Sacramento Cogeneration Authority
P.O. Box 15830, Sacramento, CA 95852-1830 · 916/732-5218
Procter & Gamble Cogeneration Project

DOCKET
93-AFC-2
DATE: JAN 3 1994
RECD: DEC 3 1 1993

SCA 93-078

January 3, 1994

Mr. B.B. Blevins
California Energy Commission
Attn: Dockets Unit
1516 9th Street
Sacramento, CA 95814-5512

RESPONSES TO FIRST SET OF DATA REQUESTS FOR THE PROCTER AND GAMBLE COGENERATION PROJECT (Docket No. 93-AFC-02)

Dear Mr. Blevins:

Please find enclosed 12 copies of the responses to the first set of data requests for the Procter and Gamble Cogeneration Project. Responses to all of the data requests are included, with the exception of Data Request ALT-1. This will be submitted under separate cover. These responses reflect the response approaches discussed with CEC staff at the Data Request workshop held on December 15, 1993.

Should you have any questions regarding the enclosed material, please contact either Diana Parker at (916) 732-6540 or me at (916) 732-5580.

Sincerely,

Susan Strachan
Manager, Project Licensing & Permitting

Enclosure

cc: Ron Sims, Walsh Construction
Rich Chapman, Black & Veatch
Darrel Woo, CEC

6201 "S" Street, Sacramento, CA 95817-1899

PROCTER & GAMBLE COGENERATION PROJECT
SACRAMENTO COGENERATION AUTHORITY

RESPONSES TO CEC DATA REQUESTS
(Set 1, dated December 3, 1993)

VISUAL

VISUAL - 1

Figure 6.9-1 shows the area from which the project will be visible. Please explain how this area was determined.

SCA RESPONSE:

The project viewshed was determined form a field reconnaissance conducted May 10-11, 1993. Major roads in the area (Power Inn, Fruitridge, Jackson, and Florin Perkins Roads) and representative neighborhood streets were driven to determine where potential views may occur based on projected heights and locations of proposed facilities. Neighborhood/school parks were also visited to access potential visibility. The structures (stacks, storage tanks, distillation towers, etc.) associated with the power plant's steam host, Procter & Gamble, were used as a reference point for location and project structure heights during the field reconnaissance.

VISUAL - 2

The AFC (pp. 6-9-8 and 6.9-9) indicates that partial views of the HRSG stacks may occur from Baer Park and Sim Park. Please reconcile this with the fact that these parks are located outside the area designated on Figure 6.9-1 from which the project will be visible.

SCA RESPONSE:

Baer Park represents an isolated location examined during the field reconnaissance where, although extremely remote, potential views of the project stacks were considered possible because of the open space associated with the athletic fields. Because such open space is not characteristic of the surrounding neighborhood and because of the remote potential for project visibility, this area was not included within the project viewshed.

Sim Park is not expected to have views of the project. The sentence regarding potential views should have read as follows: Potential views of the project are expected to be screened by surrounding vegetation and the existing Procter & Gamble facilities.

VISUAL - 3

The AFC (p. 6.9-8) states that Warren Park will not have views of the power plant. Please explain why this is so.

SCA RESPONSE:

No views of the power plant from Warren Park are expected because of the screening provided by surrounding vegetation and houses.

VISUAL - 4

The AFC (p. 6.9-6) specifies the height of the major project facilities. Please specify the length and width of each of these major project elements.

SCA RESPONSE:

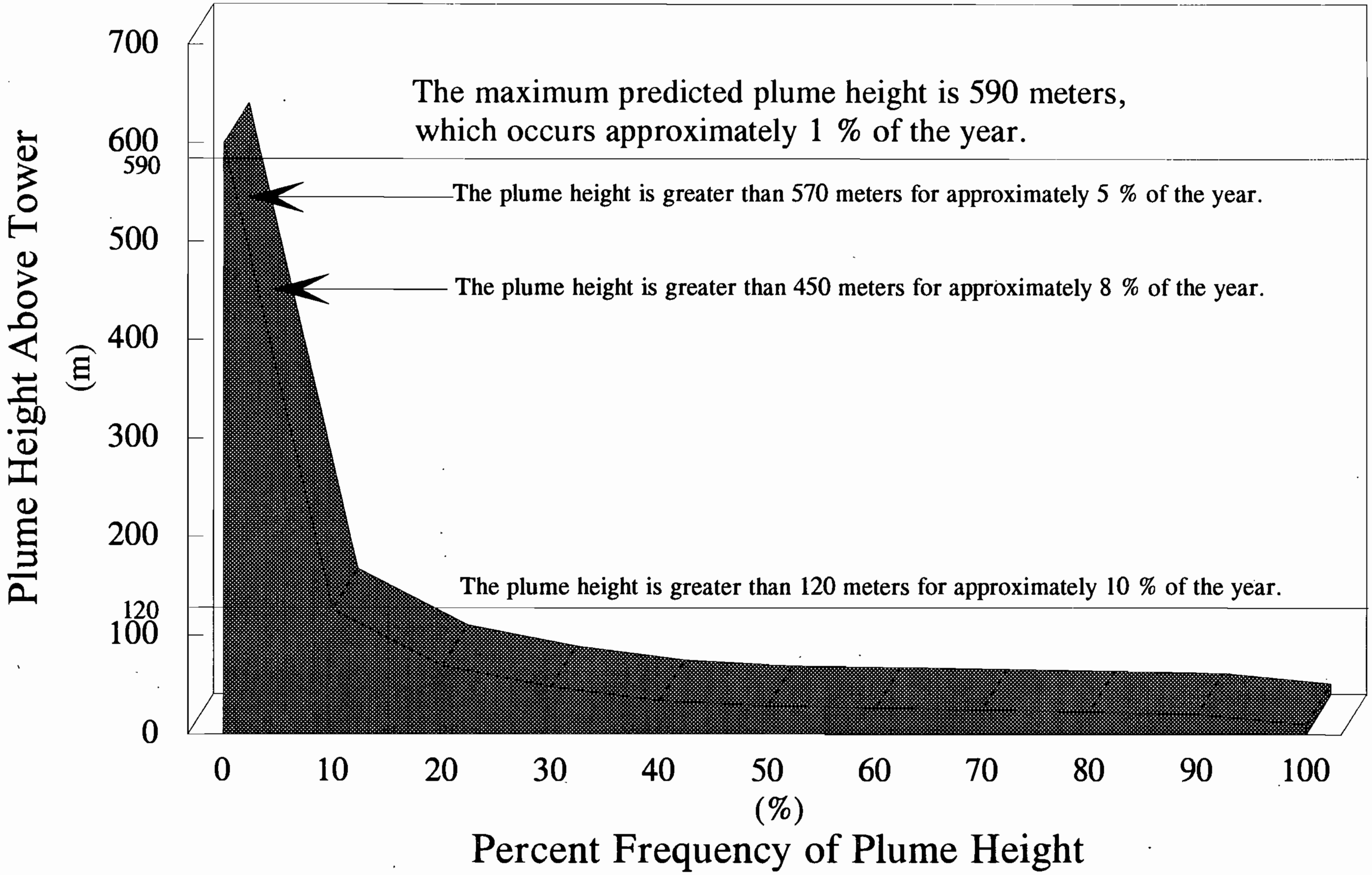
The approximate dimensions are as follows:

Project Facility	Length (ft)	Width (ft)	Dia (ft)
* HRSG	105	25	-
* HRSG Stacks (2)	-	-	10
* Aux Boiler Stack	-	-	4
* Simple Cycle Exhaust Stack	-	-	13
* Deaerator	20	8	-
* 3 Cell Cooling Tower	150	51	-
* Water Storage Tanks	-	-	32
* Project Buildings:			
Control Bldg.	100	60	-
Water Treat/Warehouse	140	100	-
* Substation	400	170	-
* Transmission Line Combination take-off tower and disconnect switch	50	12	-
* Steam Pipe Rack	570 within plant site	varies between 4-15	-

VISUAL - 5

The AFC (p. 6.9-28) states that: The SACTI model predicted that for approximately 90 percent a year the predicted plume height will be less than 394 feet (120 meters). Additionally, the model predicted that the maximum shadowing will occur about 565 feet (200 meters) east of the tower for 684 hours for the 5 year meteorological period (1985-1989), or an average of 1.6 percent a year. Beyond 656 feet (200 meters), the model predicted that the average hours of plume shadowing occurring at

Cooling Tower Plume Height Frequency



5 Year Meteorological Data Base
Based on the SACTI cooling tower plume height frequency output table.

any direction from the tower represent less than 0.5 percent of the year (approximately 119 hours for the 5 year period).

a. *Does the above indicate that the model predicted a plume height of greater than 394 feet for approximately 10 percent of the year?*

b. *Please specify the maximum plume height predicted by the model.*

c. *Please specify the percent of the year that the maximum plume height is predicted to occur.*

d. *Please provide the SACTI model cooling tower plume results summarized on AFC p. 6.9-28.*

SCA RESPONSE:

a. The SACTI model predicted that for approximately 90 percent of the year the cooling tower plume height will be less than 394 feet (120 meters). Conversely, the model predicted that the plume height will be greater than 394 feet (120 meters) for approximately 10 percent of the year.

b. The maximum predicted plume height above the cooling tower is 1,936 feet (590 meters).

c. The SACTI model predicted that the maximum plume height of 1,936 feet (590 meters) will occur for approximately 1 percent of the year. Additionally, to illustrate the frequency distribution of plume height throughout the year, Figure VIS-1 is attached. Figure VIS-1, which plots percent frequency distribution along the abscissa and plume height in meters along the ordinate, is based on the plume height frequency table generated in the SACTI model output.

d. The SACTI model output file is provided as Attachment VIS-1.

VISUAL - 6

Please clarify whether the colors used for the project features in Figures 6.9-3b and 6.9-4b are the colors specifically proposed for the project.

SCA RESPONSE:

The colors specified for the buildings are slate blue for the body and regal blue for the trim. The color specified for the combustion turbine generator enclosures is national blue. It was the SCA's intent that the colors shown in the figures be an accurate representation of the colors selected.

