform.

37. Only hydraulic tools connected to the boom tip tool circuit will be permitted to make contact with "energized lines". This does not preclude the use of self contained hydraulic hand tools. Employees shall avoid body contact with hoses.

38. Prior to the commencement of work a tailboard briefing will be held to establish the exact procedures to be used and the sequence of work steps.

The tailboard briefing between the person in charge and the crew should include explanation of why the work is to be done, what is to be accomplished, a discussion of how the work is to be carried out and who will do it. The briefing should study the factors which may affect the safety and progress of the work, such as the conductor weight, the condition of the pole, crossarm and pins, guying requirements and the "second points of contact".

This matter of identifying and guarding against the "second point of contact" is a major safety factor in planning the work. No electrical accident is possible without a second point of contact and the severity of the electrical accident is directly related to the conductivity of the path to ground or to another phase.

If additional employees arrive at the site to assist in the work or if a major change in work practice is necessitated after the work begins an additional discussion(s) will take place to clearly establish the procedures to be used.

If Live Line Tools are to be used in conjunction with Rubber Glove techniques, the tailboard briefing shall clearly establish how the work will be conducted so that safety at the work site will not be compromised.

During the Tailboard Briefing a "Non-test" will be considered prior to Rubber Gloving.

APPROPRIATE EQUIPMENT TO BE UTILIZED

The following equipment and tools are approved for Rubber Gloving voltages 5,000 thru 21,000 volts in addition to utilizing existing Live Line Tools and work methods.

1. **Aerial Devices with bucket liners and pans.**
2. Digger Derrick pin on buckets with bucket liners and pans.
3. Insulated work platforms.
4. Fiber Strap hoists with insulated link.
5. Load pick-up jumpers.
6. Hot Jumpers (25kv).

APPROPRIATE INVOLVED CONSTRUCTION

The Joint Rubber Glove Committee has reviewed current overhead electric distribution construction standards in the PG&E system and make the following recommendations.

1. **All future construction should be designed to enhance the safety of the employee utilizing the Rubber Glove Method.**

Recommended considerations:

a. Increased phase separation,(i.e. wood crossarm construction)
b. Insulated jumpers
c. Non-conductive arms and brackets
d. Increased use of non-conductive guy strain insulators
e. Phase out conductive brackets, (i.e. steel crossarms, steel braces)

2. All current construction that decreases the ability to isolate the workman such as risers, booster banks, etc. are an area of concern and should be stressed during the tailboard briefing. Other areas of concern are tree conditions and severe corrosion areas.

3. CONSTRUCTION TO BE EXEMPTED

   NONE

   Certified Rubber Glove Journeyman at the job site shall determine whether the construction involved may be safely worked utilizing Rubber Glove Procedures.

MINIMUM COMPLEMENT OF LIVE LINE TOOLS AND EQUIPMENT

- **8 Live Line Tools (hot sticks) with quick change heads**
- **2 Grip all sticks**
- **1 Eight foot hot cutter**
- 1 Hand line holder

All the above tools shall be carried on the crew trucks.

A local consensus of Service Center Supervision and Crew Foreman will establish and maintain the complement of Live Line Tools and equipment to be stored in each tool room.

Nothing in this agreement will require a reduction in Live Line Tools and equipment currently available.

MINIMUM CREW SIZE AND COMPLEMENT

Rubber Glove Crews will be three persons Staffed as follows:

- **Journeyman as described in paragraph "E" in letter of agreement 90-34-PGE between Company and Union.**
- Certified Journeyman
- Apprentice Lineman that are qualified in Rubber Glove Methods.
- Ground Person shall be a regular employee and fully trained in the following:

    1. First Aid
    2. Cardiopulmonary Resuscitation
    3. Radio Procedures
    4. Aerial Lift Operations:
        a. Upper Controls
        b. Lower Controls
        c. Aerial Rescue Procedures

JOURNEYMAN CERTIFICATION

Training established by the Joint Rubber Glove Committee will certify Lineman to Rubber Glove Voltages above 5,000 volts.

Certified Rubber Glove Journeymen must have a minimum of one day additional training annually.

This training will begin in the calender year following the completion of the initial training of the incumbent Journeymen.

o RECOMMENDATION

-- Incumbent Journeyman who volunteer for Rubber Gloving will be trained by Company Seniority

-- While initial training is in progress for incumbent Journeymen an Apprentice upon reaching Journeyman status will be placed on the training list and trained by Company Seniority. When placed on the list the employee will receive a 3% increase in their weekly wage rate. An additional 3% will be paid when the employees begin their training.

-- Apprentice Lineman must have reached the 5th step of their Apprenticeship prior to being eligible to attend Rubber Glove School.

RUBBER GLOVE INSTRUCTORS

QUALIFICATIONS:

- **Journeyman Level.**
- **Minimum Of Five (5) Years Journeyman Level Overhead Line Experience.**
- Work Skills To Be Considered:
  - -- Leadership
  - -- Safety Record
  - -- Rotational Assignments
  - -- Certified In Rubber Gloving

SELECTION:

- The committee will approve the list of candidates for Rubber Glove Instructors.
- Management will select Instructors from the approved list.

TRAINING:

- Instructor Training 2-4 weeks
- Minimum number of 7 instructors to be trained on initial start up.
- Three (3) members of the Company Rubber Glove Committee and Three (3) members of Union Rubber Glove Committee will train the instructors
- Committee to review training program at two (2) months or sooner if needed. During the first two training classes there shall be three (3) members of the Company Rubber Glove Committee and three members of the Union Rubber Glove Committee present and they will act as observers and will have the authority to make minor changes to the training program or call the committee together if needed.

INCLEMENT WEATHER PROHIBITIONS

Weather conditions for the day shall be considered. If inclement weather develops after work has begun and the job must be completed, the Live Line Method can be used or the circuit may be deenergized. Inclement weather will be determined by the Foreman and crew.

Pacific Gas and Electric Company
215 Market Street
San Francisco, CA 94106
415/972-7000

March 2, 1990

Attachment 2

Local Union No. 1245
International Brotherhood of
Electrical Workers, AFL-CIO
P. O. Box 4790
Walnut Creek, CA 94596

Attention: Mr. Jack McNally, Business Manager

Gentlemen:

Pursuant to the provisions of Letter Agreement 89-129 in an attempt to mutually establish satisfactory resolutions to the long-standing difference of opinion relative to the initiation and/or expansion of the barehanding and rubber gloving work procedures, an Ad Hoc Negotiating Committee consisting of Willie Bouzek, II, Loran Davis, Ron Fitzsimmons, Daniel Mayo, Darrel Mitchell, Cary McDermott, Jack McNally, Ken Richards, Daniel Robertson, Howard Stiefer, and Arlis Watson for the Union; and David Bergman, Rick Doering, Rod Maslowski, Ron Morris, Jim Pope, and Byron Tomlinson for the Company met to discuss the issues.

On February 13, 1990, the parties reached a tentative agreement subject to further negotiations concerning the specific application of the procedures and a favorable response from Union's affected membership.

Additionally, in the event agreement is reached, the parties will jointly seek a variance from Cal/OSHA to allow both procedures to be performed on the PG&E system in accordance with terms of the parties' agreement.

The tentative agreement consists of the following:

A. OVERVIEW COMMITTEE

A permanent Overview Committee consisting of three members appointed by Union and three members appointed by Company shall be established to meet on a regular basis. The Overview Committee will provide overall guidance, review issues of system-wide concern (e.g., EMF, safety issues), resolve issues, and have the ability to cancel either application for cause. For example, cause would exist if it was demonstrated that safety was being compromised on a continuing system-wide basis, or electromagnetic fields were proven to create health risks. In addition, the Overview Committee will have the ability to suspend the application of this agreement at a specific location for cause, including the failure of Company to maintain a full complement of live line tools on all line trucks in service or an exempt supervisor requiring bargaining

unit personnel to utilize these work procedures when the involved journeymen did not reach a consensus to do so. The Overview Committee will also review response to injuries and accidents and the availability of and access to medical facilities including burn centers.

The Overview Committee will also be responsible for resolving difference of opinion among other working committees established by this agreement and shall review experiences in such areas as accidents, safety rules, procedures, equipment, etc.

B. RUBBER GLOVING COMMITTEE

A committee shall be established comprised of eight members appointed by Union and eight members appointed by Company to develop mutually acceptable safety rules, work procedures, training programs, certification procedures, training programs for instructors, appropriate equipment to be utilized, required complement of distribution live line tools, appropriate involved construction, construction to be exempted, crew size and complement, and inclement weather prohibitions. Additionally, the Committee shall approve the selection of the instructors to be used for the initial two-year training period at a centralized training facility. Rubber gloving procedures shall be limited up to and including 21KV, phase to phase and only to overhead facilities.

C. BAREHANDING COMMITTEE

A Barehanding Committee comprised of five members appointed by Union and five members appointed by Company will be established to address the same issues outlined under the Rubber Gloving Committee section above but applicable to barehanding. Barehanding procedures shall be limited to 230 and 500KV, phase to phase.

D. EMF COMMITTEE

A joint committee comprised of three members appointed by Union and three members appointed by Company shall be established to review available data and material related to electromagnetic fields. The committee may develop and monitor data specifically related to PG&E employees and work procedures.

E. APPLICATION

Rubber gloving training of incumbent journeyman will be limited to volunteers in the following classifications:

- **In the Distribution Unit: 0740 Electric Crew Foreman, 0739 Electric Crew Foreman, 2535 Transmission Troubleman, 2540 Troubleman, 1100 Lineman, 1103 Unassigned Lineman, 1109 Utility Lineman - Oakhurst.**

- In General Construction: 0650 Subforeman A, 0653 Subforeman B, 1100 Lineman.

Incumbent journeyman who elect not to volunteer for rubber gloving training will not lose any current established rights such as bidding, demotion, overtime rights, etc. Incumbent journeyman who volunteer for the training may subsequently revert to "grandfather" status, thereby forfeiting the possibility of performing the expanded gloving procedures and the accompanying premium pay.

Barehanding training of the previously listed incumbent journeymen will only be offered to a limited number of volunteers as listed above in DBU and GC and to employees who subsequently bid into DBU's Transmission Department.

The parties agree to negotiate amendments to the appropriate apprenticeship programs to require rubber gloving certification for future journeyman and to establish the necessary provisions for a Transmission Department in the Distribution Business Unit. Company will establish 15 additional positions to facilitate the establishment of such a department.

The bargaining unit journeyman at the job site, by consensus opinion, shall exclusively determine whether to perform the work with live line tools or utilize the rubber gloving or barehanding procedures. A violation of this provision by the Company could result in a one-year suspension of this agreement at the involved headquarters. The Company will retain the authority to detemine whether the work will be performed energized.

F. RETENTION OF LIVE LINE TOOLS

Company shall maintain a full complement of live line tools on all line trucks in service. A suspension of this agreement for 12 months shall occur for a failure to maintain a full complement of live line tools at a headquarters (or General Foreman's area in General Construction). The suspension may be avoided if the Company corrects the violation within 15 days following written notification to the Division Manager (or General Foreman in General Construction) by Union's Business Representative of a violation. However, a second notice of a proven violation in any 12-month period will result in a one-year suspension at that headquarters (or General Foreman's area in General Construction) regardless of whether the first violation was corrected within 15 days.

G. JOB SECURITY

No layoffs for lack of work will occur in the Electric T&D Department if PG&E is contracting work normally performed by Electric T&D employees. If any layoffs for lack of work occur in the Electric T&D Department, all journeymen in the above listed classifications will be offered Section 206.13 recall rights for 60 months, and recall shall occur prior to resuming contracting of Electric T&D work.

No layoffs for lack of work of journeymen will occur in the Line Department of General Construction while PG&E is contracting any work involving rubber gloving or barehanding.

H. CERTIFICATION

PG&E will certify PG&E employees for rubber gloving and barehanding work. Contractor employees utilized by PG&E to perform any rubber gloving or barehanding work must first be certified by IBEW, Local 1245, to perform such work through the IBEW/NECA Joint Apprenticeship Training Program.

I. COMPENSATION

Company agrees to train all employees in the above listed classifications that volunteer for rubber gloving and a select number of volunteers in the above listed classifications for barehanding. Volunteers for training will be solicited by Company at a date agreed to by the Overview Committee upon completion of the design of the rubber gloving training and certification program and receipt of a Cal/OSHA variance. Upon volunteering for training, eligible employees will receive a 3% increase in their weekly wage rate in the form of a premium. An additional 3% increase will be paid when employees begin training or two years after the initial volunteering date, whichever is earlier. Company will determine the sequence of headquarters to be involved in the training and the sequence of volunteers, by seniority, to be given the training. All subsequent journeymen who become certified to perform rubber gloving and all future journeymen shall also receive the 6% premium above their weekly base rates. The premium will continue to be 6% above the weekly base rate after future wage increases are applied, and the premium will be included in the determination of any future payments, such as bonuses or incentive pay, that would be determined by gross or base pay and shall also be applicable to all straight time paid, overtime paid, pension determination, LTD determination, life insurance payments, 401K Plan contributions, etc.

In the event a volunteer does not successfully complete the rubber gloving training or otherwise decides not to participate, they will no longer receive the premium.

If you are in accord with the foregoing and agree thereto, please so indicate in the space provided below and return one executed copy of this letter to Company.

Very truly yours,

PACIFIC GAS AND ELECTRIC COMPANY

By Reid B. Bradford
Manager of Industrial Relations

The Union is in accord with the foregoing and it agrees thereto as of the date hereof.

LOCAL UNION NO. 1245, INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS, AFL-CIO

March 3, 1990

By Jack McLay
Business Manager

DATE: July 16, 1990

TO: OVERVIEW COMMITTEE

FROM: BARE HAND COMMITTEE

SUBJECT: Bare Hand Work Procedures

ED HUBACHER
ROD MASLOWSKI
BYRON TOMLINSON

JACK McNALLY
DARREL MITCHELL
HOWARD STIEFER

Pursuant to Local Union 1245, IBEW and PG&E agreement 90-34 dated March 2, 1990 the Barehand Committee, comprised of the following 5 PG&E members and 5 IBEW Local 1245 members:

PG&E	IBEW L.U. 1245
Ron Bernstein	Robert Bustamante
Rod Goodwin	John Delsman
Steve Little	George Machado
Tom Rasler	John Meyer
R. Mickey Wagner	Russell Rylee

Do mutually agree to the following:

1. The Barehand Work Procedures developed by PG&E with input from the joint committee. This includes agreed to safety rules (see attachment 1, proposed APR safety rule changes), barehand work procedures (attachments 2 thru 7), barehand work procedure manual, and training program. The committee agrees that a training class on leakage current and testing of ropes will be included in the training.