VIS-7

The AFC (p. 6.9-31) states that: "Trees will also be planted in parking and other maneuvering areas along the front of the plant to provide shading."

a. *Please provide a map showing the location of the tree planting in relation to the project.*

b. *Please specify the expected height of the trees at maturity.*

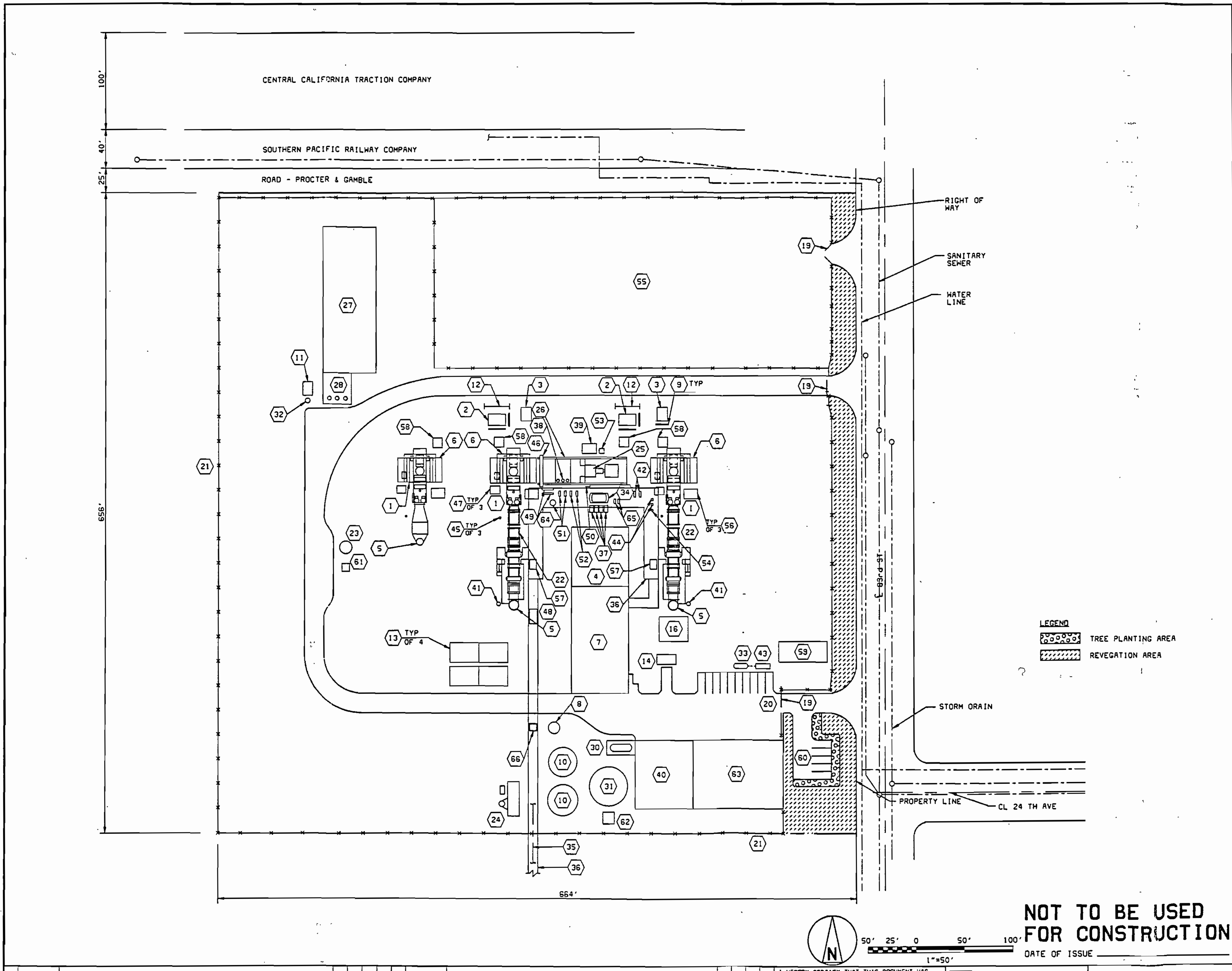
c. *If the trees will provide screening of the project from any area from which it can be viewed by the public, please provide an artist's rendering of the effect of such screening.*

SCA RESPONSE

a. Trees will be planted for shading purposes at the visitor's parking lot as shown on Figure SV-1. Planting will follow the City of Sacramento's guidelines specified in the Parking Lot Tree Shading Regulations and Water Conserving Landscape Ordinance. Requirements include a minimum of 50 percent of the parking area to be shaded, a three foot high earth berm or shrubbery to screen the parking lot from view of city streets, and the use of plants well-adapted to the regional climate. To avoid interference with project components such as pipelines, the oil/water separator for stormwater discharges, the sanitary discharge flowmeter, etc., no trees will be planted adjacent to the employee's parking lot.

b. The two tree species, which will be planted, are valley oak (*Quercus lobata*) and sweet bay (*Laurus nobilis*). At maturity, valley oak and sweet bay reach approximate heights of 100 to 110 feet and 35 to 40 feet, respectively, depending on site conditions.

c. The planting of shade trees in the project's visitor parking lot is proposed to comply with the City of Sacramento's shade tree ordinance. This parking area is located in the southeast corner of the project site. Industrial and commercial structures associated with Procter & Gamble and other businesses to the south and east already screen potential views of the project site from Fruitridge Road. The addition of shade trees in this area is not expected to provide significant additional screening of project features to the general public. However, the plantings will enhance the appearance of the site entrance as illustrated on the artist's rendering. The rendering (Figure VIS-2) illustrates the view from 83rd Street near its intersection with 24th Avenue looking northwest into the site.



NOT TO BE USED
FOR CONSTRUCTION

DATE OF ISSUE ____________

LEGEND

1. COMBUSTION TURBINE (3)
2. GENERATOR TRANSFORMER (2)
3. AUXILIARY TRANSFORMER (2)
4. CHILLER BUILDING
5. STACK (3)
6. INLET FILTER (3)
7. CONTROL/ADMIN BUILDING
8. CONDENSATE STORAGE TANK
9. TRANSFORMER FIREWALL (5)
10. DEMINERALIZED WATER STORAGE TANK (2)
11. CIRC WATER CHEMICAL FEED
12. COMBINATION TAKEOFF TOWER AND DISCONNECT SWITCH (2)
13. GAS COMPRESSORS (4)
14. STANDBY GENERATOR
15.
16. CYCLE CHEMICAL FEED
17.
18.
19. GATE (3)
20. PAVED SITE ACCESS ROAD
21. SITE FENCE
22. HEAT RECOVERY STEAM GENERATOR (2)
23. AMMONIA STORAGE TANK
24. AUXILIARY BOILER
25. STEAM TURBINE
26. CONDENSER
27. COOLING TOWER
28.
29.
30. ACID STORAGE TANK
31. NEUTRALIZATION TANK
32. SODIUM HYPOCHLORITE TANK
33. OIL/WATER SEPARATOR
34. DEAERATOR
35. STEAM LINE TO PROCTER & GAMBLE
36. PIPE RACK
37. BOILER FEED PUMPS (4)
38. CONDENSATE PUMPS (3)
39. TURBINE LUBE OIL UNIT
40. WATER TREATMENT BUILDING
41. BOILER BLOWDOWN TANK (2)
42. AIR COMPRESSORS (2)
43. SANITARY DISCHARGE FLOWMETER AND SAMPLE STATION
44. DESICCANT AIR DRYERS (2)
45. INLET GAS SCRUBBERS (3)
46. ST MAINTENANCE CRANE
47. NOX WATER INJECTION SKID (3)
48. CT WASH SKID (2)
49. AUX COOLING WATER HEAT EXCHANGERS (2)
50. CONDENSER AIR EJECTOR
51. CLOSED CYCLE COOLING WATER PUMPS (2)
52. CONDENSER VACUUM PUMPS (2)
53. LUBE OIL CONDITIONER
54. AIR RECEIVER
55. OWNER'S SUBSTATION
56. AUXILIARY SKID (3)
57. AMMONIA FLOW CONTROL SKID (2)
58. GENERATOR BREAKER ENCLOSURE (4)
59. GAS METER STATION
60. VISITOR PARKING
61. AMMONIA TRANSFER PUMPS
62. NEUTRALIZATION BASIN PUMPS
63. WAREHOUSE AND MAINTENANCE SHOP BUILDING
64. CLOSED COOLING WATER HEAD TANK
65. AUX BOILER FEED PUMPS (2)
66. CONDENSATE MAKEUP PUMPS

NO	DATE	REVISIONS AND RECORD OF ISSUE	BY	CHK	APP	FLM
A	9-3-93	ISSUED FOR PRELIMINARY ARC REVIEW				

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF CALIFORNIA

SIGNED ____________

DATE ____________ REG NO. ____________

BLACK & VEATCH

ENGINEER VBD DRAWN JWD

CHECKED DATE

SACRAMENTO COGENERATION AUTHORITY
PROCTER & GAMBLE COGENERATION PROJECT

SITE ARRANGEMENT
REVEGATION & TREE PLANTING AREAS

PROJECT DRAWING NUMBER 23933-CSTU-S1010 REV A

CODE

AREA

FIGURE SV-1

062699SEIBERT ACAD 12_clb
A01SL006 D1 PLOT SCALE: 1"=50', 1=600
12/15/93 16:49:52

Artist Rendering of SCA Project -
View looking northwest from intersection of
83rd Street and 24th Avenue

Figure VIS-2

Attachment

VIS-1

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      EPRI SEASONAL/ANNUAL TABLES PROGRAM, VERSION 11-01-90

      LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)-SCA

    SUMMARY OF PLUME PREDICTIONS WHEN WIND IS FROM   0.0 DEGREES EAST OF NORTH

     CAT NO.     PLUME LENGTH       PLUME HEIGHT       PLUME RADIUS

        11              19.70               14.2               4.50
        12              19.40               14.3               5.30
        13              18.80               14.8               6.50
        14              28.00                9.5               4.60
        15              47.90               12.6               5.30
        16              37.10               13.4               6.10
        17              54.50                0.2               4.60
        18              34.50                3.0               5.40
        19              19.00               14.8               6.90
        20              19.00               14.6               8.00
        21              23.40               16.7               8.30
        22              42.40               13.8               5.80
        23              87.00               20.8               9.90
        24              21.60               11.3               7.50
        25              31.00               14.7               7.80
        26              36.30               15.1               8.40
        27              35.90               16.1               8.90
        28              36.00               15.8               9.40
        29              69.60               25.8              10.10
        30              35.30               17.1              10.60
        31              93.60               32.8              12.70
        32             102.50               37.4              13.20
        33             101.60               39.6              13.90
        34             130.90               46.6              15.20
        35             129.70               49.4              16.10
        36             169.00               58.1              17.70
        37             177.70               63.0              19.00
        38             226.00               75.7              20.90
        39             284.70               88.1              23.10
        40             412.60              111.7              26.00
        41            4860.00+             553.6+            200.50+
        42            4856.30+             581.2+            236.20+
        43            4830.90+             564.8+            198.10+
        44             650.00               93.0              39.50
        45            4881.80+             385.1+            127.50+

 * A PLUS SIGN INDICATES THAT THE VISIBLE PLUME DID NOT END WITHIN A CENTERLINE DISTANCE OF  5000.0 METERS
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1
             EPRI SEASONAL/ANNUAL TABLES PROGRAM, VERSION 11-01-90

             LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)-SCA

        SUMMARY OF PLUME PREDICTIONS WHEN WIND IS FROM  45.0 DEGREES EAST OF NORTH

            CAT NO.     PLUME LENGTH       PLUME HEIGHT       PLUME RADIUS

              11             14.50               12.5               4.70
              12             19.20               14.2               5.50
              13             18.60               14.7               6.60
              14             22.90                8.7               4.60
              15             37.90               10.9               5.60
              16             27.10               11.4               6.70
              17             39.50                3.3               4.20
              18             54.40                4.3               5.70
              19             18.80               14.7               7.00
              20             18.80               14.5               7.80
              21             18.40               15.0               8.00
              22             32.40               11.7               6.20
              23             67.30               16.7               9.80
              24             16.60               10.0               6.40
              25             25.80               13.7               6.70
              26             26.40               12.7               8.70
              27             26.00               13.4               9.00
              28             26.20               13.1               9.70
              29             55.00               21.7              10.50
              30             25.40               14.4              10.10
              31             79.00               28.3              12.50
              32             83.20               31.3              13.00
              33             67.60               29.9              11.40
              34             91.80               36.4              13.60
              35            130.00               47.7              16.50
              36            139.60               50.8              16.70
              37            178.10               61.0              19.30
              38            207.00               68.5              21.30
              39            265.90               80.2              23.10
              40            374.20              100.1              26.30
              41           4861.90+             542.0+            200.70+
              42           4857.90+             572.4+            237.00+
              43           4832.50+             564.8+            201.20+
              44            651.30               87.2              40.50
              45           4883.30+             369.4+            130.30+