2. Instructors, supervisors and barehand crew members will be qualified as described in the barehand work Procedure Manual in Section 3 (Attachment 2, Safety), page 1, paragraph I(A)(1)(2)(3) and (4).

3. Barehand tools and equipment shall meet the requirements of the Barehand Work Procedure Manual in Section 3 (Attachment 2, Safety), page 3, paragraph III(A)(B)(C)(D)(E)(F)(G) and (H).

4. The barehand committee recognizes that live line tools will

7/16/90

be used in conjunction with barehand work techniques and because barehand work techniques are expected to change, the committee does not feel a need to specify what complement of transmission trailers and tools will be required in the future.

5. Barehand work techniques can be used on all 230 and 500kV lines as long as minimum working distances are maintained.

6. The crew size and complement required by the Barehand Work Procedure Manual shall be adhered to.

7. Barehand work shall not be performed during inclement weather.

8. Four instructors will be used during the initial barehand training. Initial instructors will consist of 2 from management and 2 from bargaining unit. Company will make the final selection of instructors. Initial instructors will be qualified in barehand work techniques. This committee does consider the barehand crew members that developed PG&E's work procedures and members of this joint committee as qualified to instruct the initial barehand training classes.

Initial bargaining unit instructors will be replaced with rotational instructors after enough classes have been completed to prepare a candidate's list. The initial instructors will approve this list of candidates. Management will select the rotational instructors from this list.

If additional instructors are required during the initial training they will be selected from the employees that have successfully completed the required barehand training or meet the requirements of qualified instructor above.

9. No additional training program is required for instructors. Initial instructors will be given the necessary time (1 month) to prepare for the start of barehand training.

10. Union will have the option to review barehand training at any time barehand training is being conducted.

11. Company will keep abreast of any changes in technology. Any changes in technology that will improve or enhance safety will be incorporated into the barehand work procedures.

In addition to the above this committee also recommends the following:

1. There is some existing lower transmission voltages constructed for 230kV and this committee feels the overview committee should allow these voltages to be worked using barehand

work techniques as long as 230kV working distances are maintained.

2. The barehand committee should review the completed barehand work procedure manual prior to its final printing. This will insure that all agreed to changes in attachments II thru VII are incorporated into the manual prior to the start of any training.

3. Changes to the manual (attachments 1 thru 7), other than required regulatory changes, will be reviewed and agreed to by Company and Union prior to implementation.

The Company members of the barehand committee are in accord with the foregoing and agree thereto as of the date hereof.

Pacific Gas and Electric Company

by R. Mickey Wagner — July 12, 1990
R. Mickey Wagner Chairman

Ron Bersntien

Rod Goodwin

Steve Little

Tom Rasler

The Union members of the barehand committee are in accord with the foregoing and agree thereto as of the date hereof.

Local Union 1245, IBEW

by Russell Rylee — July 12, 1990
Russell Rylee Chairman

Robert Bustamante

John Delsman

George Machado

John Meyer

ATTACHMENT 1

Safety Rule Changes for Barehand Work

405. Working Distance

Add (e): Nothing in this rule shall prohibit working on conductors or apparatus energized from 230kV to 500kV using approved barehand work methods. The minimum clearance distance for live line barehand work, as shown in the following Table, shall be maintained from all grounded objects, conductors, and equipment at a different potential than that to which the live line barehand equipment is bonded unless such grounded objects or other lines and equipment are covered by insulating guards.

MINIMUM CLEARANCE DISTANCES FOR LIVE LINE BARE HAND WORK

Nominal voltage range phase-to-phase Kilovolts	Phase to Ground	Phase-to-Phase
230kV	5 ft. 0 in.	8 ft. 4 in.
500kV	11 ft. 0 in.	20 ft. 0 in.

Note: *Above 242kV the minimum clearance distance shall be permitted to be reduced provided that such distances are not less than the shortest distances between the energized part and a grounded surface.*

502. General

Change (c) to read: All live line tools shall be approved by the appropriate General Office Department Manager before being put into use. No alterations shall be made without approval.

Add following note to (d): Except when approved live line barehand work methods are used.

505. Use of Live Line Tools.

Add exception to Table in (a): Except when live line barehand work methods are being used.

Add exception to (i): Except when performing live line barehand work.

ATTACHMENT 2

I. SAFETY

1. Live line barehand work will only be performed by qualified, trained workers. All barehand aerial work will be performed by qualified barehand journeymen. In ordered to be considered qualified:

   a. All barehand supervisors and journeymen must have successfully completed an 3 week barehand training school.

   b. Barehand ground personnel must have successfully completed a minimum of one week of training during the 3 week barehand school and attend 2 day's refresher training during the annual refresher training for journeymen.

   b. A one week refresher class will be required annually for all barehand supervisors and journeymen to maintain qualifications.

   c. Barehand supervisors must have progressed through the linesman classification.

2. Barehand live line work shall not be conducted on voltages less than 230kV.

3. No barehand live line work will be performed during inclement weather. If work is in progress and weather condition turn bad; all work will cease and ropes, ladders and live line tools will be removed and stored.

4. Barehand live line work will not be performed during the progress of an electrical storm in the immediate area.

5. Safety Rules, as set forth in our A.P.R. book, shall be adhered to.

6. At no time shall barehand live line work methods be used when minimum clearances specified in A.P.R. Rule #405 cannot be maintained. Minimum clearance distances are as follows:

TABLE I

VOLTAGE	PHASE TO GROUND	PHASE TO PHASE
230-242 kV	5'0"	8'4"
500-552 kV*	11'0"	20'0"

* NOTE: *When replacing insulators on 500kV with less than the minimum number of insulators required in Table II in the Non-Test Section gaps will be raised to within 60 inches of the energized conductor as long as the minimum number of good insulators required by Table III in the Non-Test Section are maintained.*

The use of gaps to reduce working clearences is for the purpose of replacing insulators and is not intended to be used to arbitraly reduce the safe working clearences required by Table I above.

7. The minimum clearance distances will be placed on the aerial lift platform so they are easily visible to the operator.

8. A supervisor qualified in live line barehand work procedures will be on the job site whenever barehand live line work is being performed. He is not to be a working member of the crew, but is on the job site to insure all safety rules are being followed.

9. An insulated measuring device shall be available and used to verify clearance distances when needed.

10. Work shall be conducted on only one phase at a time at each work location.

11. All supporting structures, whether wood or metal, and all component parts shall be considered to be at full ground potential.

12. A non-test will be secured before barehand live line work is begun. *(see non-test section)*

13. Insulators shall be tested with an approved tester when there is any question as to their insulation value. *(see insulator testing section)*

14. Handlines *(made from hot rope)* shall not be hung on the aerial lift platform, but may be attached to the conductor as long as the line is clean and dry.

15. Prior to performing barehand work on the conductor, the conductor and attachments in adjacent spans must be checked to insure that the work can be done safely.

16. Communications must be maintained with the switching center having jurisdiction when performing barehand work.

17. A safety to the tower is required when performing barehand work from the ladder when the lineman's safety can not be attached to the tower steel. The barehand tower safety will be attached to the employee before the insulators are disconnected and not removed until the insulators are re-attached. Any ladder safety will be removed while insulatoes are disconnected. The barehand tower safety is not required when ascending or descending the ladder.

18. Ladders or aerial lifts to be used for live line barehand work will be placed in contact with an energized source equal to the voltage to be worked upon for a minimum of three minutes before an employee is allowed to ascend the ladder or get into the aerial lift platform.

II. RESPONSIBILITY

1. Each employee has the prime responsibility to perform live line barehand work in a safe manner following all appropriate safety rules.

2. The supervisor and crew foreman in charge of the work being performed shall be responsible for the enforcement of all appropriate safety rules.

3. Each supervisor and crew foreman is responsible for the training of the employees under his supervision and to insure only qualified employees are allowed to perform barehand work. The supervisor and crew foreman have the overall responsibility to insure all employees under his supervision are utilizing safe work procedures (*This does not relieve the individual employee of his responsibility).*

4. The condition of tools and equipment is the direct responsibility of the supervisor and crew foreman in charge, but the employee using the tools will share in the responsibility to insure that tools and equipment are well maintained and used only for the purpose designed. Tools and equipment will be inspected each day they are to be used. Any item which is unsafe for use will be removed from service until repaired or replaced. *THERE ARE TO BE NO EXCEPTIONS.*

5. It is the responsibility of the supervisor and crew foreman to insure a tailboard conference is held at the beginning of each project with all crew personnel (*See section on tailboard conference).*

III. TOOLS & EQUIPMENT

1. Only tools and equipment designated, tested and intended for live line barehand work shall be used.

2. Tools and equipment shall only be used for the purpose for which they were designed.

3. Tools and equipment shall be well maintained and inspected at the beginning of each project prior to being used.

4. Hot rope shall be treated the same as live line tools. Ropes shall be inspected prior to the start of a job. Only hot rope that is not contaminated and clean shall be used for live line barehand work. Hot rope showing any signs of contamination shall not be used.

5. Hot rope shall be stored in a weatherproof trailer or tool room, that is heated to keep out any moisture. Plastic garbage cans will be utilized to store and move hot rope. The use of garbage cans will keep the rope as clean as possible.

6. Aerial lifts. (*see section on aerial lifts)*

7. Conductive Clothing. (*see section on conductive clothing)*

8. Insulator Tester. (*see section on insulator testing)*

ATTACHMENT 3

CONDUCTIVE CLOTHING

GENERAL:

Conductive clothing provides a Faraday type shield around a worker's body, which facilitates the elimination of any discomfort due to induced or static voltage and currents, when working on energized High Voltage Lines.

Workers assigned to a barehand crew will be assigned their own conductive suits, gloves and foot wear and will be responsible for their care and cleanliness.

The company will provide, replace and repair any conductive clothing (suit, gloves, socks and foot wear) as required.

WEARING OF CONDUCTIVE CLOTHING:

Conductive clothing will always be worn over work clothing.

When putting on conductive clothing, it is important that all the different pieces of conductive clothing are well bonded together.

Conductive socks with conductive clothing will properly bond the worker through the soles of the conductive boot and will not require leg straps. Exception: When working off the ladder leg straps will be required to bond the conductive boots to the suit, when the proper bonding of the boots to the suit can not be maintained.

When putting on the hood, make sure that it is fitted over the lip of the hard cap so that the face is shielded. Otherwise, the face may possibly experience some discomfort.

NEED TO CONSIDER BEFORE BONDING ON:

Two bonding straps or tails are attached to the conductive suit. One bonding strap will be connected to platform rail when working from the Condor, the second bonding tail shall be left in the pocket provided on the conductive jacket. When working from the ladder both bonding tails are used to the conductor, until needed they will be left in the jacket pocket. Do not allow bonding tails to hang down, this could reduce safe working clearances.

The soles of the conductive boots must be clean before getting on the Condor platform or before ascending the tower.

CARE OF CONDUCTIVE CLOTHING:

The integrity of the conductive clothing is essential. It is the responsibility of the worker to exercise extra care when wearing, storing or handling conductive clothing. Conductive clothing will be inspected before use. Any damage to the suit must be evaluated to determine if suit must be removed from service for repair or replacement.

Any conductive clothing, especially boots, that are no longer usable must be put in such a condition that they can not be used for any other purpose. (*e.g. cut up)*

Boots will be kept reasonably clean, especially the bottom of the soles. They will be kept in good repair.

Conductive clothing and/or conductive foot wear shall not be used for any other purpose than what they were designed.

STORAGE:

Conductive suits, gloves and socks shall be stored in a dust free breathable container. Conductive suits, gloves and socks will not be stored while damp from perspiration or other moisture. Conductive clothing will be hung up until dry before storing.

CLEANING:

Conductive clothing can be washed by hand or in an automatic washer with a mild detergent and dried in an automatic dryer on low heat or air dry. Note: In no case will any additives, such bleach, be used when washing conductive clothing.

Conductive clothing that is heavily soiled with grease or oil will be dry cleaned.

REPAIR OF CONDUCTIVE CLOTHING:

Small snags or rips, no longer then two inches in length, can be sewed or patched without negative effects. When making repairs you must provide a one inch overlap with either a conductive patch or stitched with conductive thread.

Repairs to conductive suits will only be made by those who are designated, qualified and trained employee in repair procedures.

Socks and Gloves are not repairable.

Boots will be kept in good repair. Leg straps will be replaced as required.

INSPECTION OF CONDUCTIVE CLOTHING:

A visual inspection of conductive suits, gloves and foot wear shall be performed at the beginning of each work day they are to be used. The visual inspection should include the checking of suits for rips and/or tears. Zip fasteners, metal press studs, metal hooks and eyes must be checked to insure they are correctly inserted and nothing prevents them from good electrical contact. The stitching must be checked to insure it is continuous and two or more pieces joined are in good electrical contact.

Leg straps shall be tested prior to use with a continuity tester when their continuity is in doubt.

ATTACHMENT 4

CONDOR AERIAL LIFT

Model 150-I

INTRODUCTION

Instructions outlined in this manual cover the operation of the aerial lift equipment.

The Condor is a vehicle-mounted, elevating and rotating work platform. Because of its direct contact with human life, it is essential that the unit be properly maintained and operated. All needed maintenance must be performed before using this device.

Every person working with the Condor shall be given the required training to become thoroughly familiar with all phases of its operation and trained in barehand live line techniques.

SAFETY

Our Condor is equipped with special equipment that is important to safe barehand operations:

1. We have fiber-optic controls which greatly reduce the number of hydraulic hoses going to the platform.

2. On the 3 hydraulic hoses that go through the boom atmospheric vent valves have been installed at the platform end. At the elbow end of the boom, hydraulic check valves have been install to prevent hydraulic fluid from leaking out of the hydraulic lines going through the boom. Those 2 types of valves have been installed to prevent the possibility of a hydraulic line vacuum leading to a flashover.

3. The Condors engine will be kept running while bonded on to assure hydraulic pressure is maintained. All movement of the platform and boom shall stop while bonding on to an energized conductor. This will elimante the possibility of the Condor engine shuting off.

4. The fiberglass boom has a corona shield which is very important to assure safe operation of the boom. Removal or severe damage of the corona shield could under certain condition lead to flashover across the boom. Do not use if corona shield is damaged or not in position.

5. Hydraulic fluid has a flash point of 450 degrees. Any hydraulic fluid leaks which cause a spray may cause a fire if an arc is created by installing or removing a bond.

6. **The Condor 150-I shall not be used when the working heigth is 100 feet or less in winds of 30 MPH or more or if the working heigth is over 100 feet in winds of 25 MPH or more.**

7. The daily check list must be used prior to the start of any barehand work

CAUTION: *The Condor operator and the person monitoring the leakage current meter shall be at the same potential as the Condor during the required 3 minute energized test (Section 2, Safety).*

All other personnel shall maintain a 25 foot clearance from the Condor, grounds, and any thing the grounds are attached to during this 3 minute test.

The following are excerpts from the Federal Register, Title 29, Chapter XVII, O.S.H.A. - 1926.556.

(i) Lift controls shall be tested each day prior to use to determine that such controls are in safe working condition.

(ii) Only authorized persons shall operate an aerial lift.

(iii) Belting off to an adjacent pole, structure, or equipment while working *from* an aerial lift shall not be permitted.*

(iv) Employees shall always stand firmly on the floor of the basket (platform), and shall not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position.

(v) A body belt SHALL BE WORN and a lanyard attached to the boom or basket when working from an aerial lift.

(vi) Boom and basket load limits specified by the manufacturer shall not be exceeded.

(vii) The brakes shall be set and when outriggers are used, they shall be positioned on pads or a solid surface.

(viii) An aerial lift truck shall not be moved when the boom is elevated in a working position with men in the basket, except for equipment which is specifically designed for this type of operation (the Condor is not this type of equipment).

(ix) The insulated portion of an aerial lift shall not be altered in any manner that might reduce its insulating value.

(x) Before moving an aerial lift for travel, the boom(s) shall be inspected to see that it is properly cradled and outriggers are in stowed position.

DESCRIPTION

The Condor is a completely self contained, hydraulically operated unit, mounted on a truck-type chassis. The aerial lift is assembled to form an integrated mechanical structure, providing for both horizontal and vertical movements. A hydraulic-mechanical leveling system keeps the operator's platform level at all times, regardless of the booms position. Two sets of swing-out outriggers, located on both sides of the unit enable the unit to be leveled and stabilized.

Power for operating the hydraulic system is obtained from the trucks PTO to the main hydraulic pump, or from an auxiliary engine which drives the auxiliary hydraulic pump.

* *Nothing in this rule shall prohibit transferring to and from the aerial lift platform to other work locations.*

Two control stations are provided; ground controls are at the rear of the unit and the aerial controls are on the work platform. The ground control console at the rear provides full operating control of all lift functions, and controls the primary power source and selection of upper or lower controls. The platform-mounted control console permits aerial control through the use of fiber-optic controls.

The Condor 150-I is a heavy-duty aerial device, having a platform capacity of 1500 lbs. in any position; rises to a working height of 150 feet above the ground and extends to 62 feet in a horizontal plane at a column (lower boom) height of 52 feet. Maximum height of the column (lower boom) is 87 feet with a maximum horizontal reach of 58 feet.

Various maneuvers are obtainable through the use of its hydraulic operational functions consisting of 360 degree rotation, the extension and retraction of both the vertical column (lower boom 52 ft. minimum; 87 ft. maximum) and elbow (upper boom 48 ft. minimum; 62 ft. maximum). The elbow (upper boom) will also move through an arc of 160 degrees in relation to the column (this unit is NOT designed to go over-center).

In the event of primary and emergency power source failure lowering of the elbow (upper boom elbow bleed down) can be accomplished by employment of the hand-operated pump located at the base of the turret and is used to unseat the holding valve of the knuckle cylinders, thereby permitting the elbow (upper boom) to be lowered. In an emergency the turret position can be controlled manually by turning the worm gear mechanism inside the turret.

OUTRIGGERS

Stability during operation is provided by heavy-duty hydraulically powered outriggers. The outriggers are located on the truck frame to provide a spread of 20 feet, 6 inches with the front to rear spacing of 28 feet, 10 inches.

Both sets of swing-out outriggers are equipped with leveling jack legs used to level and stabilize the lift during operation with sufficient length to provide for 18 inches of penetration. All outrigger jacks are equipped with 15 inch diameter swivel pads.

Controls for operating the outriggers are located at the front (2 toggle switches) and rear (4 toggle switches) of the truck. Each of the four outriggers are independently controlled and a sequencing phase is used to operate both the swing-out motion and leveling. This operation provides for an additional safety feature in that it insures that outrigger legs be in the full swing-out position before leveling jacks will operate. Likewise until leveling jacks are fully retracted, outrigger legs cannot be swung in.

TURNTABLE

The turntable (turret) contains a hydraulically driven reduction worm gear assembly which provides for 360 degree rotation. The rotation gear box is hydraulically driven and contains provisions to enable the unit to be rotated manually.

BOOM CONSTRUCTION

The Condor has four boom sections, two articulating and two telescoping. The boom sections are constructed of high-tensile steel and fiberglass.

The column (lower boom) consists of two sections, an outer steel section and an inner telescoping steel section. The elbow (upper boom) consists of two sections, an outer steel section with a 16 foot fiberglass insert, 1/2/inch thick and an inner telescoping steel section.

Telescoping the column (lower boom) incorporates the use of a 5 1/2 inch diameter cylinder, attached to a 1/2 inch cable and sheave system with a two to one movement ratio.

Telescoping the elbow (upper boom) incorporates the use of a 4 1/2 inch diameter cylinder, attached to a 3/8 inch cable and sheave system with a two to one movement ratio.

Dual 7 inch diameter cylinders are used to raise both the column (lower boom to a vertical position) and on the elbow (upper boom through an arc of 160 degrees).

AERIAL PLATFORM

The platform is fabricated out of steel and the dimensions are 96 inches long by 36 inches wide and 42 inches high and the floor is fabricated from extruded metal.

An automatic leveling system is incorporated to level the platform, regardless of boom position. This is accomplished by the use of a remote sensor and hydraulic leveling valve which control the flow of oil to a hydraulic leveling cylinder.

HYDRAULIC SYSTEM

Power for all operations is supplied by a variable volume pressure compensating piston pump. driven by the truck engine. The use of this type of pump permits the operation of all lift functions simultaneously with a minimum loss of pressure or volume, as the pump automatically compensates for the increase in demand. This, therefore, provides for a more efficient unit.

Pilot operated check and holding valves are installed on all hydraulic cylinders to prevent cylinder drift and a fail-safe feature in case of a hydraulic line failure.

CONTROLS

The ground control station is located at the rear of the vehicle and contains the following controls and instruments:

1. Operational Controls
   (a) Column-Raise & Lower
   (b) Column-Extend & Retract
   (c) Elbow-Open & Close
   (d) Elbow-Extend & Retract
   (e) Rotation-CCW & CW
   (f) Horn
   (g) Auxiliary engine ignition switch and toggle switch (emergency power supply).
   (h) Rotation Override Button
   (i) Plug in connection for Boom Current Monitor
   (j) Speed Control - (slow or fast)
   (k) 45/60 degree angle switch
   (l) Aerial / Ground selection switch
   (m) Engine Stop-Start Switch

2. Outrigger Controls - four located on rear of truck (one for each outrigger) and two located on the front of the truck (for use with front outriggers only).

3. Hydraulic Oil Pressure Gauge, locate on lower left rear corner of turret.

The aerial control console is located at the platform and contains the following controls:

1. Operational Controls
   (a) Column-Raise & Lower
   (b) Column-Extend & Retract
   (c) Elbow-Open & Close
   (d) Elbow-Extend & Retract
   (e) Boom Rotation-CCW & CW (f) Horn
   (g) Engine Stop-Start Switch
   (h) Deadman (foot controlled)
   (i) Platform Rotation

EQUIPMENT OPERATING CHARACTERISTICS

The control level should be moved slowly and smoothly to avoid jerky and erratic platform movement.

Each control (whether a toggle switch or lever-type control) when activated increases engine RPM and brings the hydraulic pressure to operating level. When released, the engine RPM returns to idle and the hydraulic pressure to zero.

At the ground station when the operator releases the control, hydraulically and electrically the unit is in a stand-by-condition. In the platform if the operator has released the switch or lever arm control or has stepped off the deadman, the unit is now in a stand-by-condition.

It should be remembered that when operating the unit from the platform, that the boom is behind the operator; and extreme care should be exercised when the boom is lowered or rotated to prevent contact with buildings, electrical wires, or other obstructions. Where practical, this should be one of the "ground" operator's functions to watch for these hazards, warn platform operator and if necessary to over-ride his controls.

STABILIZATION

CAUTION:

ALWAYS RAISE FRONT OUTRIGGERS FIRST AND THEN RAISE REAR OUTRIGGERS. LOWER REAR OUTRIGGERS FIRST THEN LOWER FRONT OUTRIGGERS.

It is absolutely necessary to extend the outriggers and set the leveling jacks firmly to ensure safe operation of the Condor. The aerial lift portion of the Condor will not function unless the outriggers are out and set. All wheels must be suspended (off the ground) for maximum stability.

Operating sites with moderate surface defects and/or sloping terrain are permissible only if they are corrected to provide firm, secure stabilized footing and level lift conditions.

Inspect ground seating surfaces at the site in areas where outrigger jacks will rest. Place adequate support plates (36" x 36" or larger) beneath each outrigger jack for additional footing support.

If an outrigger jack extends to its limit, without making a secure foot pad contact, then the ground surface must be built up using shoring material such as hardwood blocks, steel plates etc. to afford a firm secure foundation.

INSTABILITY WARNING

This unit is equipped with a warning system that alerts the operator when an operation is approaching an unstable condition. The warning system is connected electrically, and sounds the vehicle horn when this condition is reached.

TO CORRECT THIS SITUATION, LOWER CONDOR TO THE STOWED POSITION AND RESET OUTRIGGERS AND/OR JACKS. Additional support plates may be required.

CAUTION: *At no time* should the platform be maneuvered into such a position that enables the elbow and platform to be on the *same side of the center of the turret.* THIS IS *NOT* AN OVER-CENTER UNIT.

INTERLOCK SYSTEM

An interlock system for the booms and outriggers is incorporated into the unit to provide additional safety to personnel as well as the prevention of damage to unit.

* *All aerial lift operational functions are inoperative until the outriggers are properly set.*

* *With outriggers set, Column control circuit becomes energized. Once Column control is activated, raising Column from stowed position, outrigger controls are de-energized.*

* *Column must be raised to 60 degrees from the stowed position before Elbow and Column Extension control functions are operable. Operating range of the Column is 60 to 81 degrees, unless you activate the 45 degree angle switch (located only at the ground control station) which allows the Column and Elbow (upper boom) to open to 45 degrees. As you increase the angle of the Column you can also increase the angle of the Elbow.*

* *To energize Column Extension function, Elbow must be actuated to the "OPEN" position (separating upper boom from Column) and Column must be 75 degrees or more from stowed position.*

ELBOW SPEED CONTROL

A device is incorporated to automatically slow down elbow movement, regardless of amount travel placed on control lever. This reduction of speed occurs when upper boom travel is approaching 15 degrees to vertical. This system will remain energized until upper boom is lowered away from vertical. The purpose of this is to prevent a sudden or abrupt stop at maximum elevation. Also, while descending it will eliminate the feeling of platform suddenly "falling".

AUXILIARY BATTERIES

A battery charging system is incorporated to enable the leveling system batteries to be charged while in transit. A battery charger is provided for the fiber-optic control transmitter battery. The battery charges anytime it is connected to the charger inside the cab of the vehicle. The power source for this charger is from the vehicles main batteries (the truck does not need to be running to charge the fiber-optic control battery.

VEHICLE CAB

The following are controls located within the vehicle cab that have a relation to the operation of the Condor.

Engage power take off (P.T.O.) as indicated by instruction decal.

Turn MASTER switch to "ON" position.

NOTE

It is not necessary to leave engine running as *STOP-START* switches are located at the control stations. If engine is turned off, be sure *IGNITION* switch is left in the *"ON"* position.

FIBERGLASS BOOM

Calavar recommends that the fiberglass boom be visually checked each day as part of the equipment check-out prior to use of the machine.

NOTE

Always ensure clean surface of the fiberglass boom.

Clean the exterior surface of the boom with denatured alcohol.

Use the canvas cover for the boom when unit is not in use.

Check desiccant condition. If pink in color replace with fresh desiccant.

CURRENT MONITORING METER

The Von Meter is a continues monitoring meter which measures the micro amps leakage on the hydraulic hose, fiber-optic and through the fiberglass portion of the boom.

The legal limits of leakage is one micro amp per KV line to line. We set the alarm at one micro amp phase to ground for added safety.

Operator must be in the area to frequently observe (3 to 5 minutes) current monitoring meter to ensure the reading does not rise unexpectedly.

INSPECTIONS

DAILY
See Condor Daily Inspection, Appendix A & B.

90 DAY
See Garage personnel for information.

YEARLY
See Garage personnel for information.

ATTACHMENT 5

TAILBOARD CONFERENCE

Before the start of any job, a complete tailboard conference will be held with all workers in attendance. Everybody must understand what you plan to accomplish, how you plan to accomplish it and what each worker is expected to do and what order it is to be done in.

1. It is the responsibility of the Electric Crew Foreman to conduct a tailboard conference at the beginning of each project. The tailboard shall include the following:

   a. The voltage to be worked.

   b. The clearances to be maintained.

   c. The barehand work method to be used.

   d. The loads that will be handled (*To determine safe rigging procedures).*

   e. Maximum amps that could occur on the line and the size of the temporary jumper to be used (*This is only required when the line is to be opened).*

   f. Equipment limitation (*see aerial lift section for wind restriction and operating requirements when Condor is to be used).*

2. Live line barehand work is not expected to be done routinely and that is why the following items should be covered during the tailboard conference. These items are not all inclusive, but just cover some recommended areas that will act as a reminder to the crew.

   a. The use of conductive suits, gloves and foot wear should be reviewed and the importance of bonding all pieces of conductive clothing together. Emphasize that all conductive clothing must be checked to see that it is in good condition.

   b. The barehand procedure to be used shall be reviewed.

   c. The use of the tarps and the checking of the condition of all ropes, tools and equipment should be stressed. Ropes should be worked off tarps and kept from contact from the ground.

   d. Review the handling and care of the live line tools. All live line tools must be wiped with a silicon cloth prior to being used.

   e. The reason for the job. How the job is to be done. Who is to do what and the order it is to be done in.

   f. Tools, material and equipment should be laid out before the worker ascends the tower or the men working out of the Condor get on the Condor platform.

   g. A non-test is always requested. The crew shall be informed of the approval of the non-test and when reclosing devices were made inoperative and if the gaps were raised.

h. The testing of the insulators when required.

i. Any hazards noted by any member of the crew will be discussed in detail and detailed instructions given to all crew members on how they are to be worked.

j. If unforeseen conditions arise that may significantly effect the work another tailboard will be given to explain the changes.

ATTACHMENT 6

LIVE LINE BARE HAND RESCUE PROCEDURES

Working out of Aerial Lift:

When performing live line barehand work from an aerial lift, the worker monitoring the leakage current will be in position to override the upper controls and lower the worker on the platform in case of injury or the worker becomes disabled.