     * A PLUS SIGN INDICATES THAT THE VISIBLE PLUME DID NOT END WITHIN A CENTERLINE DISTANCE OF  5000.0 METERS
```

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1

              EPRI SEASONAL/ANNUAL TABLES PROGRAM, VERSION 11-01-90

              LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)-SCA

         SUMMARY OF PLUME PREDICTIONS WHEN WIND IS FROM  90.0 DEGREES EAST OF NORTH

            CAT NO.     PLUME LENGTH       PLUME HEIGHT      PLUME RADIUS

               11            20.10               13.7              5.60
               12            24.50               15.7              8.90
               13            38.20               21.1             11.10
               14            33.50                7.4              5.70
               15            48.70                6.5              7.50
               16            62.60               13.4             10.90
               17            24.50                1.4              3.60
               18            34.40               -0.3              4.10
               19            47.70               25.0             12.40
               20            62.10               28.9             14.20
               21            71.30               32.0             14.80
               22            53.10               10.2              9.80
               23           108.50                9.7             11.20
               24            76.00               20.5             12.60
               25            75.80               21.6             13.20
               26            86.50               20.3             13.30
               27            95.70               24.3             14.30
               28           105.80               25.1             14.60
               29           115.90               26.2             15.20
               30           134.30               33.9             16.60
               31           155.20               33.1             16.70
               32           164.40               37.4             18.10
               33           183.20               43.9             19.20
               34           213.20               47.6             19.90
               35           241.80               56.0             21.90
               36           281.90               59.9             22.70
               37           320.50               69.6             24.40
               38           389.40               80.9             26.80
               39           537.80              101.4             28.90
               40           786.60              128.0             31.90
               41          4874.20+             442.1+           151.10+
               42          4871.10+             469.5+           185.00+
               43          4842.00+             563.7+           207.40+
               44           808.70               65.3             40.00
               45          4886.50+             341.4+           124.30+

     * A PLUS SIGN INDICATES THAT THE VISIBLE PLUME DID NOT END WITHIN A CENTERLINE DISTANCE OF  5000.0 METERS
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1
    TOTAL RECORDS FOR SEASON ANNUAL                =   43611

    NUMBER OF STAGNANT CASES =    8851
1         *********************** FREQUENCY PERCENTAGE BY CATEGORY AND WIND DIRECTION ***********************
                LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)-SCA
                SEASON=ANNUAL
          ********************************************** WIND FROM ********************************************
 CATEGORY     N    NNE     NE    ENE     E    ESE     SE    SSE     S    SSW     SW    WSW     W    WNW     NW    NNW
  NUMBER  ******************************************** PLUME HEADED ********************************************
              S    SSW     SW    WSW     W    WNW     NW    NNW     N    NNE     NE    ENE     E    ESE     SE    SSE   SUM

   11       0.83  0.23  0.11  0.08  0.13  0.19  0.35  0.57  2.22  1.98  2.22  1.35  1.54  1.39  1.37  1.29  15.87
   12       0.29  0.05  0.06  0.03  0.04  0.08  0.13  0.28  0.97  0.78  0.58  0.20  0.17  0.24  0.45  0.40   4.74
   13       0.06  0.03  0.01  0.03  0.20  0.33  0.94  1.13  1.66  1.52  1.10  0.22  0.10  0.21  0.19  0.05   7.75
   14       0.18  0.00  0.00  0.00  0.00  0.00  0.01  0.07  0.59  1.05  0.90  0.22  0.11  0.21  0.34  0.30   3.98
   15       0.29  0.00  0.00  0.00  0.01  0.04  0.07  0.18  1.04  2.52  2.32  0.30  0.09  0.20  0.67  0.76   8.49
   16       0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.01  0.00   0.02
   17       0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.01  0.01   0.04
   18       0.20  0.01  0.00  0.00  0.00  0.00  0.00  0.01  0.12  0.49  0.60  0.08  0.03  0.05  0.37  0.68   2.65
   19       0.05  0.02  0.01  0.00  0.02  0.02  0.01  0.03  0.12  0.08  0.06  0.04  0.05  0.07  0.05  0.04   0.67
   20       0.03  0.00  0.01  0.00  0.00  0.00  0.06  0.06  0.14  0.08  0.08  0.03  0.05  0.03  0.04  0.03   0.65
   21       0.01  0.00  0.00  0.01  0.06  0.13  0.25  0.47  0.51  0.21  0.13  0.06  0.01  0.03  0.05  0.06   1.99
   22       0.01  0.00  0.00  0.00  0.00  0.00  0.00  0.01  0.02  0.03  0.02  0.00  0.00  0.00  0.01  0.01   0.11
   23       0.02  0.00  0.00  0.00  0.00  0.01  0.01  0.03  0.13  0.18  0.15  0.04  0.01  0.02  0.08  0.05   0.74
   24       0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   25       0.05  0.01  0.01  0.01  0.03  0.01  0.02  0.06  0.12  0.11  0.12  0.05  0.03  0.04  0.08  0.10   0.86
   26       0.15  0.02  0.02  0.03  0.03  0.12  0.26  0.38  0.83  0.72  0.61  0.18  0.08  0.13  0.34  0.32   4.22
   27       0.12  0.02  0.01  0.01  0.02  0.07  0.14  0.18  0.47  0.35  0.28  0.11  0.10  0.12  0.19  0.19   2.39
   28       0.10  0.02  0.02  0.01  0.05  0.12  0.19  0.32  0.68  0.54  0.38  0.07  0.05  0.13  0.22  0.27   3.19
   29       0.09  0.03  0.02  0.01  0.03  0.15  0.26  0.36  0.66  0.53  0.37  0.11  0.05  0.12  0.23  0.21   3.24
   30       0.10  0.01  0.01  0.00  0.03  0.09  0.18  0.27  0.51  0.33  0.18  0.07  0.06  0.07  0.16  0.13   2.20
   31       0.11  0.02  0.02  0.01  0.03  0.08  0.18  0.25  0.55  0.38  0.26  0.06  0.04  0.08  0.12  0.17   2.36
   32       0.05  0.01  0.02  0.01  0.03  0.11  0.25  0.26  0.50  0.32  0.23  0.06  0.04  0.08  0.14  0.15   2.25
   33       0.08  0.01  0.01  0.01  0.05  0.10  0.25  0.31  0.57  0.36  0.17  0.04  0.05  0.08  0.12  0.15   2.36
   34       0.06  0.03  0.01  0.01  0.02  0.10  0.27  0.28  0.55  0.29  0.20  0.08  0.07  0.08  0.14  0.13   2.32
   35       0.08  0.02  0.02  0.02  0.08  0.13  0.35  0.34  0.62  0.30  0.18  0.07  0.07  0.08  0.13  0.14   2.63
   36       0.17  0.02  0.01  0.04  0.11  0.30  0.50  0.62  1.03  0.54  0.35  0.10  0.11  0.09  0.24  0.19   4.45
   37       0.05  0.02  0.02  0.03  0.06  0.18  0.28  0.36  0.61  0.27  0.12  0.04  0.05  0.06  0.09  0.12   2.36
   38       0.08  0.02  0.02  0.01  0.06  0.18  0.28  0.37  0.54  0.21  0.14  0.04  0.06  0.06  0.13  0.10   2.29
   39       0.06  0.02  0.02  0.02  0.08  0.19  0.37  0.38  0.48  0.22  0.11  0.05  0.04  0.07  0.11  0.09   2.31
   40       0.07  0.03  0.03  0.02  0.09  0.22  0.42  0.35  0.44  0.18  0.10  0.03  0.06  0.08  0.12  0.08   2.32
   41       0.08  0.03  0.02  0.02  0.08  0.24  0.42  0.43  0.43  0.17  0.08  0.03  0.03  0.06  0.11  0.08   2.29
   42       0.12  0.04  0.03  0.03  0.09  0.25  0.36  0.30  0.33  0.14  0.06  0.02  0.06  0.10  0.12  0.14   2.21
   43       0.31  0.09  0.07  0.06  0.19  0.32  0.51  0.41  0.41  0.14  0.08  0.05  0.10  0.17  0.29  0.30   3.50
   44       0.05  0.05  0.03  0.02  0.10  0.21  0.25  0.17  0.12  0.06  0.03  0.04  0.07  0.08  0.08  0.08   1.45
   45       0.03  0.00  0.00  0.00  0.02  0.10  0.16  0.26  0.21  0.10  0.04  0.01  0.01  0.03  0.07  0.08   1.12
            ----  ----  ----  ----  ----  ----  ----  ----  ----  ----  ----  ----  ----  ----  ----  ----   ----
  TOTALS    3.97  0.87  0.60  0.54  1.75  4.08  7.74  9.48 18.18 15.20 12.26  3.88  3.40  4.29  6.85  6.91 100.00
```

```
1        ******************************* STABILITY CLASS BY     D DIRECTION **********************************
               LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)-SCA
               SEASON=ANNUAL
         ********************************************* WIND FROM *********************************************
STABILITY    N     NNE     NE    ENE     E     ESE     SE    SSE     S     SSW     SW    WSW     W     WNW     NW    NNW
 CLASS   ******************************************* PLUME HEADED ********************************************
             S     SSW     SW    WSW     W     WNW     NW    NNW     N     NNE     NE    ENE     E     ESE     SE    SSE   STAG.

   1       0.01  0.02  0.03  0.02  0.01  0.00  0.00  0.00  0.01  0.01  0.01  0.04  0.04  0.02  0.01  0.01    0.04
   2       0.12  0.17  0.07  0.08  0.06  0.03  0.03  0.04  0.08  0.08  0.11  0.23  0.33  0.21  0.12  0.09    0.06
   3       0.23  0.17  0.15  0.12  0.08  0.06  0.05  0.07  0.15  0.17  0.19  0.24  0.21  0.25  0.19  0.18    0.07
   4       0.37  0.21  0.24  0.29  0.26  0.26  0.30  0.32  0.31  0.43  0.44  0.27  0.16  0.22  0.38  0.47    0.11
   5       0.15  0.18  0.25  0.23  0.21  0.23  0.23  0.24  0.27  0.21  0.15  0.08  0.10  0.14  0.18  0.16    0.08
   6       0.10  0.19  0.21  0.22  0.31  0.36  0.35  0.30  0.18  0.10  0.08  0.10  0.13  0.15  0.10  0.08    0.23
   7       0.02  0.06  0.05  0.06  0.07  0.06  0.04  0.02  0.01  0.01  0.01  0.03  0.03  0.01  0.01  0.01    0.41


         *************** WIND SPEED DISTRIBUTION BY DIRECTION AT REFERENCE HEIGHT OF 200. METERS **************
               LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)-SCA
               SEASON=ANNUAL
         ******************************************** WIND FROM ********************************************
  WIND       N     NNE     NE    ENE     E     ESE     SE    SSE     S     SSW     SW    WSW     W     WNW     NW    NNW
  RANGE  ******************************************* PLUME HEADED ********************************************
             S     SSW     SW    WSW     W     WNW     NW    NNW     N     NNE     NE    ENE     E     ESE     SE    SSE  STAG.

   1       0.04  0.08  0.07  0.08  0.05  0.03  0.01  0.02  0.02  0.01  0.02  0.06  0.06  0.04  0.02  0.02    1.00
   2       0.51  0.73  0.83  0.79  0.79  0.66  0.58  0.47  0.40  0.26  0.28  0.53  0.73  0.59  0.40  0.33    0.00
   3       0.45  0.18  0.10  0.13  0.17  0.31  0.40  0.52  0.58  0.73  0.70  0.41  0.21  0.37  0.58  0.65    0.00


        ********************************* COMBINED FACTORS BY WIND DIRECTION **********************************
               LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)-SCA
               SEASON=ANNUAL
         ********************************************* WIND FROM *********************************************
COMBINED     N     NNE     NE    ENE     E     ESE     SE    SSE     S     SSW     SW    WSW     W     WNW     NW    NNW
 CLASS*  ******************************************* PLUME HEADED ********************************************
             S     SSW     SW    WSW     W     WNW     NW    NNW     N     NNE     NE    ENE     E     ESE     SE    SSE   STAG.

   1       0.01  0.03  0.02  0.02  0.01  0.00  0.00  0.00  0.00  0.00  0.01  0.03  0.03  0.02  0.01  0.01    0.17
   2       0.18  0.27  0.21  0.17  0.11  0.06  0.05  0.05  0.09  0.07  0.09  0.27  0.42  0.28  0.13  0.09    0.00
   3       0.16  0.07  0.03  0.03  0.02  0.03  0.03  0.06  0.14  0.19  0.22  0.21  0.12  0.18  0.19  0.18    0.00
   4       0.02  0.03  0.03  0.04  0.02  0.01  0.01  0.01  0.01  0.01  0.01  0.02  0.01  0.01  0.01  0.01    0.19