Working from the Ladder:

Working from The Tower utilizing the Ladder work procedures for suspension (vertical) insulator replacement:

1. A rescue harness must be worn by the worker on the ladder. (hot end man) 2. One man on the tower will be suited in full conductive clothing (suit, gloves and foot wear) and will be designated the rescuer in case the hot end man on the ladder becomes immobilized for any reason.

3. A bonding wand will be placed at the lower end of the ladder. This wand will be made up of #6 Cu. and will be used to bond the rescuer to the foot of the hot end man when a rescue is taking place.

4. The hot end man is required to be attached to a barehand tower safety while he is performing the work.

NOTE: *The following steps will not be required if the bull line can be attached to the tower safety of the hot end man, if he is in position to be lifted from the ladder and lowered to the ground.*

5. The rescuer will climb on and ascend the ladder using the same procedure the hot end man utilized in reaching the conductor.

6. The rescuer, when reaching the work area, will bond on to the sole of the conductive boots worn by the hot end man insuring all required clearances are adhered to.

7. The rescuer will then bond on to the hot end man by holding his ankle with his hand. He can then remove the bonding wand from the sole of the hot end mans foot.

8. The rescuer will then ascend the ladder until he is in position to bond on to the conductor using a clamp attached to the tail of his suit.

9. The rescuer will attached the bull line to the ring in the back of the harness of the hot end man.

10. A strain is taken on the bull line and the safety of the hot end man is removed from the ladder/conductor.

11. The hot end man is lowered until he is clear of the ladder. The rescuer positions himself so he is clear of the hot end man.

12. The hot end man is lowered so the strain of his strap pulls the bonding clamp free of the conductor and he is lowered to the ground.

13. Required first aid is applied.

Working from the tower utilizing the ladder work procedure for V-String insulator replacement:

1. A rescue harness must be worn by the worker on the ladder (hot end man).

2. One man on the tower will be suited in full conductive clothing (suit, gloves and footwear) and wear a harness. He will be designated the rescuer in case the hot end man becomes immobilized for any reason.

3. A sling and block will be hung on the upper steel of the bridge directly over the conductor. A 4 foot shotgun will be along side the sling and block.

4. The hot end man is required to be attached to a barehand tower safety while he is performing the work.

NOTE: *The following steps will not be required if the bull line can be attached to the tower safety of the hot end man, if he is in position to be lifted from the ladder and lowered to the ground.*

5. The 3/4 inch bull line is passed through this block and attached to the ring in the back of the harness of the rescuer. A tag line is attached to the ring in the back of the harness of the rescuer.

6. Using the capstan, the rescuer is lowered from the tower bridge to the work area. The tag line is used to tag the rescuer away from the insulator string while being lowered to the work area.

7. The rescuer, when reaching the work area, will bond on to the conductor using a clamp attached to the tail of his suit and the 4 foot shotgun.

8. The rescuer will be lowered to the ladder until he is in position to assist the hot end man.

9. The rescuer attaches the bull line and tag line to the ring in the back of the harness of the hot end man.

10. A strain is taken on the bull line and the safety of the hot end man is removed from the ladder.

11. The hot end man is lowered until he is clear of the ladder. The rescuer position himself so he is clear of the hot end man.

12. The hot end man is lowered so the strain of the strap pulls the bonding clamp free of the conductor and he is lowered to the ground. The tag line is used to insure the worker being rescued is kept clear of the guys while being lowered to the ground.

13. Required first aid is applied.

Working from the tower utilizing the ladder work procedures for deadend insulator replacement:

1. A safety harness must be worn by the worker on the ladder. (the hot end man)

2. The hot end man is required to be attached to a barehand tower safety while he is performing the work. In no case will he safety off to the conductor or insulator string.

3. The hot end man will use spring loaded bonding clamps attached to the suit tails when bonded on to the conductor.

4. If a problem occurs, the ladder will be pulled away from the energized conductor (using the tag line attached to the hot end of the ladder). This will allow the spring loaded bond on clamps to break free.

5. The ladder will be positioned so that safe working clearances can be maintained by the rescuer when he ascends the ladder from the tower.

6. The rescuer ascends the ladder until he is in position to render assistance and straps off.

7. The rescuer will provide immediate first aid if practical.

8. The rescuer will take one end of the handline attached to the ladder and pass it around the side rails of the ladder. He will then tie the end of the line to the ring of the safety harness worn by the hot end man.

9. A strain is taken on the line and the safety of the hot end man is disconnected from the ladder.

10. The rescuer will role the hot end man off the ladder and the weight of the hot end man is taken on the line.

11. The hot end man is lowered to the ground.

12. Required first aid is applied.

ATTACHMENT 7

NON-TEST

DEFINITION: Non-test (Line remains energized and circuit conditions are established which *will not* permit the circuit to be re-energized until the crew is in the clear.)

NON-TEST CRITERIA FOR BAREHAND WORK:

A. In no case will live line barehand work be done without a non-test. Table II shows the minimum number of good insulators needed to maintain the required minimum safe working clearances.

TABLE II

MINIMUM NUMBER OF GOOD SUSPENSION INSULATORS TO MAINTAIN THE REQUIRED MINIMUM PHASE TO GROUND WORKING CLEARANCES.

Line to line kV	Minimum number of good insulators
230	11 (5'0")
500	23 (11'0")

NOTE: *The insulators shall be tested with an approved insulator tester if there is any question or doubt on the amount of good insulators remaining in a string of insulators.*

B. Before working on the 500kV with less then the amount of good insulators shown in Table II surge protection will be obtained. Surge protection is accomplished by raising the protective gaps at each end of the line section to be worked to 60 inches. Table III shows the conditions and minimum good insulators (Includes withstand voltage) required under which barehand live line work can be performed with the protective gaps raised.

TABLE III

Line to line kV	Minimum number of good insulators
500*	17 (660kv)**

***NOTE:** *WET DIRTY INSULATORS WILL NOT BE CHANGED UNDER ENERGIZED CONDITIONS.*

***Per note in Table 1 in Safety section.*

C. A safety clearance will be obtained, prior to barehand work, if there are a fewer number of good insulators remaining in a string of insulators as shown in Table II and/or Table III.

Note: *A safety clearance is when the line is deenergized but not grounded. All work performed under a safety clearance will be done using approved barehand live line procedures. This will include the 3 minute energized test of the aerial lift and/or ladder to be used to position the worker to perform the work (This will depend on what work method is to be used).*

Attachment 3

IMPLEMENTATION PROCEDURES FOR RUBBER GLOVING
(Revised 7/31/91)

1. Sign up lists will be posted for 30 days following the initiation date which has been established as August 1 through August 31 by the Overview Committee.

2. Only those volunteers who sign up during the 30 day period will be eligible for the 3% premium.

3. Journeymen who elect to volunteer after the 30 day sign up period will not be eligible for the 3% advance premium. (See item #8 for further preclusions).

   Consideration will be given on a case by case basis to journeymen who wish to volunteer but through circumstances beyond their control missed the 30 day period.

4. The Sign up will include a form to be completed by each individual volunteer and submitted to his/her supervisor.

5. Only those classifications identified in the rubber glove letter agreement are eligible to volunteer. Those classifications are as follows:

   0740 Electric Crew Foreman
   0739 Electric Crew Foreman (temporary classification for use when in charge of a crew of 5 other employees)
   2535 Transmission Troubleman
   2540 Troubleman
   *1099 Underground Lineman
   1100 Lineman
   1103 Unassigned Lineman
   1109 Utility Lineman-Oakhurst
   *0649 Subforeman A - GC
   0650 Subforeman A - GC
   0653 Subforeman B - GC
   1100 Lineman - GC
   0737 Underground Construction Crew Foreman (Electric)
   1077 Underground Construction Journeyman (Electric)

   *Must have previously worked as PG&E journeyman Lineman

NOTE 1: This group can be expanded by mutual agreement of the Parties.

NOTE 2: One and 10 journeymen, if physically qualified to perform overhead line work from a bucket truck, may volunteer and be included in this program.

However, if Company has cause to question a one in ten journeyman's ability to perform these duties, Company may require a medical evaluation and release prior to permitting the individual to volunteer for rubber glove training. Company's determination to

Attachment 3

request the evaluation must be based on an objective determination such as employee's immediate work history or prior documented medical opinion. If the employee receives the medical clearance he will be slotted into the training schedule based upon his seniority and be paid rubber glove compensation in accordance with this agreement on a retroactive basis.

In any case, one in ten journeymen will be required to pass all aspects of the rubber glove training program, including the installation of a de-energized insulated platform project at a minimum height necessary to demonstrate the skill. For the one in ten journeyman any work limitations will be noted on their training certification.

6. Payment of the 3% premium for volunteering will start after the 30 day sign up period. The overview committee has established September 1 as the generic date for commencement of the 3% premium pending variance agreement from Cal/OSHA. (September 1, 1991). The premium will appear on paychecks in the first pay period in October, retroactive to September 1.

7. The "Initial Period of Training" is defined as the period required to train all journeymen volunteers who signed up during the 30 day period.

8. Apprentices who reach journeyman status during the course of the initial period of training will be placed on the training lists and trained by company seniority as part of the initial training. Such employees shall receive 3% upon reaching journeyman or unassigned status and an additional 3% upon completion of the training or 24 months from September 1, 1991, whichever comes first.

9. Journeymen who elect to volunteer after the 30 days sign up period will be included in the initial training only if training slots are available. If training slots are not available, these volunteers will be trained at future apprentice training for rubber gloving.

10. Training lists will be established by company seniority by headquarters and GC General Foreman areas.

11. Training slots will be assigned to GC and to each region for distribution among the divisions.

Attachment 3

12. Journeymen volunteers eligible for the 3% advance premium will receive an additional 3% at the commencement of training or 24 months from September 1, 1991, whichever comes first.

13. Any volunteer bypassed for the training will be eligible for the full 6% at the time of bypass, as if he/she has attended the training.

14. All other employees will receive the 6% rubber glove premium at the conclusion of training.

15. Any employee who has passed the training program and, subsequent to leaving one of the classifications listed in #4 above, is utilized on an upgrade or temporary basis in such classifications will be eligible to receive the 6%.

16. Employees eligible to receive the 6% premium will be paid the premium over the classification rate to which they are assigned as long as that classification is listed in #4 above.

ELECTRIC AND MAGNETIC FIELDS

1. Company/Union Joint Agreement on Electric and Magnetic Fields

A joint committee comprised of three members appointed by Union and three members appointed by Company shall be established to review available data and material related to electromagnetic fields. The committee may develop and monitor data specifically related to PG&E employees and work procedures.

2. COMPANY-UNION JOINT EMF COMMITTEE STATEMENT

Electric and Magnetic Fields (EMF) is a joint on-going concern. The EMF Committee has been established to review avaiable data and material related to Electric and Magnetic Fields. In addition, the Committee will collect data specifically related to PG&E employees and work procedures, including barehand and rubber gloving.

The scientific community has determined there are biological effects associated with EMF. Live line work practices have been and will be in effect without knowing the full extent of the potenial health effects due to EMF.

The goals of the Committee will be to review current and ongoing scientific studies to assure health and safety issues are identified and referred to the Overview Committee in a timely manner. Furthermore, the Committee will jointly gather data on EMF field strengths at various work locations as determined by the Committee.

The Committee will meet on a regular basis, no less than quarterly after the Joint Safety and Health Committee meeting.

Reports and recommendations will be provided to the Overview Committee at least quarterly.

This statement was adopted at the meeting of the Company-Union Joint EMF Committee meeting held on September 14, 1990.

Attachment 4

IMPLEMENTATION PROCEDURES FOR BARE HAND TRAINING

1. The Company will determine the location and number of employees to be trained at a selected location by Company seniority. Training will be given to all journeymen assigned to Transmission Crews, all Transmission Troublemen who volunteer, and a number of volunteers, by selected locations and seniority in General Construction and, if needed, Division Journeymen.

2. A volunteer sign-up sheet will be posted for 30 calendar days in selected service centers in the Region and General Construction General Foreman areas following the initiation date jointly agreed to by the Overview Committee (8-1-91 through 8-31-91). Only the following classifications will be eligible to volunteer:

0740 Electric Crew Foreman
2535 Transmission Troubleman
1100 Lineman
1100 Lineman - GC
0650 Subforeman A- GC
0653 Subforeman B- GC
1645 Equipment Operator (for ground work only)
0910 Groundman (for ground work only)

VOLUNTEER SIGN UP FOR BARE HAND AGREEMENT

The Company/Union Overview Committee established by Letter Agreement 90-34-PGE (Rubber Gloving and Barehanding Agreement) have established the initiation date for bare hand sign-up. In accordance with that agreement, you have 30 calendar days to volunteer for bare hand training if you are in one of the following classification:

0740 Electric Crew Foreman
2535 Transmission Troubleman
1100 Lineman
1100 Lineman - GC
0650 Subforeman A - GC
0653 Subforeman B - GC
1645 Equipment Operator (for ground work only)
0910 Groundman (for ground work only)

HEADQUARTERS _____

	Name (print)	SS#	Signature	Date
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				

In the event you do not successfully complete the barehand training or otherwise decide not to participate, you will be reassigned under the provisions of Letter Agrfeement 90-69 estgablishing the Region Transmission Crews.

Attachment 5

STATE OF CALIFORNIA—DEPARTMENT OF INDUSTRIAL RELATIONS

PETE WILSON, Governor

OCCUPATIONAL SAFETY
AND HEALTH STANDARDS BOARD
1006 FOURTH STREET
SACRAMENTO, CA 95814-3372
(916) 322-3640

RECEIVED JUL 2 2 1991

July 17, 1991

John C. Vocke
Attorney/Director-OSHA
Compliance
Pacific Gas & Electric Co.
Safety, Health & Claims Dept.
123 Mission Street
San Francisco, CA 94106

Subject: PACIFIC GAS AND ELECTRIC COMPANY
OSHSB File No. 90-V-102 and 90-V-103

Dear Mr. Vocke:

Attached is a copy of the Proposed Decision in the above referenced matter. The entire Standards Board will vote on whether to adopt this Proposed Decision at its Business Meeting scheduled for July 25, 1991 in San Diego. I have also attached a copy of the Agenda for that Standards Board's Public Meeting, Public Hearing and Business Meeting. A copy of the final Decision will be mailed to you after that date.

Sincerely,

Jaylene Vlasak

JAYLENE VLASAK
Variance Secretary

Attachments

STATE OF CALIFORNIA—DEPARTMENT OF INDUSTRIAL RELATIONS

PETE WILSON, Governor

OCCUPATIONAL SAFETY
AND HEALTH STANDARDS BOARD
1006 FOURTH STREET
SACRAMENTO, CA 95814-3372
(916) 322-3640

DECLARATION OF SERVICE BY MAIL

I, Jaylene Vlasak, declare as follows:

I am a citizen of the United States, over the age of 18 years and not a party to the within action; my place of employment and business address is 1006 Fourth Street, Third Floor, Sacramento, California 95814.

On July 17, 1991, I served the attached Proposed Decision with respect to Application for Permanent Variance, OSHSB File Nos. 90-V-102 and 90-V-103, by placing a true copy thereof in an envelope addressed to the persons named below at the address set out immediately below each respective name, and by sealing and depositing said envelope in the United States Mail at Sacramento, California, with postage thereon fully prepaid. There is delivery service by United States Mail at each of the places so addressed, or there is regular communication by mail between the place of mailing and each of the places so addressed:

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Lineman, PG&E
2671 Midge Avenue
Merced, CA 95340

I declare under penalty of perjury that the foregoing is true and correct.

Executed on July 17, 1991, at Sacramento, California.

Jayleine Ward
SIGNATURE

BEFORE THE
OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD
DEPARTMENT OF INDUSTRIAL RELATIONS
STATE OF CALIFORNIA

In the Matter of Applications for a Permanent Variance by: PACIFIC GAS AND ELECTRIC COMPANY 123 Mission Street San Francisco, CA 94106 Applicant	OSHSB FILE NO. 90-V-102 NO. 90-V-103 PROPOSED DECISION

Jurisdiction

I

These matters came on regularly for hearing before John Hay, Jere Ingram, and John Baird, Members of the California Occupational Safety and Health Standards Board (Board), constituting the Hearing Panel of the Board. Keith Tohru Yamanaka, Hearing Officer, presided at the hearing in Oakland, California, on May 29, 1991, at 9:05 a.m.

II

John C. Vocke, Attorney/Director - OSHA Compliance, representing Pacific Gas and Electric Company (Applicant), Jack McNally, Business Manager, International Brotherhood of Electrical Workers, Local Union 1245, representing the affected employees, James Kinney, Associate Safety Engineer, representing the Division of Occupational Safety and Health (Division), and William Baty, Senior Safety Engineer, representing the Board staff, were present at the hearing.

William Mazotti, Vice President, Ronald G. Smith, Live Line Methods Supervisor, Richard Wagner, Live Line Supervisor, and Dennis Reisinger, Supervisor, Transmission Section, testified as witnesses for Applicant.

The following persons were granted intervenor status and testified at the hearing: Daniel D. Mayo, Lineman, PG&E; Edward L. Baker, Business Representative, I. B. E. W. Local Union 18; Rae Sanborn, Business Manger, I. B. E. W. Local 47; and David Moore, Business Manger, Local Union 465.

III

John C. Vocke filed an application for permanent variance on Applicant's behalf on November 29, 1990, requesting a permanent variance from Title 8, California Code of Regulations, sections 2940.2(a)(1) and (2), 2940.6(h), 2940.7(b)(5), 2941(g), 2944(f),

and Appendix C of the High Voltage Electrical Safety Orders regarding implementing live-line, barehand work techniques on energized high-voltage systems owned, operated, and maintained by Applicant throughout California. This application was docketed as OSHSB No. 90-V-102. On March 15, 1991, Applicant filed an amended application from the same sections.

John C. Vocke filed an application for permanent variance on Applicant's behalf on November 29, 1990, requesting a permanent variance from Title 8, California Code of Regulations, sections 2940.2(a)(1) and (2), 2940.6(a)(4), (5), (6), and (7), 2940.6(c), 2941(f) and (f)(1), 2941(g), (g)(1) and (g)(2), 2944(e) and (e)(1), 2944(f), and Appendix C of the High Voltage Electrical Safety Orders regarding implementing rubber gloving of voltages above 7,500 volts, up to and including 21,000 volts on Pacific Gas and Electric energized high-voltage systems located throughout California. This application was docketed as OSHSB No. 90-V-103. On March 15, 1991, Applicant filed an amended application from the same sections.

IV

The Division submitted an evaluation report with respect to OSHSB No. 90-V-102 dated April 12, 1991, recommending that the variance be granted subject to five conditions. The Standards Board's staff submitted an evaluation report dated May 2, 1991, recommending that the variance be granted subject to five conditions.

The Division submitted an evaluation report with respect to OSHSB No. 90-V-103 dated April 12, 1991, recommending that the variance be granted subject to five conditions. The Standards Board's staff submitted an evaluation report dated May 2, 1991, recommending that the variance be granted subject to five conditions.

V

The parties presented oral and documentary evidence, and the matters were continued to allow submission of documents into evidence. The records were closed, and the matters were submitted on July 12, 1991.

Law and Motion

At the hearing, Applicant moved to amend its application docketed as OSHSB No. 90-V-102 by deleting Appendix C of the High Voltage Electrical Safety Orders.

Applicant also moved to amend its application docketed as OSHSB No. 90-V-103 by deleting sections 2940.6(a)(4), (5), (6),

and (7), 2940.6(c), 2941(f) and (f)(1), 2941(g)(2), and Appendix C of the High Voltage Electrical Safety Orders.

The Division and I.B.E.W. Local Union 1245 having no objections, the motions were granted.

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OSHSB No. 90-V-102

8 Cal. Code of Regs. Sections 2940.2(a)(1) and (2), 2940.6(h), 2940.7(b)(5), 2941(g), and 2944(f)

Summary of Evidence

Applicant provides gas and electric power to customers throughout Northern California. Applicant seeks to obtain a variance to allow its workers to use the live-line, barehand technique to work on energized lines of 230,000 volts up to 500,000 volts.

The Standards Board staff report indicated that the conventional method of working on energized systems in excess of 7,500 volts is for workers to use "hot sticks". Hot sticks are long, cylindrical rods, some of which are up to 19 feet long, made of non-conductive material. The working end of a hot stick may have one of several different attachments designed to perform different tasks, such as removing or replacing conductors and other different parts of high voltage systems. The Standards Board staff report stated that the length of the hot sticks to be used by workers depends on the voltage worked; the higher the voltage, the longer the hot stick. Workers can work while at ground potential or at a potential other than that of the energized part on which they are working because of the insulating properties of the hot sticks.

The Standards Board staff report also stated that workers using the live-line, barehand technique are placed at the same potential as the energized parts or conductors on which they are to work. Therefore, they may use their hands to accomplish the repairs directly, rather than relying on the hot sticks.

However, several safety orders do not allow live-line, barehand work. Sections 2940.2(a)(1) and (2) provide:

> (a) No employee shall be permitted to approach or take any conductive object without an approved insulating handle closer to exposed energized parts than shown on Table 2940.2 unless:

(1) The employee is insulated or guarded from the energized part (gloves or gloves with sleeves rated for the voltage involved shall be considered insulation of the employee from the energized part, for voltages of 7,500 or less), or

(2) The energized part is insulated or guarded from the employee and any other conductive object at a different potential.

Table 2940.2 provides in relevant part:

ALTERNATING CURRENT - MINIMUM DISTANCES

Nominal Voltage Range (Phase to Phase) Kilovolt	Minimum Working and Clear Live Line Tool Distances
Above 2 to 15	2 ft. 0 in.
Above 15 to 35	2 ft. 4 in.
Above 35 to 46	2 ft. 6 in.
Above 46 to 72	3 ft. 0 in.
Above 72 to 121	3 ft. 4 in.
Above 121 to 145	3 ft. 6 in.
Above 145 to 169	3 ft. 8 in.
Above 169 to 242	5 ft. 0 in.
Above 242 to 362	7 ft. 0 in.
Above 362 to 552	11 ft. 0 in.
Above 552 to 765	15 ft. 0 in.

* * *

Section 2940.6(h) provides:

(h) Conductive Objects. Conductive objects of a length capable of contacting energized conductors shall not be carried into the level of such conductors unless suitable means are taken to prevent accidental contact.

Section 2940.7(b)(5) provides:

> (b) Aerial Lifts.
>
> * * *
>
> (5) Clearances. Metal booms, metal baskets, or metal platforms of personnel aerial lift equipment operated in accordance with Section 2949 shall not be brought closer than the distances specified in Section 2940.2(b) Table 2940.2 to any exposed energized conductors or equipment.

Section 2941(g) provides:

> (g) Working on Conductors or Equipment Energized in Excess of 7,500 Volts.
>
> (1) All work on energized lines and equipment over 7,500 volts shall be done by means of suitable devices. Rubber gloves shall not be considered to be suitable devices.
>
> (2) All exposed energized high or low voltage conductors or equipment, communication conductors, grounded conductors, and grounded guy wires within reach of any part of the body shall be covered with suitable protective equipment or barricaded.
>
> EXCEPTION: Parts of the conductor or equipment on which work is to be performed, and the supporting pole or tower need not be covered.

Section 2944(f) provides:

> (f) Working on Conductors or Equipment Energized in Excess of 7,500 Volts. All work on conductors or equipment energized in excess of 7,500 volts shall be done by means of suitable devices. Rubber gloves shall not be considered to be suitable devices.

William Mazzotti testified that Applicant had first become interested in the live-line, barehand technique in 1984 when Applicant determined that it had a major problem with spacers on its lines. Applicant obtained a temporary variance from the Division and used contract helicopter live-line, barehand technique to replace the spacers. The project took about one year and resulted in 50,000 live-line contacts and the replacement of 22,000 spacers. Mr. Mazzotti testified that no injuries occurred during the project and that the use of the technique saved ratepayers approximately $33,000,000 in energy replacement costs.

He further testified that Applicant developed the live-line, barehand technique beginning in 1987, when Federal OSHA rules allowing the technique applied in California. Because safety is a primary concern, Applicant and I.B.E.W. Local Union 1245 jointly formed four committees: an overview committee, a rubber glove committee, a barehand committee, and an EMF [electro-magnetic field] committee. The committees were charged with developing training methods, to review and monitor EMF data, and to initiate the barehand work technique. Journey-level workers made up the committees. The committees visited utilities in other states in which the barehand technique is allowed, and spent over 2,000 hours at two of its own sites developing the technique, using de-energized and energized systems. The committees completed the development of the technique in July 1990, and held meetings throughout Applicant's workforce. Local 1245 recommended implementation of the technique.

Applicant's representative noted that the technique saves money by allowing work to be done on lines that are energized.

Richard M. Wagner, Live-Line Supervisor, testified that workers using the live-line, barehand technique are able to do work, such as spacer replacements and conductor repairs, that was not practical using present methods. In present methods, workers can be located up to twenty or twenty-five feet away from the area in which the work is to occur. The workers use hot sticks, to reach and remove or replace various pieces of equipment. Workers using the barehand technique are less likely to be placed in awkward working positions and are able to see what they are doing because they are working at the work location, rather than using hot sticks.

Mr. Wagner testified that workers using the barehand technique dress in conductive suits containing twenty-five percent of stainless steel thread so that the electric field rolls around the suits and keeps the workers more comfortable. The suits include a jacket with a hood, pants, socks, and boots. The workers also wear gloves of material similar to the conductive suits when they handle the equipment. Because the workers are positioned where they must do the work, and because they are using their hands rather than the hot sticks, they have greater control using the barehand technique and take less time to do a job. Some jobs that would take a day to complete using present methods can take about one hour using the barehand technique. Other jobs may save one-half hour or an hour.

Mr. Wagner also testified that the joint barehand committee visited other utilities to aid Applicant's development of work procedures and safety rules. The committee agreed to the following work and safety procedures: a barehand training manual; a barehand training program; a barehand training facility at

Los Banos; equipment to be used for barehand work; and the tools to be used for barehand work.

He stated that the training program must be successfully completed before a worker can do live-line, barehand work. Qualified journeymen must successfully complete a three-week initial training course and a one-week refresher course each year thereafter. Ground personnel, including the equipment operator, the groundman, and an apprentice lineman, do not do barehand work, but must successfully complete a one-week initial training course and a two-day refresher course each year thereafter. Supervisors must have a journeyman background and must successfully complete the three-week initial training course, as well as a one-week refresher course each year thereafter.

The barehand technique is proposed for work on 230,000-(230kV) and 500,000-volt (500kV) lines. Thus the equipment used in the barehand work was considered by the joint committee. Mr. Wagner testified that two methods will be used to position the workers: a 150-foot Condor aerial lift and ladders. The Condor aerial lift is certified as a 500kV unit, which is the highest voltage on which the barehand technique will be applied. It is tested initially at 2 1/2 times its phase-to-ground rating of 288kV, i.e., 720,000 volts, then must be retested every three years at 430,000 volts. The aerial lift is insulated and must pass a daily inspection and testing by being brought into contact with the energized system and being monitored for three minutes to determine whether any current leakage results. Any leakage must be under pre-set limits. A back-up meter is available on every lift to ensure that there will be no erroneous readings. Moreover, the meters will operate while the lift is being used during the barehand work and will sound an audible alarm to alert workers if leakage exceeds pre-set limits.

Mr. Wagner testified that workers must be brought up to the same potential as the energized system for them to be able to use the barehand technique. The aerial lift platform is positioned within about three feet of the conductor, and an insulated tool is used to clamp a bonding jumper from a portion of the platform to the conductor. The worker is also connected to the platform through a tail on the conductive suit he or she is wearing, as well as through his or her boots.

Mr. Wagner also testified that the journeyman-linemen at the work site decide whether to use the barehand technique to accomplish the work. The supervisor is not involved in the decision, except that the supervisor may act to de-energize the system or prohibit barehand work if required by safety considerations. In addition, journeymen are not penalized if they do not want to barehand.

Dennis Reisinger testified that he is a registered electrical engineer in California. He testified that Applicant has monitored and supported research on the health effects of electrical and magnetic fields, and testified that, as research progresses, scientists have become less concerned with the effects of electric fields and more concerned with the effects of magnetic fields. Research is unclear whether established biological responses to magnetic fields translate into health effects for humans. Research is also unclear whether the biological responses are to high or low levels of magnetic fields or some "window" of levels of magnetic fields, to changes in fields, to harmonics, or to some other unidentified field characteristic.

Mr. Reisinger noted that about thirty scientific studies have been completed addressing the cancer incidence or mortality of workers in occupations with high potential for exposure to electric and magnetic fields. The studies indicate elevated risk levels for certain types of cancers. However, Mr. Reisinger stated that the methodologies used in the studies are questionable. He described two studies indicating health effects on workers with potential to exposure to magnetic fields, but noted that the National Institute of Occupational Safety and Health has called for improved exposure assessment, large studies, and closer coordination with researchers doing animal and cellular studies. He also noted that a report issued in September 1989 by the Public Utilities Commission, in cooperation with the Department of Health Services, on the health effects of electric power facilities stated that it was not known which components, if any, of electric power utility operations pose significant health hazards.

Mr. Reisinger also testified that it was not known whether it is short-term or long-term exposure to certain magnetic field levels that pose a risk, if any, to human health.