   5       0.27  0.28  0.40  0.41  0.37  0.32  0.31  0.26  0.23  0.16  0.17  0.19  0.19  0.22  0.23  0.21    0.00
   6       0.24  0.07  0.05  0.07  0.08  0.15  0.21  0.29  0.34  0.47  0.42  0.14  0.06  0.13  0.33  0.41    0.00
   7       0.00  0.02  0.02  0.02  0.02  0.01  0.01  0.00  0.00  0.00  0.00  0.01  0.01  0.01  0.00  0.00    0.64
   8       0.06  0.18  0.22  0.22  0.30  0.28  0.23  0.15  0.08  0.03  0.02  0.07  0.12  0.09  0.04  0.03    0.00
   9       0.05  0.05  0.03  0.04  0.06  0.13  0.16  0.17  0.11  0.07  0.06  0.05  0.03  0.06  0.07  0.06    0.00

  * COMBINED CLASSES ARE DEFINED AS FOLLOWS:
    1=UNSTABLE, LOW WIND  2=UNSTABLE, MODERATE WIND 3=UNSTABLE, HIGH WIND
    4=NEUTRAL, LOW WIND   5=NEUTRAL MODERATE WIND   6=NEUTRAL, HIGH WIND
    7=STABLE, LOW WIND    8=STABLE, MODERATE WIND   9=STABLE, HIGH WIND
```

```
1        ************************************ PLUME LENGTH FR    NCY TABLE **************************************
                   LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)  SCA
                   SEASON=ANNUAL
DISTANCE ***************************************** WIND FROM ********************************************
  FROM          N    NNE     NE    ENE      E    ESE     SE    SSE      S    SSW     SW    WSW      W    WNW     NW    NNW    ALL
 TOWER   ***************************************** PLUME HEADED *****************************************
  (M)           S    SSW     SW    WSW      W    WNW     NW    NNW      N    NNE     NE    ENE      E    ESE     SE    SSE    SUM

   100.      3.97   0.87   0.60   0.54   1.75   4.08   7.74   9.48  18.18  15.20  12.26   3.88   3.40   4.29   6.85   6.91 100.00
   200.      1.28   0.39   0.26   0.34   1.21   3.08   3.92   4.83   6.82   3.32   1.29   1.04   1.04   1.56   1.48   1.83  33.68
   300.      0.80   0.28   0.21   0.29   0.98   2.42   2.78   2.66   2.95   1.23   0.64   0.58   0.73   0.96   1.02   0.95  19.48
   400.      0.66   0.23   0.17   0.20   0.77   1.89   2.13   1.91   1.93   0.79   0.38   0.33   0.48   0.71   0.79   0.76  14.15
   500.      0.66   0.23   0.15   0.17   0.65   1.54   1.71   1.91   1.93   0.79   0.28   0.25   0.37   0.59   0.67   0.76  12.67
   600.      0.59   0.21   0.15   0.17   0.65   1.54   1.71   1.56   1.50   0.61   0.28   0.25   0.37   0.59   0.67   0.68  11.52
   700.      0.59   0.21   0.15   0.15   0.57   1.35   1.71   1.56   1.50   0.61   0.28   0.20   0.33   0.53   0.67   0.68  11.08
   800.      0.54   0.16   0.12   0.15   0.57   1.35   1.46   1.40   1.38   0.56   0.25   0.20   0.33   0.53   0.58   0.60  10.16
   900.      0.54   0.16   0.12   0.13   0.47   1.12   1.46   1.40   1.38   0.56   0.25   0.16   0.28   0.44   0.58   0.60   9.65
  1000.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  1100.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  1200.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  1300.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  1400.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  1500.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  1600.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  1700.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  1800.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  1900.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  2000.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  2100.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  2200.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  2300.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  2400.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  2500.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  2600.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  2700.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  2800.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  2900.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  3000.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  3100.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  3200.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  3300.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  3400.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  3500.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  3600.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  3700.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  3800.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  3900.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  4000.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  4100.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  4200.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  4300.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  4400.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  4500.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  4600.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  4700.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  4800.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  4900.      0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  5000.      0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
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1         *********************************** PLUME LENGTH FR[illegible]NCY TABLE ***********************************
              LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS) [illegible]CA
              SEASON=ANNUAL
DISTANCE ****************************************** WIND FROM ******************************************
  FROM        N     NNE     NE    ENE     E     ESE     SE    SSE     S     SSW     SW    WSW     W     WNW     NW    NNW      ALL
 TOWER    ***************************************** PLUME HEADED *****************************************
  (M)         S     SSW     SW    WSW     W     WNW     NW    NNW     N     NNE     NE    ENE     E     ESE     SE    SSE      SUM

  5100.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  5200.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  5300.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  5400.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  5500.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  5600.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  5700.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  5800.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  5900.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  6000.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  6100.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  6200.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  6300.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  6400.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  6500.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  6600.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  6700.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  6800.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  6900.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  7000.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  7100.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  7200.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  7300.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  7400.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  7500.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  7600.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  7700.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  7800.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  7900.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  8000.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  8100.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  8200.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  8300.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  8400.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  8500.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  8600.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  8700.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  8800.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  8900.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  9000.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  9100.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  9200.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  9300.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  9400.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  9500.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  9600.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  9700.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  9800.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
  9900.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
 10000.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00     0.00
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1     *********************************** PLUME HEIGHT FR[illegible]NCY TABLE ************************************
           LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)[illegible]CA
           SEASON=ANNUAL
 HEIGHT ******************************************** WIND FROM **********************************************
 FROM       N     NNE    NE    ENE     E    ESE     SE    SSE     S    SSW     SW    WSW     W    WNW     NW    NNW    ALL
 TOWER *******************************************  PLUME HEADED *******************************************
 (M)        S     SSW    SW    WSW     W    WNW     NW    NNW     N    NNE     NE    ENE     E    ESE     SE    SSE    SUM

   10.    3.97  0.87  0.60  0.54  1.75  4.08  7.74  9.48 18.18 15.20 12.26  3.88  3.40  4.29  6.85  6.91 100.00
   20.    3.59  0.86  0.60  0.54  1.74  4.03  7.72  9.40 17.47 13.66 10.76  3.24  3.17  3.81  6.13  5.92  92.63
   30.    1.50  0.44  0.33  0.43  1.57  3.76  5.13  5.47  8.17  4.41  2.53  1.69  1.45  2.17  2.23  2.26  43.53
   40.    1.39  0.41  0.28  0.33  1.19  2.93  4.44  5.08  7.37  3.70  1.73  0.87  0.93  1.30  1.76  2.00  35.71
   50.    1.15  0.37  0.26  0.30  1.03  2.52  3.92  4.26  5.76  2.64  1.29  0.62  0.78  1.05  1.48  1.53  28.96
   60.    1.01  0.32  0.24  0.27  0.96  2.32  3.57  3.64  4.59  2.05  1.12  0.50  0.66  0.88  1.35  1.26  24.75
   70.    0.85  0.30  0.23  0.20  0.77  1.89  3.07  3.02  3.56  1.50  0.76  0.33  0.48  0.71  1.12  1.07  19.85
   80.    0.80  0.28  0.19  0.16  0.61  1.50  2.51  2.66  2.95  1.23  0.50  0.25  0.36  0.57  0.90  0.95  16.38
   90.    0.72  0.26  0.19  0.16  0.61  1.50  2.51  2.29  2.42  1.02  0.50  0.25  0.36  0.57  0.90  0.85  15.07
  100.    0.66  0.23  0.15  0.15  0.55  1.33  1.88  1.91  1.93  0.79  0.35  0.21  0.29  0.51  0.70  0.76  12.40
  110.    0.61  0.19  0.15  0.15  0.55  1.33  1.88  1.75  1.81  0.74  0.35  0.21  0.29  0.51  0.70  0.68  11.88
  120.    0.61  0.19  0.12  0.13  0.47  1.14  1.46  1.75  1.81  0.74  0.25  0.15  0.26  0.44  0.58  0.68  10.77
  130.    0.54  0.16  0.12  0.13  0.47  1.14  1.46  1.40  1.38  0.56  0.25  0.15  0.26  0.44  0.58  0.60   9.63