He also stated that magnetic fields are created by the current flowing through a line or conductor. The strength of the magnetic field depends on the current and the distance from the current, not on the voltage. Thus, the strength of the magnetic field at 200 amperes, measured at the same distance from the current, will be the same at 120 volts, 4,000 volts, 21,000 volts, 230,000 volts, and 500,000 volts. The strength of the magnetic field declines the further from the current the measurement is taken, at the rate of $1/d^2$, where "d" is the distance from the current.

Jack McNally testified on behalf of the affected workers. He stated that Local 1245 was the collective bargaining representative for PG&E linemen and that they supported the application for permanent variance. The union had participated

and reached agreement with Applicant on procedures and work practices.

Mr. McNally indicated that the union had agreed with Applicant to establish four committees to be responsible for different aspects of the procedures involving the barehand technique and rubber gloving. The overview committee consists of three members from management and three from labor, and is to be a permanent committee. The rubber glove committee consists of eight members each from management and labor and developed the work practices and other aspects of rubber gloving. The barehand committee consists of five members each from management and labor and developed the work practices and other aspects of the barehand technique to be used by Applicant. Finally, the EMF committee consists of three members from each side and addresses EMF issues.

Mr. McNally further testified that under the agreement between the union and Applicant, journeyman linemen, who do the work, helped develop the programs. Participation in the barehand work practice, as well as rubber gloving, is voluntary. Linemen are not required to do either. Linemen who volunteer to participate must pass the training program. The barehand technique and rubber gloving are optional methods that are additional tools to accomplish the work; use of hot sticks will continue. Linemen on the scene will decide which method will be appropriate to accomplish the work. Mr. McNally also testified that both the barehand technique and the rubber gloving practice may be terminated for cause by either Applicant or the union.

The Division evaluated application OSHSB No. 90-V-102 and recommended granting the variance subject to the following conditions:

1. The applicable sections of 8 CCR that are not a part of this variance shall be enforced.

2. All work procedures shall be in accordance with the "Proposed Practices" as stated beginning on page 5 of the Application for Permanent Variance No. 90-V-102 submitted by John C. Vocke, dated March 15, 1991. These work practices are incorporated herein by reference.

3. This variance will only be applicable to PG&E employees and will not include contractors or their employers.

4. The PG&E Transmission Live Line Barehand Work Procedure Manual with each page dated shall be enforced.

5. Monitoring of the electromagnetic field radiation exposure of employees shall be performed by the petitioner in accordance with methodologies designated by the California Department of Health Services. A copy of the monitoring results shall be provided to the Division on an annual basis.

The Standards Board staff also evaluated application OSHSB No. 91-V-102 and recommended granting the variance subject to the following conditions:

1. The Applicant shall resubmit at the variance hearing copies of all training manuals, safety programs, accident prevention rules and any other documents or papers the Applicant intends on using to implement its live-line barehand work techniques. Each page of the resubmitted material containing written words or illustrations shall be imprinted with the effective date or current date of the document.

2. The Applicant shall comply with all of the safe work practices as set forth in the training manuals, safety programs, accident prevention rules and other documents it has provided the Board and the Division with respect to this permanent variance application regarding live-line barehand work.

3. The Applicant shall provide both the Division and Board with copies of all relevant information it obtains in the future concerning the health effects of EMF.

4. The Applicant shall not make any revisions or additions, except for editorial changes, concerning live-line, barehand work techniques to its training manuals, safety programs, accident prevention rules, or other documents or papers without prior written approval from the Division.

5. This variance shall remain in effect until such time as regulations are promulgated by the Board that permit live-line barehand work techniques, at which time the Applicant shall comply fully with the new or revised regulations.

The Board staff representative testified that Applicant's proposal, combined with the recommended conditions, would provide equivalent safety.

Daniel D. Mayo testified as an intervenor. He testified that he is a lineman with PG&E, is a member of the EMF committee, and was a member of the joint bargaining committee which formed the rubber gloving and barehand tentative agreement. He stated that the EMF issue is not being adequately addressed.

Mr. Mayo testified that he had obtained information on thirty-two occupational epidemiology studies addressing the effects of EMF. Twenty-seven of the studies showed increased risks of cancer. He acknowledged that any of these studies could be attacked individually because of methodology flaws, but asserted that the studies, taken together, demonstrate a rough consistency that cannot be ignored. Mr. Mayo testified that laboratory research has shown that EMF's cause biological effects, and that scientists have offered the hypothesis that EMF's are a biological stressor, or a suppressor of the body's immune system, or that EMF's cause cancer in some other way. He acknowledged that scientists disagree about the degree of risk and about the significance of EMF's. However, he asserted that it is agreed that more research is needed.

Therefore, he argued for "prudent avoidance" as the best regulatory policy. He stated that the best way to avoid exposure to EMF's is to maintain distance from the source of EMF's since EMF's fall off rapidly with distance. Mr. Mayo testified that the EMF Committee had taken magnetic field measurements for various work locations, and that these measurements verified that magnetic field strength is greatly reduced by distance. In one case, movement of one foot away from a conductor resulted in a seventy-five-percent drop in the magnetic field strength. The use of hot sticks provides a means of prudent avoidance since workers are farther from the conductors, thereby reducing the range of exposure values and weakening the changes in magnetic fields. The live-line, barehand technique exposes workers to sharply higher magnetic fields.

Finally, Mr. Mayo testified that other PG&E linemen were concerned about the health effects of EMF, and submitted signed petitions to that effect. He urged the Hearing Panel to wait for the final results of the Public Utility Commission's Order Instituting Investigation into EMF's, for a bill introduced by the legislature, and for the Federal Environmental Protection Agency to release its final report on EMF's.

Edward L. Baker testified that he represents I.B.E.W. Local 18 and is a lineman for Los Angeles Water and Power with twenty-three years of experience. He opposed the application for permanent variance. He specifically concentrated on the EMF and presented a study indicating a correlation between EMF and childhood cancer. He noted that legislation had been adopted in 1988 which required the Department of Health Services and the Public Utilities Commission (PUC) to research EMF, and noted that

pending legislation would require the PUC to develop rules implementing a policy of prudent avoidance. Mr. Baker stated that prudent avoidance with respect to the application for permanent variance would require maintaining workers' distance from magnetic fields.

Rae Sanborn, testified that he represents I.B.E.W. Local 47 and that Local 47 opposes both variance applications. He noted that no study establishes that exposure to EMF's arising from the barehand technique is as safe or safer than current methods using hot sticks. Moreover, the use of hot sticks would keep workers six feet further away from the magnetic fields than either the live-line barehand technique or rubber gloving. He also questioned the assumptions on which Applicant based its testimony about EMF.

Mr. Sanborn testified that Applicant's experience with live-line work and rubber gloving was based on optimal conditions, and it was his opinion that these optimal conditions would not exist in the field. Productivity constraints would lead foremen to require the live-line barehand technique and rubber gloving, rather than to recognize that those methods were optional with the workers. In addition, he testified from his experience that injuries from live-line work are more severe than when using hot sticks.

David Moore testified that he represents I.B.E.W. Local 465, in San Diego, and that the Local opposed the variance applications. He asserted that working in conductors with the live-line barehand technique or rubber gloving is more hazardous than using hot sticks. He noted that current practices have improved and have been modernized.

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OSHSB No. 90-V-103

8 Cal. Code of Regs. Sections 2940.2(a)(1) and (2), 2941(g)(1), 2944(e) and (e)(1), and 2944(f)

Summary of Evidence

Applicant is seeking a variance to allow its workers to use rubber gloves when working on voltages above 7,500 volts, up to and including 21,000 volts.

The Standards Board evaluation report indicates that there are several methods for working on electrical conductors. The line may be taken out of service and de-energized, then workers may work on the conductors. However, de-energizing a line is not always feasible. Working on energized lines is accomplished by

workers using hot sticks, or using rubber gloves to handle the equipment directly. The description of hot sticks in the Summary of Evidence for OSHSB No. 90-V-102 is incorporated by this reference.

However, several safety orders limit the use of rubber gloving. Sections 2940.2(a)(1) and (2) provide:

> (a) No employee shall be permitted to approach or take any conductive object without an approved insulating handle closer to exposed energized parts than shown on Table 2940.2 unless:
>
> (1) The employee is insulated or guarded from the energized part (gloves or gloves with sleeves rated for the voltage involved shall be considered insulation of the employee from the energized part, for voltages of 7,500 or less), or
>
> (2) The energized part is insulated or guarded from the employee and any other conductive object at a different potential.

Section 2944(e)(1) provides:

> (e)(1) Working on Conductors or Equipment Energized at 7,500 Volts or Less. When working on conductors or equipment energized at 7,500 volts or less, all energized conductors or equipment and all grounded conductors or equipment, including guy wires, within reach of any part of the body, shall be isolated, barricaded, or covered with suitable protective equipment.
>
> EXCEPTION: the part of the conductor or equipment on which work is to be performed need not be covered.

Section 2944(f) provides:

> (f) Working on Conductors or Equipment Energized in Excess of 7,500 Volts. All work on conductors or equipment energized in excess of 7,500 volts shall be done by means of suitable devices. Rubber gloves shall not be considered to be suitable devices.

William Mazotti's testimony, summarized above, applied to OSHSB Nos. 90-V-102 and 103. Therefore, the summary of his testimony is incorporated by this reference.

Ron G. Smith testified that rubber gloving is not intended to replace the use of hot sticks and other live-line tools, but

rather, it is intended to provide a safe additional means of accomplishing work.

He stated that the joint rubber glove committee developed the practices and procedures to implement rubber gloving. These procedures include appropriate safety rules and work procedures, the use of appropriate equipment, and training programs, as well as prohibitions against using rubber gloving during inclement weather. Workers using rubber gloving are insulated by using approved linemen rubber gloves and other rubber protective equipment. The workers are also isolated from a second point of contact with energized parts by using an aerial lift device with bucket liners or an insulated work platform, which serves as an additional layer of insulation. The workers may also use portable insulated work platforms that can be mounted on the pole.

Mr. Smith also testified that the rubber glove method is voluntary in two ways. Linemen may volunteer to do the work and must complete training and be certified for rubber gloving work. In addition, the ultimate decision on when to use rubber gloving in the field is a decision made by the crew doing the work, based on conditions at the job site.

Dennis Reisinger's testimony, summarized above, applied to OSHSB Nos. 90-V-102 and 103. Therefore, the summary of his testimony is incorporated by this reference. In addition, Mr. Reisinger testified that workers are currently allowed to use rubber gloving on 4000-volt circuits. Since the strength of the magnetic field is a function of the current, not voltage, the magnetic fields to which workers will be exposed when they use rubber gloving on 7,500-volt and 21,000-volt circuits will be the same as the 4,000-volt circuits.

Jack McNally's testimony, summarized above, applied to OSHSB Nos. 90-V-102 and 103. Therefore, the summary of his testimony is incorporated by this reference. Mr. McNally also testified that Local 1245 agreed with Applicant that workers who engage in rubber gloving will receive an additional six percent increase in salary in recognition of the additional skill required. No salary increase is awarded for barehand work.

The Division evaluated application OSHSB No. 90-V-103 and recommended granting the variance subject to the following conditions:

1. The applicable sections of 8 CCR that are not part of this variance shall be enforced.

2. All work procedures shall be in accordance with the "Proposed Practices" as stated beginning on page 5 of Application for Permanent Variance No.

90-V-103 submitted by John C. Vocke, dated March 15, 1991. These work practices are incorporated herein by reference.

3. This variance will only be applicable to PG&E employees and does not include contractors or their employees.

4. The PG&E Rubber Glove Manual, dated March 1, 1991, shall be enforced.

5. Monitoring of the electromagnetic field radiation exposure of employees shall be performed by the petitioner in accordance with methodologies designated by the California Department of Health Services. A copy of the monitoring results shall be provided to the Division on an annual basis.

The Standards Board staff also evaluated application OSHSB No. 90-V-103 and recommended granting the variance subject to the following conditions:

1. The Applicant shall resubmit at the variance hearing copies of all training manuals, safety programs, accident prevention rules and any other documents or papers the Applicant intends on using to implement its rubber gloving work procedures on voltages 7,500 volts, up to and including 21,000 volts. Each page of the resubmitted material containing written words or illustrations shall be imprinted with the effective date or current date of the document.

2. The Applicant shall comply with all of the safe work practices as set forth in the training manuals, safety programs, accident prevention rules and other documents it has provided the Board and the Division with respect to this permanent variance application regarding rubber gloving work.

3. The Applicant shall provide both the Division and Board with copies of all relevant information it obtains in the future concerning the health effects of EMF.

4. The Applicant shall not make any revisions or additions, except for editorial changes, concerning rubber gloving work procedures to its training manuals, safety programs, accident prevention rules, or other documents or papers without prior written approval from the Division.

5. This variance shall remain in effect until such time as regulations are promulgated by the Board that permit rubber gloving work procedures on voltages 7,500 volts, up to and including 21,000 volts, at which time the Applicant shall comply fully with the new or revised regulations.

The Board staff representative testified that Applicant's proposal, combined with the recommended conditions, would provide equivalent safety.

Daniel D. Mayo's testimony, summarized above, applied to OSHSB Nos. 90-V-102 and 103. Therefore, the summary of his testimony is incorporated by this reference. In addition, with respect to rubber gloving, Mr. Mayo indicated that the use of hot sticks would, in most cases, result in a exposure to lower magnetic fields than working using rubber gloves.

Edward L. Baker's testimony, summarized above, addressed the EMF issue with respect to OSHSB Nos. 90-V-102 and 103. Therefore, the summary of his testimony is incorporated by this reference. In addition, Mr. Baker noted that even though Applicant had shown that some jobs take significantly less time to accomplish with rubber gloving than with hot sticks, the workers would still work their full work days, and thereby do more jobs in a day. Thus, there would be no reduction in exposure.

Rae Sanborn's testimony, summarized above, addressed both OSHSB Nos. 90-V-102 and 103. Therefore, the summary of his testimony is incorporated by this reference. In addition, Mr. Sanborn testified that rubber gloving increases workers' exposure to EMF, because workers will still be working a full day. Thus, if jobs take a shorter time using rubber gloving, more jobs will be done in a day.

David Moore's testimony, summarized above, also addressed both OSHSB Nos. 90-V-102 and 103. Therefore, the summary of his testimony is incorporated by this reference. Mr. Moore also asserted that no evidence indicated that rubber gloving is safer than work using hot sticks.

--ooOoo--

OSHSB No. 90-V-102

Findings and Reasons for Decision

Applicant has complied with all statutory and regulatory requirements precedent to the granting of a request for a permanent variance.

The facts in the testimony of the following witnesses summarized in the Summary of Evidence are found to be facts in this Decision: William Mazotti, Ron G. Smith, Dennis Reisinger, and Jack McNally. The facts in the Standards Board staff's report, summarized in the Summary of Evidence are also found to be the facts in this Decision.