  140.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  150.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  160.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  170.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  180.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  190.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  200.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  210.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  220.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  230.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  240.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  250.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  260.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  270.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  280.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  290.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  300.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  310.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  320.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  330.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  340.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  350.    0.54  0.16  0.12  0.11  0.37  0.91  1.46  1.40  1.38  0.56  0.25  0.12  0.20  0.36  0.58  0.60   9.12
  360.    0.54  0.16  0.12  0.11  0.36  0.81  1.46  1.40  1.38  0.56  0.25  0.11  0.19  0.33  0.58  0.60   8.95
  370.    0.54  0.16  0.12  0.11  0.36  0.81  1.46  1.40  1.38  0.56  0.25  0.11  0.19  0.33  0.58  0.60   8.95
  380.    0.54  0.16  0.12  0.11  0.36  0.81  1.30  1.40  1.38  0.56  0.21  0.11  0.19  0.33  0.52  0.60   8.68
  390.    0.54  0.16  0.12  0.11  0.36  0.81  1.30  1.40  1.38  0.56  0.21  0.11  0.19  0.33  0.52  0.60   8.68
  400.    0.51  0.16  0.12  0.11  0.36  0.81  1.30  1.13  1.17  0.45  0.21  0.11  0.19  0.33  0.52  0.52   8.00
  410.    0.51  0.16  0.12  0.11  0.36  0.81  1.30  1.13  1.17  0.45  0.21  0.11  0.19  0.33  0.52  0.52   8.00
  420.    0.51  0.16  0.12  0.11  0.36  0.81  1.30  1.13  1.17  0.45  0.21  0.11  0.19  0.33  0.52  0.52   8.00
  430.    0.51  0.16  0.12  0.11  0.36  0.81  1.30  1.13  1.17  0.45  0.21  0.11  0.19  0.33  0.52  0.52   8.00
  440.    0.51  0.16  0.12  0.11  0.36  0.81  1.30  1.13  1.17  0.45  0.21  0.11  0.19  0.33  0.52  0.52   8.00
  450.    0.51  0.16  0.12  0.11  0.36  0.81  1.30  1.13  1.17  0.45  0.21  0.11  0.19  0.33  0.52  0.52   8.00
  460.    0.51  0.16  0.12  0.09  0.28  0.58  1.30  1.13  1.17  0.45  0.21  0.08  0.16  0.26  0.52  0.52   7.54
  470.    0.51  0.16  0.12  0.09  0.28  0.58  1.30  1.13  1.17  0.45  0.21  0.08  0.16  0.26  0.52  0.52   7.54
  480.    0.51  0.16  0.12  0.06  0.19  0.32  1.30  1.13  1.17  0.45  0.21  0.05  0.10  0.17  0.52  0.52   6.98
  490.    0.51  0.16  0.12  0.06  0.19  0.32  1.30  1.13  1.17  0.45  0.21  0.05  0.10  0.17  0.52  0.52   6.98
  500.    0.51  0.16  0.12  0.06  0.19  0.32  1.30  1.13  1.17  0.45  0.21  0.05  0.10  0.17  0.52  0.52   6.98
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1      ********************************** PLUME HEIGHT FR   NCY TABLE ***********************************
           LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)   CA
           SEASON=ANNUAL
HEIGHT ******************************************** WIND FROM **********************************************
FROM       N     NNE    NE    ENE     E    ESE    SE    SSE    S    SSW    SW   WSW    W    WNW    NW   NNW    ALL
TOWER ******************************************* PLUME HEADED ********************************************
(M)        S     SSW    SW    WSW     W    WNW    NW    NNW    N    NNE    NE   ENE    E    ESE    SE   SSE    SUM

 510.    0.51  0.16  0.12  0.06  0.19  0.32  1.30  1.13  1.17  0.45  0.21  0.05  0.10  0.17  0.52  0.52    6.98
 520.    0.51  0.16  0.12  0.06  0.19  0.32  1.30  1.13  1.17  0.45  0.21  0.05  0.10  0.17  0.52  0.52    6.98
 530.    0.51  0.16  0.12  0.06  0.19  0.32  1.30  1.13  1.17  0.45  0.21  0.05  0.10  0.17  0.52  0.52    6.98
 540.    0.51  0.16  0.12  0.06  0.19  0.32  1.30  1.13  1.17  0.45  0.21  0.05  0.10  0.17  0.52  0.52    6.98
 550.    0.51  0.16  0.12  0.06  0.19  0.32  1.30  1.13  1.17  0.45  0.21  0.05  0.10  0.17  0.52  0.52    6.98
 560.    0.51  0.16  0.10  0.06  0.19  0.32  0.88  1.13  1.17  0.45  0.14  0.05  0.10  0.17  0.41  0.52    6.36
 570.    0.44  0.13  0.10  0.06  0.19  0.32  0.88  0.71  0.75  0.28  0.14  0.05  0.10  0.17  0.41  0.44    5.15
 580.    0.12  0.04  0.03  0.00  0.00  0.00  0.36  0.30  0.33  0.14  0.06  0.00  0.00  0.00  0.12  0.14    1.65
 590.    0.12  0.04  0.00  0.00  0.00  0.00  0.00  0.30  0.33  0.14  0.00  0.00  0.00  0.00  0.00  0.14    1.07
 600.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 610.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 620.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 630.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 640.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 650.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 660.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 670.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 680.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 690.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 700.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 710.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 720.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 730.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 740.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 750.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 760.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 770.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 780.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 790.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 800.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 810.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 820.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 830.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 840.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 850.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 860.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 870.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 880.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 890.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 900.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 910.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 920.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 930.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 940.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 950.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 960.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 970.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 980.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
 990.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
1000.    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00    0.00
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1          ********************************** PLUME RADIUS FRE[illegible]NCY TABLE ***********************************
              LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)-[illegible]CA
              SEASON=ANNUAL
MAXIMUM ****************************************** WIND FROM ******************************************
 FROM        N     NNE     NE    ENE     E     ESE     SE    SSE     S    SSW     SW    WSW     W    WNW     NW    NNW    ALL
TOWER  ***************************************** PLUME HEADED *****************************************
 (M)         S     SSW     SW    WSW     W     WNW     NW    NNW     N    NNE     NE    ENE     E    ESE     SE    SSE    SUM

    5.    3.97   0.87   0.60   0.54   1.75   4.08   7.74   9.48  18.18  15.20  12.26   3.88   3.40   4.29   6.85   6.91 100.00
   10.    2.95   0.64   0.49   0.54   1.75   4.08   7.38   8.85  15.36  12.17   9.14   3.79   3.37   4.23   5.13   5.31  85.19
   15.    1.58   0.46   0.34   0.43   1.57   3.77   5.31   5.71   8.54   4.56   2.71   1.73   1.46   2.19   2.39   2.34  45.07
   20.    1.15   0.37   0.26   0.33   1.15   2.95   3.92   4.26   5.76   2.64   1.29   0.92   0.97   1.40   1.48   1.53  30.39
   25.    0.80   0.28   0.21   0.27   0.96   2.32   2.78   2.66   2.95   1.23   0.64   0.50   0.66   0.88   1.02   0.95  19.11
   30.    0.66   0.23   0.17   0.18   0.71   1.71   2.13   1.91   1.93   0.79   0.38   0.29   0.43   0.65   0.79   0.76  13.74
   35.    0.59   0.21   0.15   0.15   0.57   1.35   1.71   1.56   1.50   0.61   0.28   0.20   0.33   0.53   0.67   0.68  11.08
   40.    0.59   0.21   0.15   0.13   0.47   1.12   1.71   1.56   1.50   0.61   0.28   0.16   0.28   0.44   0.67   0.68  10.57
   45.    0.54   0.16   0.15   0.13   0.47   1.12   1.71   1.40   1.38   0.56   0.28   0.16   0.28   0.44   0.67   0.60  10.05
   50.    0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
   55.    0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
   60.    0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
   65.    0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
   70.    0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
   75.    0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
   80.    0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
   85.    0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
   90.    0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
   95.    0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  100.    0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  105.    0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  110.    0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  115.    0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  120.    0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  125.    0.54   0.16   0.12   0.11   0.37   0.91   1.46   1.40   1.38   0.56   0.25   0.12   0.20   0.36   0.58   0.60   9.12
  130.    0.54   0.16   0.12   0.11   0.36   0.81   1.46   1.40   1.38   0.56   0.25   0.11   0.19   0.33   0.58   0.60   8.95
  135.    0.51   0.16   0.12   0.11   0.36   0.81   1.46   1.13   1.17   0.45   0.25   0.11   0.19   0.33   0.58   0.52   8.26
  140.    0.51   0.16   0.12   0.11   0.36   0.81   1.30   1.13   1.17   0.45   0.21   0.11   0.19   0.33   0.52   0.52   8.00
  145.    0.51   0.16   0.12   0.11   0.36   0.81   1.30   1.13   1.17   0.45   0.21   0.11   0.19   0.33   0.52   0.52   8.00
  150.    0.51   0.16   0.12   0.11   0.36   0.81   1.30   1.13   1.17   0.45   0.21   0.11   0.19   0.33   0.52   0.52   8.00
  155.    0.51   0.16   0.12   0.11   0.36   0.81   1.30   1.13   1.17   0.45   0.21   0.11   0.19   0.33   0.52   0.52   8.00
  160.    0.51   0.16   0.12   0.09   0.28   0.58   1.30   1.13   1.17   0.45   0.21   0.08   0.16   0.26   0.52   0.52   7.54
  165.    0.51   0.16   0.12   0.09   0.28   0.58   1.30   1.13   1.17   0.45   0.21   0.08   0.16   0.26   0.52   0.52   7.54
  170.    0.51   0.16   0.12   0.09   0.28   0.58   1.30   1.13   1.17   0.45   0.21   0.08   0.16   0.26   0.52   0.52   7.54
  175.    0.51   0.16   0.12   0.09   0.28   0.58   1.30   1.13   1.17   0.45   0.21   0.08   0.16   0.26   0.52   0.52   7.54
  180.    0.51   0.16   0.12   0.09   0.28   0.58   1.30   1.13   1.17   0.45   0.21   0.08   0.16   0.26   0.52   0.52   7.54
  185.    0.51   0.16   0.12   0.09   0.28   0.58   1.30   1.13   1.17   0.45   0.21   0.08   0.16   0.26   0.52   0.52   7.54
  190.    0.51   0.16   0.12   0.09   0.28   0.58   1.30   1.13   1.17   0.45   0.21   0.08   0.16   0.26   0.52   0.52   7.54
  195.    0.51   0.16   0.12   0.06   0.19   0.32   1.30   1.13   1.17   0.45   0.21   0.05   0.10   0.17   0.52   0.52   6.98
  200.    0.51   0.16   0.12   0.06   0.19   0.32   1.30   1.13   1.17   0.45   0.21   0.05   0.10   0.17   0.52   0.52   6.98
  205.    0.20   0.07   0.12   0.06   0.19   0.32   1.30   0.72   0.76   0.31   0.21   0.05   0.10   0.17   0.52   0.22   5.32
  210.    0.12   0.04   0.03   0.06   0.19   0.32   0.36   0.30   0.33   0.14   0.06   0.05   0.10   0.17   0.12   0.14   2.55
  215.    0.12   0.04   0.03   0.00   0.00   0.00   0.36   0.30   0.33   0.14   0.06   0.00   0.00   0.00   0.12   0.14   1.65