The Hearing Panel finds that the training and retraining requirements, the work procedures Applicant proposes to use in the live-line, barehand technique, the manual developed by the joint barehand committee, the discretion given the crew on when to use the live-line, barehand technique, as well as the prohibition on using the technique during inclement weather, all contribute to equivalent safety. It is the Hearing Panel's conclusion that Applicant's complete program for live-line, barehand work, together with the Division's recommended conditions 1 through 4, and the Standards Board staff recommended conditions 2 through 4, is the minimum necessary program, and that future applications for similar variances should, at a minimum, include the same procedures and training.

The main issue in this variance application, however, is whether equivalent safety was established with respect to EMF exposure. The Hearing Panel finds that the live-line, barehand technique places workers closer to magnetic fields on primary voltage installations than if they were using current hot-stick work practices. The magnitude of exposure to the magnetic fields is greater the closer to the fields the worker is positioned. However, nothing in the record establishes that being exposed to a stronger magnetic field is, in fact, more hazardous than exposure to a weaker magnetic field. The Hearing Panel specifically credits Dennis Reisinger's testimony that scientific evidence is not clear on the extent, if any, EMF causes health effects to humans. Scientific findings have also not clearly established which characteristic if any of EMF causes health effect to humans. It is possible that exposure to the lower magnetic fields may be more hazardous than exposure to the higher magnetic fields. It is possible that exposure to the harmonics generated with the magnetic fields, rather than the strength of the magnetic fields themselves, is the factor possibly causing health effects to humans.

Even were one to accept the intervenors' assertions that EMF does adversely affect humans, nothing presented by the intervenors establishes that, in fact, exposure to the stronger magnetic fields is the cause of the effects. Therefore, the

Hearing Panel finds that the concept of prudent avoidance cannot be realistically applied to electrical workers. Without knowing which characteristic or characteristics of EMF, if any, cause the adverse human health effects, the Hearing Panel cannot determine what should be avoided.

The Hearing Panel finds that Applicant has established equivalent safety with respect to EMF, with the following two conditions. Due to the lack of consensus in the scientific community with respect to EMF, the Hearing Panel finds it necessary for equivalent safety to include the condition that Applicant provide the Division and the Board with copies of all information it obtains in the future concerning the health effects of EMF. This condition was recommended by the Standards Board staff. The Hearing Panel will specifically require that Applicant provide the information on an on-going basis, as the information is obtained.

The Hearing Panel will also include the Division's recommended condition 5, requiring Applicant to monitor EMF exposure and to provide the monitoring results to the Division on an annual basis. The Hearing Panel will require Applicant to provide the results on an on-going basis. Both this condition and the condition requiring Applicant to provide any future information about the health effects of EMF will enable the Division and Standards Board to monitor the EMF issue so that the terms of this variance may be modified to maintain equivalent safety in light of the most current scientific evidence.

Based on the preceding discussion, the Hearing Panel finds that the record establishes that Applicant's proposal, combined with the conditions set forth below, will provide employment and a place of employment that are as safe and healthful as those provided by sections 2940.2(a)(1) and (2), 2940.6(h), 2940.7(b)(5), 2941(g), and 2944(f).

Decision and Order

The application by Pacific Gas and Electric Company for a permanent variance from Title 8, California Code of Regulations, sections 2940.2(a)(1) and (2), 2940.6(h), 2940.7(b)(5), 2941(g), and 2944(f), regarding implementing live-line, bare hand techniques on energized high-voltage systems owned, operated, and maintained by Pacific Gas and Electric throughout California, is GRANTED, subject to the following conditions:

1. The applicable sections of Title 8 California Code of Regulations that are not a part of this variance shall be enforced.

2. All work procedures shall be in accordance with the "Proposed Practices" as stated on pages 6

through 13 of the Amended Application for Permanent Variance, No. 90-V-102, submitted by John C. Vocke, dated 3/14/91. These work practices are incorporated herein by reference. A copy of the relevant pages of the Application are attached as Appendix 1.

3. This variance will only be applicable to PG&E employees and will not include contractors or their employers.

4. Applicant shall comply with the "Transmission Live Line Barehand Work Procedures" manual with each page dated May 22, 1991.

5. Applicant shall not make any revisions or additions, except for editorial changes, concerning live-line, barehand work techniques to its training manuals, safety programs, accident prevention rules, or other documents or papers without prior written approval from the Division.

6. Applicant shall monitor the electromagnetic field radiation exposure of employees using methodologies designated by the California Department of Health Services. Applicant shall provide a copy of the monitoring results to the Division on an on-going basis.

7. Applicant shall provide copies of all relevant information it obtains in the future concerning the health effects of EMF to both the Division and the Standards Board on an on-going basis.

8. This variance shall remain in effect until such time as regulations are promulgated by the Standards Board that permit live-line barehand work techniques, at which time the Applicant shall comply fully with the new or revised regulations.

9. Applicant shall notify employees or their authorized representative(s), or both, of this order in the same manner it notified them of the application for a permanent variance.

10. This Decision and Order shall remain in effect unless modified or revoked upon application by the Applicant, employee, the Division of Occupational Safety and Health, or by the Board on its own motion, in the manner prescribed for its issuance.

--ooOoo--

OSHSB No. 90-V-103

Findings and Reasons for Decision

Applicant has complied with all statutory and regulatory requirements precedent to the granting of a request for a permanent variance.

The facts in the testimony of the following witnesses summarized in the Summary of Evidence are found to be facts in this Decision: William Mazotti, Richard M. Wagner, Dennis Reisinger, and Jack McNally. The facts in the Standards Board staff's report, summarized in the Summary of Evidence are also found to be the facts in this Decision.

The Hearing Panel finds that the training and retraining requirement, the work procedures Applicant proposes to use for rubber gloving, the manual developed by the joint rubber glove committee, the discretion given the crew on when to use rubber gloving, as well as the prohibition on using the practice during inclement weather, all contribute to equivalent safety. It is the Hearing Panel's conclusion that Applicant's complete program for rubber gloving work, together with the Division's recommended conditions 1 through 4 and the Standards Board staff recommended conditions 2 through 4, is the minimum necessary program, and that future applications for similar variances should, at a minimum, include the same procedures and training.

The main issue in this variance application, however, is whether equivalent safety was established with respect to EMF exposure. The Hearing Panel finds that workers doing the rubber gloving work are in contact with the conductors or lines through which current is running. As it did in the Findings and Reasons for OSHSB No. 90-V-102, the Hearing Panel specifically credits Dennis Reisinger's testimony that scientific evidence is not clear on the extent, if any, EMF causes health effects to humans. Scientific findings have also not clearly established which characteristic of EMF causes health effect to humans. It is possible that exposure to the lower magnetic fields may be more hazardous than exposure to the higher magnetic fields. It is possible that exposure to the harmonics generated with the magnetic fields, rather than the strength of the magnetic fields themselves, is the factor possibly causing health effects to humans.

Rubber gloving is currently allowed and is currently being used on the Applicant's 4000-volt installations. Mr. Reisinger's testimony established that the current, not the amount of voltage, determines the strength of the magnetic field, assuming a constant distance from the magnetic field. Thus, rubber

gloving on 7,500-volt and 21,000-volt installations will not expose workers to stronger magnetic fields because the current will be the same for all three voltages. The Hearing Panel finds that Applicant has established equivalent safety with respect to the EMF issue, with the two conditions set forth below.

Due to the lack of consensus in the scientific community with respect to EMF, the Hearing Panel finds it is necessary for equivalent safety to include the condition that Applicant provide the Division and the Board with copies of all information it obtains in the future concerning the health effects of EMF. This condition was recommended by the Standards Board staff. The Hearing Panel will specifically require that Applicant provide the information on an on-going basis, as the information is obtained.

The Hearing Panel will also include the Division's recommended condition 5, requiring Applicant to monitor EMF exposure and to provide the monitoring results to the Division on an annual basis. The Hearing Panel will require Applicant to provide the results on an on-going basis. Both this condition and the condition requiring Applicant to provide any future information about the health effects of EMF will enable the Division and Standards Board to monitor the EMF issue so that the terms of this variance may be modified to maintain equivalent safety in light of the most current scientific evidence.

The record establishes that Applicant's proposal, combined with the conditions set forth below, will provide employment and a place of employment that are as safe and healthful as those provided by sections 2940.2(a)(1) and (2), 2941(g)(1), 2944(e) and (e)(1), and 2944(f).

Decision and Order

The application by Pacific Gas and Electric Company for a permanent variance from Title 8, California Code of Regulations, sections 2940.2(a)(1) and (2), 2941(g)(1), 2944(e) and (e)(1), and 2944(f), regarding implementing rubber gloving in excess of 7,500 volts, up to and including 21,000 volts, on Pacific Gas and Electric company's energized, high-voltage systems located throughout California, is GRANTED, subject to the following conditions:

1. The applicable sections of Title 8, California Code of Regulations that are not part of this variance shall be enforced.

2. All work procedures shall be in accordance with the "Proposed Practices" as stated on pages 5 through 10 of Amended Application for Permanent Variance, No. 90-V-103, submitted by John C.

Vocke, dated 3/14/91. These work practices are incorporated herein by reference. A copy of the relevant pages of the application are attached as Appendix 2.

3. Applicant shall not make any revisions or additions, except for editorial changes, concerning rubber gloving work procedures to its training manuals, safety programs, accident prevention rules, or other documents or papers without prior written approval from the Division.

4. This variance will only be applicable to PG&E employees and does not include contractors or their employees.

5. Applicant shall comply with the Rubber Glove Manual with each page dated March 1, 1991.

6. Applicant shall monitor the electromagnetic field radiation exposure of employees using methodologies designated by the California Department of Health Services. A copy of the monitoring results shall be provided to the Division on an on-going basis.

7. Applicant shall provide copies of all relevant information it obtains in the future concerning the health effects of EMF to both the Division and the Standards Board on an on-going basis.

8. This variance shall remain in effect until such time as regulations are promulgated by the Standards Board that permit rubber gloving work procedures on voltages 7,500 volts, up to and including 21,000 volts, at which time the Applicant shall comply fully with the new or revised regulations.

9. Applicant shall notify employees or their authorized representative(s), or both, of this order in the same manner it notified them of the application for a permanent variance.

10. This Decision and Order shall remain in effect unless modified or revoked upon application by the Applicant, employee, the Division of Occupational Safety and Health, or by the Board on its own motion, in the manner prescribed for its issuance.

I hereby certify that the above Proposed Decision is the decision

of the Hearing Panel, and the Hearing Panel recommends its adoption by the Occupational Safety and Health Standards Board as the Board's decision in the proceeding.

DATED: July 17, 1991

KEITH TOHRU YAMANAKA
Hearing Officer

APPENDIX 1

It is expressly noted that the current High Voltage Electrical Safety Orders will remain in effect for persons at work on the systems owned, operated or maintained by PG&E who are not certified or have not chosen to work under the terms of this variance.

III.

PROPOSED PRACTICES

2940.2. Clearances.

(a)(2) The energized part is insulated or guarded from the employee and any other conductive object at a different potential, or

(3) Approved live line bare hand techniques are used.

2940.6. Tools and Protective Equipment.

(h) Conductive Objects. Conductive objects of a length capable of contacting energized conductors shall not be carried into the level of such conductors unless means are taken to prevent accidental contact, except as permitted under this variance.

2940.7. Mechanical Equipment.

(b) Aerial Lifts

(4)(A) Employees in aerial lift equipment shall be belted to the lift equipment when in an elevated position. Climbing on the edge of a basket or work platform railing for added height shall be prohibited. Except in an emergency involving immediate hazard to life, no employee shall be permitted to climb in or out of basket or work platform with railings, unless: it is in the cradle position; or at ground level; or in use for bare hand live line work under the terms of this variance when transferring between such equipment and a conductor, pole,

structure, or equipment; or is equipped with a self-closing gate so designed and constructed that it will not open outwardly or inadvertently.

(5) Clearances. Metal booms, metal baskets, or metal platforms of personnel aerial lift equipment operated in accordance with Section 2949 shall not be brought closer than the distances specified in section 2940.2(b) Table 2940.2 to any exposed energized conductors or equipment except as permitted in this variance.

2941. Work On or In Proximity to Overhead High Voltage Lines.

ADD:

(g)(3) Pursuant to this variance, work on lines and equipment energized at 230 KV and above may be performed in accordance with the Live Line Bare Hand Techniques contained in Appendix C.

2944. Work On or In Proximity to Conductors and Equipment Located in High-Voltage Stations, or Switchyards.

(f) Working on Conductors or Equipment in Excess of 7,500 volts. All work on conductors or equipment energized in excess of 7,500 volts shall be done by means of suitable devices or when working as permitted in this variance using bare hand live line techniques on transmission voltages, where proper phase-to-ground or phase-to-phase clearances can be maintained. Rubber gloves shall not be considered to be suitable devices.

requests the Occupational Safety and Health Standards Board (hereinafter Board) grant a permanent variance from the requirements of Title 8, California Code of Regulations, Sections 2940.2(a)(1) and (2); 2940.6(a)(4), (5), (6) and (7); 2940.6(c); 2941(f), (f)(1), (g), (g)(1) and (g)(2); 2944(e), (e)(1), (f); and from APPENDIX C of the High Voltage Electrical Safety Orders. PG&E is petitioning to make the following additional and alternative provisions applicable on all PG&E owned, operated, or maintained distribution lines up to and including 21 KV. It is expressly noted that the current High Voltage Electrical Safety Orders will remain in effect for persons at work on the PG&E system who are not certified or have not chosen to work under the terms of this variance. Proposed deletions are in ~~overstrike~~ and proposed additions are in underline type.

III.

PROPOSED PRACTICES

2940.2. Clearances.

ADD:

(c) When performing work on voltages above 7,500 volts, up to and includin 21,000 volts, no employee shall be permitted to approach or touch any conductive object unless:

(1) The employee is insulated or guarded from the energized part(gloves or gloves with sleeves rated for the voltage involved shall be considered insulation of the employee from the energized part for voltages above 7,500 volts, up to and including 21,000 volts), or

(2) The energized part is insulated or guarded from the employee and any

other conductive object at a different potential;

(3) The employee is using an approved insulated aerial device with insulating bucket liners or an approved insulating work platform.

2940.6. Tools and Protective Equipment.

(a) Rubber Insulating Equipment

(4) The employer is responsible for the periodic visual and electrical re-testing of all insulating gloves, sleeves and blankets. The following maximum re-testing intervals shall apply: be in accordance with the American Society for Testing and Materials (ASTM) Standards, which are hereby incorporated by reference, as follows:

GLOVES, SLEEVES AND BLANKETS

	Natural Rubber Months	Synthetic Material Months
New	12	18
Re-issued	12	15

ITEM	STANDARD	PERIOD
In Service Care of Gloves & Sleeves	F 496-85	6 months
In Service Care of Insulating Blankets	F 479-88a	12 months

Rubber gloves shall be air and water tested at least each day prior to use.