  220.    0.12   0.04   0.03   0.00   0.00   0.00   0.36   0.30   0.33   0.14   0.06   0.00   0.00   0.00   0.12   0.14   1.65
  225.    0.12   0.04   0.03   0.00   0.00   0.00   0.36   0.30   0.33   0.14   0.06   0.00   0.00   0.00   0.12   0.14   1.65
  230.    0.12   0.04   0.03   0.00   0.00   0.00   0.36   0.30   0.33   0.14   0.06   0.00   0.00   0.00   0.12   0.14   1.65
  235.    0.12   0.04   0.03   0.00   0.00   0.00   0.36   0.30   0.33   0.14   0.06   0.00   0.00   0.00   0.12   0.14   1.65
  240.    0.12   0.04   0.03   0.00   0.00   0.00   0.36   0.30   0.33   0.14   0.06   0.00   0.00   0.00   0.12   0.14   1.65
  245.    0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
  250.    0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
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1        ********************************** PLUME RADIUS FR    NCY TABLE ***********************************
              LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS) SCA
              SEASON=ANNUAL
 MAXIMUM ***************************************** WIND FROM ********************************************
  FROM       N    NNE    NE   ENE     E    ESE    SE   SSE     S    SSW    SW   WSW     W   WNW    NW   NNW     ALL
 TOWER   ***************************************** PLUME HEADED *****************************************
  (M)        S    SSW    SW   WSW     W    WNW    NW   NNW     N    NNE    NE   ENE     E   ESE    SE   SSE     SUM

   255.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   260.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   265.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   270.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   275.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   280.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   285.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   290.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   295.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   300.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   305.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   310.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   315.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   320.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   325.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   330.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   335.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   340.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   345.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   350.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   355.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   360.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   365.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   370.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   375.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   380.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   385.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   390.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   395.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   400.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   405.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   410.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   415.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   420.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   425.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   430.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   435.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   440.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   445.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   450.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   455.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   460.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   465.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   470.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   475.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   480.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   485.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   490.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   495.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
   500.   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00   0.00
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1        ********************************** HOURS OF PLUME SH[illegible]WING TABLE ***********************************
             LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)-SCA
             SEASON=ANNUAL
DISTANCE ****************************************** WIND FROM ***********************************************
  FROM         N    NNE     NE    ENE      E    ESE     SE    SSE      S    SSW     SW    WSW      W    WNW     NW    NNW    ALL
 TOWER  ***************************************** PLUME HEADED **********************************************
  (M)          S    SSW     SW    WSW      W    WNW     NW    NNW      N    NNE     NE    ENE      E    ESE     SE    SSE    AVG

   200.     43.9   58.8   85.9  151.1  383.5  580.4  544.8  419.5  356.8  278.6  375.8  593.8  684.1  143.2   47.8   46.1  299.6
   400.     44.7   43.7   40.9   70.1  298.1  204.0  227.0  140.3  111.2   82.2   76.0  101.5  143.6  262.7   32.8   25.0  119.0
   600.     44.2   42.5   33.4   82.2  163.4  140.3  140.8   98.6   73.0   62.4   33.4   39.1   58.0   84.4   28.8   30.2   72.2
   800.     45.9   39.0   33.4   96.0  112.4  113.0  114.5   83.5   68.2   54.4   19.7   21.7   41.3   60.3   28.5   30.9   60.2
  1000.     46.8   34.2   36.3  100.1   84.0   91.7  110.0   81.9   62.0   52.2   19.4   15.4   29.8   45.6   29.7   29.9   54.3
  1200.     45.8   34.0   35.0  104.4   72.2   82.7  108.4   82.0   59.4   44.6   21.3    8.6   23.0   39.4   25.7   32.6   51.2
  1400.     45.8   34.0   37.0   98.0   60.1   68.5  103.4   79.0   58.4   42.3   18.2    7.2   23.0   39.3   23.7   32.6   48.2
  1600.     44.0   34.0   36.0   97.4   51.2   64.5   98.6   77.0   59.4   40.2   16.9    6.2   21.2   40.3   19.9   31.3   46.1
  1800.     41.6   34.0   36.0   89.0   46.5   60.8   96.6   75.5   58.2   36.4   16.9    5.5   21.2   37.9   19.9   32.3   44.3
  2000.     41.3   32.7   34.9   82.2   45.6   58.1   94.8   75.5   59.1   36.4   16.9    5.5   20.1   36.9   18.9   30.9   43.1
  2200.     36.1   30.7   35.7   74.9   42.5   55.7   95.7   74.5   59.1   36.3   16.9    4.5   16.8   36.8   18.9   28.3   41.5
  2400.     32.2   29.3   34.3   66.6   39.7   55.7   94.5   75.7   59.1   36.5   16.1    3.8   16.8   35.7   17.9   28.3   40.1
  2600.     30.2   26.9   33.2   61.0   34.1   55.7   94.5   74.6   57.8   35.5   16.1    3.8   16.2   36.2   17.9   28.3   38.9
  2800.     30.2   26.9   28.5   58.2   32.4   54.2   93.3   74.6   59.0   35.6   12.9    3.0   15.2   32.4   17.9   28.3   37.7
  3000.     23.7   20.9   25.1   55.8   30.5   55.4   94.6   75.7   56.6   35.6   12.9    3.0   15.2   29.2   17.9   22.0   35.9
  3200.     20.7   18.9   25.1   51.7   28.8   55.4   92.0   73.3   56.6   33.2   11.6    3.0   14.2   29.2   16.6   21.0   34.5
  3400.     19.7   14.2   24.1   45.0   28.8   53.5   91.0   71.2   56.6   30.9   10.4    3.0   12.2   27.7   16.6   19.0   32.7
  3600.     13.2   14.2   23.1   41.7   28.3   53.5   91.9   71.2   56.6   30.9    8.4    3.0   12.2   26.7   14.6   18.0   31.7
  3800.     10.2    8.2   18.5   40.4   28.3   54.5   91.9   71.4   56.6   29.9    7.4    2.0   11.2   24.1   12.6   12.0   29.9
  4000.      5.2    4.0   18.5   39.1   28.3   52.7   90.9   70.3   53.5   28.9    7.4    2.0    8.2   21.6    8.6    6.0   27.8
  4200.      3.2    2.0   13.5   36.8   28.3   51.7   91.1   68.4   53.5   28.9    7.4    1.0    6.2   20.6    6.6    0.0   26.2
  4400.      1.2    1.0   11.5   35.8   27.2   49.6   90.1   69.7   52.5   27.9    7.4    0.0    6.2   17.1    4.6    0.0   25.1
  4600.      0.0    0.0    7.5   32.7   24.9   49.6   89.1   69.7   50.5   27.9    6.4    0.0    4.2   15.1    1.4    0.0   23.7
  4800.      0.0    0.0    7.5   23.6   25.4   46.6   86.0   61.9   46.5   26.9    5.4    0.0    4.2   12.1    1.4    0.0   21.7
  5000.      0.0    0.0    7.5   21.0   24.8   46.6   84.1   61.9   42.3   26.9    5.4    0.0    3.2   10.6    1.4    0.0   21.0
  5200.      0.0    0.0    6.0   19.8   23.2   46.6   80.1   59.9   41.3   25.9    4.4    0.0    2.2    8.4    1.4    0.0   19.9
  5400.      0.0    0.0    6.0   15.1   23.2   44.9   78.2   54.7   35.3   24.0    4.4    0.0    2.2    4.7    1.4    0.0   18.4
  5600.      0.0    0.0    2.9   11.0   20.2   44.9   68.7   44.7   28.2   21.0    4.4    0.0    2.2    4.7    0.0    0.0   15.8
  5800.      0.0    0.0    2.9    6.0   20.9   44.9   56.7   35.2   24.0   18.0    4.4    0.0    2.2    4.7    0.0    0.0   13.7
  6000.      0.0    0.0    1.9    6.0   19.9   43.9   44.4   23.3   23.0   18.0    2.4    0.0    2.2    3.5    0.0    0.0   11.8
  6200.      0.0    0.0    0.8    6.6   19.9   40.1   42.5   17.2    7.7   15.0    2.4    0.0    1.2    1.0    0.0    0.0    9.6
  6400.      0.0    0.0    0.8    6.6   18.9   40.1   38.5   14.2    4.0   13.0    2.4    0.0    1.2    1.0    0.0    0.0    8.8
  6600.      0.0    0.0    0.0    6.0   18.9   36.3   34.2   12.1    0.0   11.9    2.4    0.0    1.2    1.0    0.0    0.0    7.7
  6800.      0.0    0.0    0.0    6.0   18.9   33.2   31.7    7.7    0.0   11.9    2.4    0.0    1.2    0.0    0.0    0.0    7.1
  7000.      0.0    0.0    0.0    6.0   17.6   32.2   28.2    7.7    0.0    9.6    1.6    0.0    1.2    0.0    0.0    0.0    6.5
  7200.      0.0    0.0    0.0    6.0   17.6   29.1   28.2    5.7    0.0    8.6    1.6    0.0    1.2    0.0    0.0    0.0    6.1
  7400.      0.0    0.0    0.0    5.4   16.5   28.1   27.5    3.7    0.0    8.6    1.6    0.0    1.2    0.0    0.0    0.0    5.8
  7600.      0.0    0.0    0.0    4.5   15.2   26.8   26.2    2.2    0.0    8.6    1.6    0.0    1.2    0.0    0.0    0.0    5.4
  7800.      0.0    0.0    0.0    4.5   15.2   26.8   23.6    1.1    0.0    8.6    1.6    0.0    1.2    0.0    0.0    0.0    5.2
  8000.      0.0    0.0    0.0    4.5   15.2   25.8   22.5    1.1    0.0    4.8    1.6    0.0    1.2    0.0    0.0    0.0    4.8
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1      ***************************** TOTAL SOLAR ENERGY LO   TABLE (MJ/M**2)*******************************
           LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)   A
           SEASON=ANNUAL
DISTANCE ********************************************* WIND FROM *********************************************
  FROM       N    NNE     NE    ENE      E    ESE     SE    SSE      S    SSW     SW    WSW      W    WNW     NW    NNW    ALL
 TOWER   ******************************************** PLUME HEADED *******************************************
  (M)        S    SSW     SW    WSW      W    WNW     NW    NNW      N    NNE     NE    ENE      E    ESE     SE    SSE    AVG

   200.   17.1   17.3   22.9   30.8   65.7  106.7  137.5  118.1   92.1   60.0  107.0  172.2  214.2   49.4   23.7   21.1   78.5
   400.   15.2   12.3   11.0   10.4   26.2   30.6   57.2   45.8   33.1   17.0   11.7   10.7   21.1   36.4   15.2   11.9   22.9
   600.   15.7   11.3    8.9    9.7   13.4   21.0   35.1   34.5   26.6   12.6    7.9    4.5   11.0   18.7   13.5   13.7   16.1
   800.   16.0   10.5    8.6    9.4    9.8   17.3   29.3   29.8   26.0   12.5    6.3    3.3    9.0   14.6   13.9   14.0   14.4
  1000.   15.7    8.8    8.9    8.8    8.4   14.4   27.2   29.6   24.2   12.2    6.2    2.7    7.5   13.5   14.0   12.9   13.4
  1200.   15.3    8.5    8.6    8.8    7.5   13.3   27.2   28.6   22.9   11.3    6.4    1.9    6.5   13.4   12.2   13.6   12.9
  1400.   15.3    8.5    8.7    8.7    7.1   11.4   25.0   27.2   22.7   11.1    5.3    1.3    6.5   13.4   11.4   13.6   12.3
  1600.   14.9    8.5    8.4    8.4    6.6   11.0   24.5   26.7   23.0   10.9    5.2    1.0    6.4   12.9   10.2   13.3   12.0
  1800.   14.2    8.5    8.4    8.2    5.9   10.5   23.9   26.6   22.9   10.5    5.2    0.9    6.4   12.2   10.2   13.6   11.8
  2000.   14.2    8.3    8.3    7.6    5.9   10.4   23.4   26.7   22.9   10.5    5.2    0.9    6.4   12.0    9.9   13.2   11.6
  2200.   13.1    7.8    8.3    7.4    5.2   10.0   23.5   25.9   22.9   10.4    5.2    0.7    5.9   12.0    9.9   12.5   11.3
  2400.   11.9    7.4    8.0    6.9    4.9   10.0   23.3   26.0   22.9    9.0    5.2    0.7    5.9   12.0    9.7   12.5   11.0
  2600.   11.6    7.1    7.8    6.7    4.3   10.0   23.3   25.9   22.8    8.8    5.2    0.7    5.9   12.0    9.7   12.5   10.9
  2800.   11.6    7.1    5.9    6.7    4.2    9.9   23.3   25.9   22.9    8.6    4.4    0.7    5.4   11.2    9.7   12.5   10.6
  3000.    9.7    5.5    5.6    6.7    4.2    9.9   23.6   26.1   22.6    8.6    4.4    0.7    5.4   10.7    9.7   11.1   10.3
  3200.    9.0    5.1    5.6    6.6    4.2    9.9   23.2   25.8   22.6    8.3    4.1    0.7    5.2   10.7    9.4   10.9   10.1
  3400.    8.7    4.2    5.5    6.1    4.2    9.7   22.0   25.3   22.6    8.1    4.1    0.7    4.7   10.2    9.4   10.1    9.7
  3600.    6.3    4.2    5.3    5.8    4.2    9.7   22.0   25.3   22.6    8.1    3.4    0.7    4.7    9.8    8.6    9.9    9.4
  3800.    5.1    2.9    4.5    5.8    4.2    9.8   22.0   25.0   22.6    8.0    3.1    0.5    4.5    9.0    7.1    7.1    8.8
  4000.    2.7    1.6    4.5    5.8    4.2    9.5   21.9   24.9   22.4    7.6    3.1    0.5    3.1    7.4    4.7    4.1    8.0
  4200.    1.4    1.0    3.5    5.7    4.2    9.0   21.9   24.6   22.4    7.6    3.1    0.4    2.3    6.7    3.6    0.0    7.3
  4400.    0.2    0.7    2.5    5.1    4.1    8.6   21.7   24.8   22.0    7.4    3.1    0.0    2.3    4.8    1.7    0.0    6.8
  4600.    0.0    0.0    1.1    4.0    3.7    8.6   21.6   24.8   21.0    7.4    2.7    0.0    1.2    3.4    0.4    0.0    6.2
  4800.    0.0    0.0    1.1    3.4    3.7    7.2   21.1   23.0   19.8    7.4    2.5    0.0    1.2    1.9    0.4    0.0    5.8
  5000.    0.0    0.0    1.1    2.7    3.7    7.2   20.8   23.0   19.3    7.4    2.5    0.0    0.7    1.5    0.4    0.0    5.6
  5200.    0.0    0.0    0.8    2.6    3.2    7.2   19.0   22.0   18.4    6.8    1.1    0.0    0.2    1.2    0.4    0.0    5.2
  5400.    0.0    0.0    0.8    1.7    3.2    7.1   18.0   20.5   15.6    6.5    1.1    0.0    0.2    0.5    0.4    0.0    4.7
  5600.    0.0    0.0    0.2    1.2    1.2    7.1   16.0   16.5   11.0    4.4    1.1    0.0    0.2    0.5    0.0    0.0    3.7
  5800.    0.0    0.0    0.2    0.1    1.2    7.1   13.1   12.3    9.0    3.0    1.1    0.0    0.2    0.5    0.0    0.0    3.0
  6000.    0.0    0.0    0.1    0.1    1.2    6.4    8.6    7.2    7.9    3.0    0.0    0.0    0.2    0.3    0.0    0.0    2.2
  6200.    0.0    0.0    0.0    0.1    1.2    5.0    8.3    4.3    1.8    2.1    0.0    0.0    0.1    0.1    0.0    0.0    1.4
  6400.    0.0    0.0    0.0    0.1    1.0    5.0    6.7    2.8    1.1    1.3    0.0    0.0    0.1    0.1    0.0    0.0    1.1
  6600.    0.0    0.0    0.0    0.1    1.0    4.1    5.3    2.4    0.0    1.2    0.0    0.0    0.1    0.1    0.0    0.0    0.9
  6800.    0.0    0.0    0.0    0.1    1.0    3.4    4.6    1.4    0.0    1.2    0.0    0.0    0.1    0.0    0.0    0.0    0.7
  7000.    0.0    0.0    0.0    0.1    0.8    3.1    3.6    1.4    0.0    0.9    0.0    0.0    0.1    0.0    0.0    0.0    0.6
  7200.    0.0    0.0    0.0    0.1    0.8    2.5    3.6    1.0    0.0    0.8    0.0    0.0    0.1    0.0    0.0    0.0    0.6
  7400.    0.0    0.0    0.0    0.1    0.8    2.3    3.6    0.5    0.0    0.8    0.0    0.0    0.1    0.0    0.0    0.0    0.5
  7600.    0.0    0.0    0.0    0.1    0.6    2.0    3.4    0.1    0.0    0.8    0.0    0.0    0.1    0.0    0.0    0.0    0.4
  7800.    0.0    0.0    0.0    0.1    0.6    2.0    2.7    0.1    0.0    0.8    0.0    0.0    0.1    0.0    0.0    0.0    0.4
  8000.    0.0    0.0    0.0    0.1    0.6    1.9    2.6    0.1    0.0    0.4    0.0    0.0    0.1    0.0    0.0    0.0    0.4
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          ******************************** PERCENT TOTAL ENE     LOSS TABLE **********************************
               LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)-SCA
               SEASON=ANNUAL
DISTANCE ********************************************* WIND FROM ***********************************************
  FROM        N    NNE     NE    ENE      E    ESE     SE    SSE      S    SSW     SW    WSW      W    WNW     NW    NNW    ALL
 TOWER   ******************************************** PLUME HEADED *********************************************
  (M)         S    SSW     SW    WSW      W    WNW     NW    NNW      N    NNE     NE    ENE      E    ESE     SE    SSE    AVG

   200.     0.1    0.1    0.1    0.1    0.2    0.4    0.5    0.4    0.3    0.2    0.4    0.6    0.7    0.2    0.1    0.1    0.3
   400.     0.1    0.0    0.0    0.0    0.1    0.1    0.2    0.2    0.1    0.1    0.0    0.0    0.1    0.1    0.1    0.0    0.1
   600.     0.1    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.1    0.0    0.0    0.1
   800.     0.1    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1000.     0.1    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1200.     0.1    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1400.     0.1    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1600.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1800.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  2000.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  2200.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  2400.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  2600.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  2800.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  3000.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  3200.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  3400.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  3600.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  3800.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  4000.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  4200.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  4400.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  4600.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  4800.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  5000.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  5200.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  5400.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  5600.     0.0    0.0    0.0    0.0    0.0    0.0    0.1    0.1    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  5800.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  6000.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  6200.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  6400.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  6600.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  6800.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  7000.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  7200.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  7400.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  7600.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  7800.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  8000.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
```

```
1        ********************************* PERCENT BEAM ENER   OSS TABLE ***********************************
             LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)-  A
             SEASON=ANNUAL
 DISTANCE ********************************************* WIND FROM *********************************************
   FROM       N    NNE    NE   ENE     E   ESE    SE   SSE     S   SSW    SW   WSW     W   WNW    NW   NNW   ALL
  TOWER   ******************************************** PLUME HEADED ******************************************
   (M)        S    SSW    SW   WSW     W   WNW    NW   NNW     N   NNE    NE   ENE     E   ESE    SE   SSE   AVG

    200.    0.1   0.1   0.1   0.2   0.3   0.5   0.7   0.6   0.5   0.3   0.5   0.9   1.1   0.3   0.1   0.1   0.4
    400.    0.1   0.1   0.1   0.1   0.1   0.2   0.3   0.2   0.2   0.1   0.1   0.1   0.1   0.2   0.1   0.1   0.1
    600.    0.1   0.1   0.0   0.0   0.1   0.1   0.2   0.2   0.1   0.1   0.0   0.0   0.1   0.1   0.1   0.1   0.1
    800.    0.1   0.1   0.0   0.0   0.0   0.1   0.1   0.2   0.1   0.1   0.0   0.0   0.0   0.1   0.1   0.1   0.1
   1000.    0.1   0.0   0.0   0.0   0.0   0.1   0.1   0.2   0.1   0.1   0.0   0.0   0.0   0.1   0.1   0.1   0.1
   1200.    0.1   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.1   0.1   0.1   0.1
   1400.    0.1   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.1   0.1   0.1   0.1
   1600.    0.1   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.1   0.1   0.1   0.1
   1800.    0.1   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.1   0.1   0.1   0.1
   2000.    0.1   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.1   0.1   0.1   0.1
   2200.    0.1   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.1   0.1   0.1   0.1
   2400.    0.1   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.1   0.0   0.1   0.1
   2600.    0.1   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.1   0.0   0.1   0.1
   2800.    0.1   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.1   0.0   0.1   0.1
   3000.    0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.1   0.0   0.1   0.1
   3200.    0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.1   0.0   0.1   0.1
   3400.    0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.1   0.0   0.1   0.0
   3600.    0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.0
   3800.    0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   4000.    0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   4200.    0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   4400.    0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   4600.    0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   4800.    0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   5000.    0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   5200.    0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   5400.    0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   5600.    0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   5800.    0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   6000.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   6200.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   6400.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   6600.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   6800.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   7000.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   7200.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   7400.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   7600.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   7800.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   8000.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