The "air/water" test is accomplished by:

A. Visually examining entire inner and outer surface for any defects (i.e.) burns, cuts, cracks, punctures and weak spots.

B. Stretching the cuff slightly, abrasions and weak spots should become

more evident.

C. Filling the rubber glove with clean water up to the wrist level, keeping the outer surface dry. Rolling cuff of glove to trap air and water. Holding tightly in this matter to prevent air or water from escaping.

D. Observing or feeling the surface of the glove, punctures may be detected by escaping air or beads of water.

(5) Gloves, sleeves and blankets shall be marked to indicate compliance with the re-test schedule and shall be marked with either the date tested, or the date the next test is due.

(6) When not being used, insulating gloves and sleeves shall be stored in glove bags or suitable containers. Insulating blankets shall be stored in a canister or by other means that offer equivalent protection.

(7) Insulating equipment shall be stored away from direct sunlight, steam pipes, radiators and other sources of excessive heat. Gloves, sleeve and blankets shall not be folded while in storage; however, blankets shall be permitted to be rolled for storage and sleeves may be loosel rolled lengthwise inside a sleeve rollup container.

(h) Conductive Objects. Conductive Objects of a length capable of contacting energized conductors shall not be carried into the level o such conductors unless means are taken to prevent accidental contact, except as permitted under this variance.

2940.7. Mechanical Equipment.

ADD:

(b)(4)(C) Aerial lifts/digger derricks used for working on energized voltages above 7,500 volts, up to and including 21,000 volts, shall have both upper and lower controls. A minimum distance that must be extended shall be marked on the insulated portion of the boom on digger derrick vehicles to meet the dielectric capabilities required for the voltages involved. Buckets of aerial lifts/digger derricks shall have insulating bucket liners with a liner pan installed when performing work on voltages above 7,500 volts, up to and including 21,000 volts.

(b)(4)(D) Insulated booms of aerial lifts/digger derricks used for work on energized voltages above 7,500 volts, up to and including 21,000 volts, shall have a periodic dielectric test performed every 12 months in accordance with paragraph 5.4.3.2 of American National Standard Institute (hereinafter ANSI) Standard A92.2 (1990).

(b)(4)(E) Insulated bucket liners used for work on energized voltages above 7,500 volts, up to and including 21,000 volts, shall have a periodic dielectric test performed every 12 months in accordance with paragraph 5.4.3.5 of ANSI (1990).

2941 Work on or In Proximity to Overhead High Voltage Lines

ADD:

(g)(3) Employees shall not be permitted to touch or work on exposed conductors or equipment energized at above 7,500 volts, up to and including 21,000 volts, except when wearing suitable insulating gloves with protectors, and working from an approved aerial lift/digger derrick vehicles wi

an approved insulating bucket liner with a liner pan, or approved insulating work platform. All exposed energized high or low voltage conductors o equipment, communications conductors, grounded conductors, grounded guy wires and metallically grounded equipment, within reach of any part of the body, shall be covered with suitable protective equipment.

2944 Work On or In Proximity to Conductors and Equipment Located in High-Voltage Stations, or Switchyards.

(e)(1) Working on energized conductors or Equipment energized at 7,500 volts or less. When Working on energized conductors or equipment energized at 7,500 volts or less, all energized conductors or equipment, including guy wires, within reach of any part of the body, shall be isolated, barricaded, or covered with suitable protective equipment.

EXCEPTION: That part of the conductor or equipment on which the work is to be performed need not be covered.

(2) Employees shall not be permitted to touch or work on any exposed energized conductor or equipment except when wearing suitable rubber gloves with protectors, or when using other suitable devices.

(f) Working on Conductors or Equipment energized in Excess of 7,500 V

All work on conductors or equipment energized in excess of 7,500 volts shall be done by means of suitable devices. Rubber gloves shall not be considered to be suitable devices.

EXCEPTION: When working under the terms of this variance on conductors or equipment energized above 7,500 volts, up to and including

21,000 volts, the requirements of paragraph (e)(1) above including the exception shall apply.

APPENDIX C

Protective Equipment

Rubber insulating equipment shall meet the provisions of the American-National-Standards-Institute-ANSI/ASTM-series American Society for Testing and Materials (ASTM) Standards, which are hereby incorporated by reference, as follows:

ITEM	STANDARD
Rubber Insulating Gloves	D-120-84a 87
Rubber Insulating Matting	D-178-81 88
Rubber Insulating Blankets	D-1048-81 88
Rubber Insulating Hoods	D-1049-80 87
Rubber Insulating Line Hose	D-1050-80 87
Rubber Insulating Sleeves	S-1051-81 87

IV.

VARIANCE NOT SUBJECT OF AN APPEAL

No appeal has been filed or is pending before the California Occupational Safety and Health Appeals Board on any issue related to this proposed variance.

V.

HEARING TIME AND WITNESS ESTIMATE

At present PG&E anticipates having eight (8) witnesses testify, and that the hearing will last at least one full day.

APPENDIX C

LIVE LINE BARE HAND WORK. In addition to other applicable orders contained in Article 36, all live line bare hand work shall be performed in accordance with the following requirements:

(1) Employees shall be instructed and trained in the live line bare hand technique and the safety requirements pertinent thereto before being permitted to use the technique on energized circuits.

(A) All work shall be under the supervision of a person trained and qualified to perform bare hand work.

(2) Before using the live line bare hand technique on energized high voltage conductors or parts, a check shall be made of the following:

(A) The nominal voltage rating of the circuit on which the work is to be performed.

(B) The clearance to ground of lines and other energized parts on which the work is to be performed.

(C) The voltage limitations of the equipment intended to be used.

(3) Only equipment and tools designed, approved, tested and intended for live line bare hand work shall be used. This requirement shall not apply to traditional hand tools used in performing line work, such as socket wrenches, adjustable wrenches, screwdrivers and hammers.

(4) The automatic reclosing feature of circuit interrupting devices shall be made inoperative when working on any energized lines or equipment.

(5) No bare hand live line work will be performed during inclement weather. Bare hand live line work shall not be performed during the progress of an electrical storm in the immediate area. At no time shall bare hand live line work methods be used when minimum clearances specified in paragraph 12 of this Appendix C cannot be maintained.

(6) The employee shall be protected by the following:

(A) Before the employee contacts the energized parts to be worked on, the conductive platform or other conductive device shall be bonded to the energized part by means of a positive connection which will remain attached to the energized part until work on the energized circuit is completed.

(B) The employee shall be connected to the platform or other conductive device by use of conductive shoes, leg clips, or other suitable means.

(C) Suitable conductive clothing for the voltage being worked shall be provided.

(7) Tools and equipment used for live line bare hand work shall be kept clean and dry.

(8) The following requirements apply to vehicular mounted lifting equipment:

(A) Before moving the aerial lift into the work position, all controls (ground level and bucket) shall be checked to determine that they are in proper working condition.

(B) Before boom is elevated, the body of the truck shall be grounded or shall be barricaded and treated as energized.

(C) Aerial lifts to be used for live line bare hand work shall have dual controls (lower and upper). The upper controls shall be within easy reach of the employee in the basket. On a two basket type lift, access to the controls shall be within easy reach from either basket. The lower set of controls shall be located near the base of the boom and shall permit override operations of the equipment at any time.

(9) Ground level boom controls shall not be operated unless permission has been obtained from the employee in the bucket, except in case of emergency.

(10) Aerial lift trucks used for bare hand live line work shall be designed and built for use in bare hand live line work. Such aerial lift trucks shall be dielectricly tested at least every three years to ensure they maintain their insulative properties.

(11) Boom current tests shall be made before starting live line bare hand work each day, each time during the day when a higher voltage is going to be worked and when changed conditions indicate a need for additional tests. This test shall consist of placing the bucket in contact with an energized source equal to the voltage to be worked upon for a minimum of three (3) minutes. The leakage current

shall not exceed one (1) microampere per kilovolt of nominal phase-to-phase voltage. Work operations shall be suspended immediately upon any indication of a malfunction in the equipment.

(12) The minimum clearance distance for live line bare hand, as specified in the minimum clearance table below shall be maintained from all grounded objects and from lines and equipment at a different potential than that to which the live line bare hand equipment is bonded unless such grounded objects or other lines or equipment are covered by insulating guards.

MINIMUM CLEARANCE DISTANCES FOR LIVE LINE BARE HAND WORK (ALTERNATING CURRENT)

Nominal voltage range phase-to-phase Kilovolts	Phase-to-ground	Phase-to-phase
Above 169 to 242	5 ft. 0 in.	8 ft. 8 in.
Above 242 to 362	7 ft. 0 in.	13 ft. 4 in.
Above 362 to 552	11 ft. 0 in.	20 ft. 0 in.
Above 552 to 765	15 ft. 0 in.	31 ft. 0 in.

NOTE: Above 242 KV the minimum clearance distances shall be permitted to be reduced provided that such distances are not less than the shortest distances between the energized part and a grounded surface.

(13) When approaching, leaving or bonding to an energized circuit, the minimum distance in the MINIMUM CLEARANCE TABLE shall be maintained between the employee and any grounded parts (including the lower boom or portions of the truck).

(14) When positioning the bucket alongside an energized bushing or insulator string, the minimum phase-to-ground clearance of the MINIMUM CLEARANCE TABLE shall be maintained between all parts of the bucket and the grounded end of the bushing or insulator string.

(15) The use of handlines between bucket, booms and the ground is prohibited.

~~(A) Nonconductive type handlines may be used from conductor to ground when not supported from the bucket. Ropes used for live line bare hand work shall not be used for any other purpose.~~

~~(B) No conductive material over 36 inches long shall be placed in the bucket, except for appropriate length jumpers, armor rod and tools.~~

(16) A minimum clearance table shall be printed on a plate of durable nonconductive material and mounted in the bucket or its vicinity so as to be visible to the operator of the boom.

(17) A nonconductive measuring device shall be available to assist in maintaining the required clearance distance.

(18) Before transferring from aerial lifts to structures, conductors, poles, or equipment, the employee shall be required to

disconnect the safety strap or lanyard from the original support device and without delay, connect it to the other.

IV.

VARIANCE NOT SUBJECT OF AN APPEAL

No appeal has been filed or is pending before the California Occupational Safety and Health Appeals Board on any issue related to this proposed variance.

V.

HEARING TIME AND WITNESS ESTIMATE

At present PG&E anticipates having eight (8) witnesses testify, and that the hearing will last at least one full day.

VI.

SUPPORTING DOCUMENTATION

Three copies of the PG&E Transmission Live Line Barehand Work Procedures Manual and the Temporary Experimental Variance are attached as documentation in support of this Application as required by Title 8, California Code of Regulations, § 411(b)(10). We are prepared to provide further copies of supporting documentation upon request.

VII

EMPLOYEE INFORMATION

The authorized employee representative, Local 1245, is in accord with this variance petition. PG&E and Local 1245 have jointly developed safe working practices and procedures to implement the terms of this variance petition.

PG&E has informed its employees of this application by the posting of a copy at all 82 service centers and 9 General Construction Field Offices where notices to employees are normally posted. Each such posting is accompanied by a notice advising affected employees of their rights to participate, as enumerated in Title 8, California Code of Regulations, § 411(b)(6).

VIII.

REQUEST FOR EXPEDITED TREATMENT

The Board staff and the Division staff have reviewed the processes and supporting documentation in detail. Because Local 1245 concurs in the filing of this petition and has been similarly informed, PG&E [redacted] that procedures commenced by the filing of this petition be [redacted]

I certify that the information contained in this petition is true to the best of my knowledge and belief.

Respectfully submitted,

JOHN C. VOCKE
Attorney for PG&E

DATE: 3/14/91

Attachment 6

BEFORE THE
OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD
DEPARTMENT OF INDUSTRIAL RELATIONS
STATE OF CALIFORNIA

In the Matter of an Application for a Permanent Variance by: PACIFIC GAS AND ELECTRIC COMPANY 123 Mission Street San Francisco, CA 94106 Applicant	OSHSB FILE NO. 90-V-102 90-V-103 ORDER

I

A hearing in this matter was held in Oakland, California, on May 29, 1991. At that time, the record was left open to allow Applicant to provide copies of slides it had used during presentation of its case.

II

By letters dated June 4 and 25, 1991, Applicant's representative transmitted to the Standards Board the copies of the slides and the prepared statements presented by Applicant's witnesses.

III

The copies of the slides addressing Electric and Magnetic Field are admitted into the records of both OSHSB Nos. 90-V-102 and 103 as 7-1 through 7-12. The copies of the slides for Testing of Insulated Boom, including two slides relating to the insulated work platform, are admitted into the record of both OSHSB Nos. 90-V-102 and 103 as Exhibit 8-1 through 8-10. The copies of the slides for Barehand are admitted into the record of OSHSB No. 90-V-102 as Exhibits 9-1 through 9-23. The copies of the slides for Live Line Tool Work Method are admitted in to the record of OSHSB No. 90-V-103 as 9-1 through 9-17.

IV

The printed testimony of R. G. Smith is admitted into the record of OSHSB No. 90-V-103 as Exhibit 10. The printed testimony of Mickey Wagner is admitted into the record of OSHSB No. 90-V-102 as Exhibit 10. The printed testimony of Dennis Reisinger and Catherine Moore is admitted into the records of both OSHSB Nos. 90-V-102 and 103 as Exhibits 11 and 12.

V

The record is now closed, and the matter is taken under submission. A proposed decision will be issued.

Dated: July 12, 1991

Keith Tohru Yamanaka
Hearing Officer

STATE OF CALIFORNIA—DEPARTMENT OF INDUSTRIAL RELATIONS

PETE WILSON, Governor

OCCUPATIONAL SAFETY
AND HEALTH STANDARDS BOARD
1006 FOURTH STREET
SACRAMENTO, CA 95814-3372
(916) 322-3640

DECLARATION OF SERVICE BY MAIL

I, Jaylene Vlasak, declare as follows:

I am a citizen of the United States, over the age of 18 years and not a party to the within action; my place of employment and business address is 1006 Fourth Street, Third Floor, Sacramento, California 95814.

On July 15, 1991, I served the attached Order with respect to Application for Permanent Variance, OSHSB File Nos. 90-V-102 and 90-V-103, by placing a true copy thereof in an envelope addressed to the persons named below at the address set out immediately below each respective name, and by sealing and depositing said envelope in the United States Mail at Sacramento, California, with postage thereon fully prepaid. There is delivery service by United States Mail at each of the places so addressed, or there is regular communication by mail between the place of mailing and each of the places so addressed:

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I declare under penalty of perjury that the foregoing is true and correct.

Executed on July 15, 1991, at Sacramento, California.

Jaylene Vlasak
SIGNATURE