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1       ********************************** PLUME SALT DEPO    ON TABLE (KG./(KM.**2-MO.)) ********************************
             LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS) SCA
             SEASON=ANNUAL
DISTANCE ************************************************** WIND FROM *************************************************
  FROM       N     NNE     NE     ENE      E      ESE     SE     SSE      S     SSW     SW     WSW      W     WNW     NW     NNW    ALL
 TOWER  ************************************************** PLUME HEADED ***********************************************
  (M)        S     SSW     SW     WSW      W      WNW     NW     NNW      N     NNE     NE     ENE      E     ESE     SE     SSE    AVG

   100.    0.11   0.00   0.00   0.23   0.20   1.02   0.00   0.00   0.11   0.06   0.24  14.96   5.17  10.75   0.27   0.28   2.09
   200.    5.51   1.17   0.67   2.04   6.37  14.96   9.08  13.17  25.64  21.98  18.00  25.94  17.68  24.45   9.84   9.91  12.90
   300.    7.72   1.62   1.06   0.73   2.80   6.85  13.11  17.14  34.77  30.66  23.69   8.18   4.16   7.59  12.68  13.82  11.66
   400.    1.10   0.39   0.39   0.23   1.01   2.15   4.79   3.51   4.71   2.43   4.46   2.54   1.42   2.43   3.50   1.55   2.29
   500.    0.15   0.13   0.08   0.19   0.91   1.90   0.77   0.45   0.34   0.16   1.06   0.60   0.48   0.62   0.85   0.23   0.56
   600.    0.15   0.13   0.08   0.09   0.43   0.94   0.77   0.45   0.34   0.16   1.06   0.22   0.30   0.36   0.85   0.23   0.41
   700.    0.15   0.13   0.08   0.03   0.10   0.25   0.77   0.45   0.34   0.16   1.06   0.08   0.06   0.09   0.85   0.23   0.30
   800.    0.14   0.12   0.04   0.03   0.10   0.25   0.35   0.42   0.32   0.15   1.00   0.08   0.06   0.09   0.71   0.21   0.25
   900.    0.01   0.00   0.01   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.96   0.08   0.06   0.09   0.61   0.02   0.15
  1000.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.45   0.08   0.06   0.09   0.29   0.02   0.09
  1100.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  1200.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  1300.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  1400.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  1500.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  1600.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  1700.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  1800.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  1900.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  2000.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  2100.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  2200.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  2300.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  2400.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  2500.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  2600.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  2700.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  2800.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  2900.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  3000.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  3100.    0.01   0.00   0.00   0.03   0.10   0.25   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  3200.    0.01   0.00   0.00   0.02   0.10   0.24   0.04   0.03   0.04   0.02   0.02   0.08   0.06   0.09   0.02   0.02   0.05
  3300.    0.01   0.00   0.00   0.02   0.08   0.18   0.04   0.03   0.04   0.02   0.02   0.07   0.04   0.06   0.02   0.02   0.04
  3400.    0.01   0.00   0.00   0.02   0.07   0.15   0.04   0.03   0.04   0.02   0.02   0.06   0.04   0.05   0.02   0.02   0.04
  3500.    0.01   0.00   0.00   0.02   0.07   0.15   0.04   0.03   0.04   0.02   0.02   0.06   0.04   0.05   0.02   0.02   0.04
  3600.    0.01   0.00   0.00   0.02   0.07   0.15   0.04   0.03   0.04   0.02   0.02   0.06   0.04   0.05   0.02   0.02   0.04
  3700.    0.01   0.00   0.00   0.01   0.05   0.11   0.04   0.03   0.04   0.02   0.02   0.04   0.03   0.04   0.02   0.02   0.03
  3800.    0.01   0.00   0.00   0.01   0.03   0.08   0.04   0.03   0.04   0.02   0.02   0.03   0.03   0.04   0.02   0.02   0.03
  3900.    0.01   0.00   0.00   0.01   0.03   0.07   0.04   0.03   0.04   0.02   0.02   0.02   0.03   0.03   0.02   0.02   0.03
  4000.    0.01   0.00   0.00   0.01   0.03   0.07   0.04   0.03   0.04   0.02   0.02   0.02   0.03   0.03   0.02   0.02   0.03
  4100.    0.01   0.00   0.00   0.01   0.03   0.07   0.04   0.03   0.04   0.02   0.02   0.02   0.03   0.03   0.02   0.02   0.03
  4200.    0.01   0.00   0.00   0.01   0.03   0.07   0.04   0.03   0.04   0.02   0.02   0.02   0.03   0.03   0.02   0.02   0.02
  4300.    0.01   0.00   0.00   0.01   0.03   0.07   0.04   0.03   0.04   0.02   0.02   0.02   0.03   0.03   0.02   0.02   0.02
  4400.    0.01   0.00   0.00   0.01   0.02   0.05   0.04   0.03   0.04   0.02   0.02   0.02   0.02   0.03   0.02   0.02   0.02
  4500.    0.01   0.00   0.00   0.01   0.02   0.05   0.04   0.03   0.04   0.02   0.02   0.02   0.02   0.03   0.02   0.02   0.02
  4600.    0.01   0.00   0.00   0.01   0.02   0.05   0.04   0.03   0.04   0.02   0.02   0.02   0.02   0.03   0.02   0.02   0.02
  4700.    0.01   0.00   0.00   0.01   0.02   0.05   0.04   0.03   0.04   0.02   0.02   0.02   0.02   0.03   0.02   0.02   0.02
  4800.    0.01   0.00   0.00   0.01   0.02   0.05   0.04   0.03   0.04   0.02   0.02   0.02   0.02   0.03   0.02   0.02   0.02
  4900.    0.01   0.00   0.00   0.01   0.02   0.05   0.04   0.03   0.04   0.02   0.02   0.02   0.02   0.03   0.02   0.02   0.02
  5000.    0.01   0.00   0.00   0.01   0.02   0.05   0.04   0.03   0.04   0.02   0.02   0.02   0.02   0.03   0.02   0.02   0.02
```

```
1       ********************************** PLUME SALT DEPOS    N TABLE (KG./(KM.**2-MO.)) ******************************
              LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)-  A
              SEASON=ANNUAL
DISTANCE ********************************************************* WIND FROM ***********************************************************
 FROM        N     NNE     NE     ENE      E      ESE     SE     SSE      S     SSW     SW     WSW      W     WNW     NW     NNW    ALL
 TOWER   ******************************************************** PLUME HEADED ********************************************************
  (M)        S     SSW     SW     WSW      W      WNW     NW     NNW      N     NNE     NE     ENE      E     ESE     SE     SSE    AVG

  5100.    0.01   0.00   0.00   0.01   0.02   0.05   0.04   0.03   0.04   0.02   0.02   0.02   0.02   0.03   0.02   0.02   0.02
  5200.    0.01   0.00   0.00   0.01   0.02   0.04   0.04   0.03   0.04   0.02   0.02   0.02   0.02   0.02   0.02   0.02   0.02
  5300.    0.01   0.00   0.00   0.01   0.02   0.04   0.04   0.03   0.04   0.02   0.02   0.02   0.02   0.02   0.02   0.02   0.02
  5400.    0.01   0.00   0.00   0.01   0.02   0.04   0.04   0.03   0.04   0.02   0.02   0.02   0.02   0.02   0.02   0.02   0.02
  5500.    0.01   0.00   0.00   0.01   0.02   0.04   0.04   0.03   0.04   0.02   0.02   0.02   0.02   0.02   0.02   0.02   0.02
  5600.    0.01   0.00   0.00   0.01   0.02   0.04   0.04   0.03   0.04   0.02   0.02   0.02   0.02   0.02   0.02   0.02   0.02
  5700.    0.01   0.00   0.00   0.01   0.02   0.04   0.04   0.03   0.04   0.02   0.02   0.02   0.02   0.02   0.02   0.02   0.02
  5800.    0.01   0.00   0.00   0.00   0.02   0.03   0.04   0.03   0.04   0.02   0.02   0.01   0.01   0.02   0.02   0.02   0.02
  5900.    0.01   0.00   0.00   0.00   0.02   0.03   0.04   0.03   0.04   0.02   0.02   0.01   0.01   0.02   0.02   0.02   0.02
  6000.    0.01   0.00   0.00   0.00   0.02   0.03   0.04   0.03   0.04   0.02   0.02   0.01   0.01   0.02   0.02   0.02   0.02
  6100.    0.01   0.00   0.00   0.00   0.02   0.03   0.04   0.03   0.04   0.02   0.02   0.01   0.01   0.02   0.02   0.02   0.02
  6200.    0.01   0.00   0.00   0.00   0.02   0.03   0.04   0.03   0.04   0.02   0.02   0.01   0.01   0.02   0.02   0.02   0.02
  6300.    0.01   0.00   0.00   0.00   0.02   0.03   0.04   0.03   0.04   0.02   0.02   0.01   0.01   0.02   0.02   0.02   0.02
  6400.    0.01   0.00   0.00   0.00   0.01   0.03   0.04   0.03   0.04   0.02   0.02   0.01   0.01   0.02   0.02   0.02   0.02
  6500.    0.01   0.00   0.00   0.00   0.01   0.01   0.04   0.03   0.04   0.02   0.02   0.01   0.01   0.01   0.02   0.02   0.02
  6600.    0.01   0.00   0.00   0.00   0.01   0.01   0.04   0.03   0.04   0.02   0.02   0.01   0.01   0.01   0.02   0.02   0.02
  6700.    0.01   0.00   0.00   0.00   0.01   0.01   0.04   0.03   0.04   0.02   0.02   0.01   0.01   0.01   0.02   0.02   0.02
  6800.    0.01   0.00   0.00   0.00   0.01   0.01   0.04   0.03   0.04   0.02   0.02   0.01   0.01   0.01   0.02   0.01   0.01
  6900.    0.00   0.00   0.00   0.00   0.01   0.01   0.03   0.02   0.03   0.02   0.02   0.01   0.01   0.01   0.01   0.01   0.01
  7000.    0.00   0.00   0.00   0.00   0.00   0.01   0.03   0.02   0.03   0.02   0.02   0.01   0.00   0.01   0.01   0.01   0.01
  7100.    0.00   0.00   0.00   0.00   0.00   0.01   0.03   0.02   0.03   0.02   0.02   0.01   0.00   0.01   0.01   0.01   0.01
  7200.    0.00   0.00   0.00   0.00   0.00   0.01   0.02   0.02   0.03   0.02   0.02   0.01   0.00   0.01   0.01   0.01   0.01
  7300.    0.00   0.00   0.00   0.00   0.00   0.01   0.02   0.02   0.03   0.02   0.02   0.01   0.00   0.01   0.01   0.01   0.01
  7400.    0.00   0.00   0.00   0.00   0.00   0.01   0.02   0.02   0.03   0.02   0.02   0.01   0.00   0.01   0.01   0.01   0.01
  7500.    0.00   0.00   0.00   0.00   0.00   0.01   0.02   0.02   0.03   0.02   0.02   0.01   0.00   0.01   0.01   0.01   0.01
  7600.    0.00   0.00   0.00   0.00   0.00   0.01   0.02   0.02   0.03   0.02   0.02   0.01   0.00   0.01   0.01   0.01   0.01
  7700.    0.00   0.00   0.00   0.00   0.00   0.01   0.02   0.02   0.02   0.01   0.02   0.01   0.00   0.01   0.01   0.01   0.01
  7800.    0.00   0.00   0.00   0.00   0.00   0.01   0.02   0.01   0.02   0.01   0.02   0.01   0.00   0.01   0.01   0.01   0.01
  7900.    0.00   0.00   0.00   0.00   0.00   0.01   0.02   0.01   0.02   0.01   0.02   0.01   0.00   0.01   0.01   0.01   0.01
  8000.    0.00   0.00   0.00   0.00   0.00   0.01   0.02   0.01   0.02   0.01   0.02   0.01   0.00   0.01   0.01   0.01   0.01
  8100.    0.00   0.00   0.00   0.00   0.00   0.01   0.02   0.01   0.02   0.01   0.02   0.01   0.00   0.01   0.01   0.01   0.01
  8200.    0.00   0.00   0.00   0.00   0.00   0.01   0.02   0.01   0.02   0.01   0.02   0.01   0.00   0.01   0.01   0.01   0.01
  8300.    0.00   0.00   0.00   0.00   0.00   0.01   0.02   0.01   0.02   0.01   0.02   0.01   0.00   0.01   0.01   0.01   0.01
  8400.    0.00   0.00   0.00   0.00   0.00   0.01   0.02   0.01   0.02   0.01   0.02   0.01   0.00   0.01   0.01   0.01   0.01
  8500.    0.00   0.00   0.00   0.00   0.00   0.01   0.01   0.01   0.02   0.01   0.01   0.01   0.00   0.01   0.01   0.01   0.01
  8600.    0.00   0.00   0.00   0.00   0.00   0.01   0.01   0.01   0.02   0.01   0.01   0.01   0.00   0.01   0.01   0.01   0.01
  8700.    0.00   0.00   0.00   0.00   0.00   0.01   0.01   0.01   0.02   0.01   0.01   0.01   0.00   0.01   0.01   0.01   0.01
  8800.    0.00   0.00   0.00   0.00   0.00   0.01   0.01   0.01   0.02   0.01   0.01   0.01   0.00   0.01   0.01   0.01   0.01
  8900.    0.00   0.00   0.00   0.00   0.00   0.01   0.01   0.01   0.02   0.01   0.01   0.01   0.00   0.01   0.01   0.01   0.01
  9000.    0.00   0.00   0.00   0.00   0.00   0.01   0.01   0.01   0.02   0.01   0.01   0.01   0.00   0.01   0.01   0.01   0.01
  9100.    0.00   0.00   0.00   0.00   0.00   0.01   0.01   0.01   0.02   0.01   0.01   0.01   0.00   0.01   0.01   0.01   0.01
  9200.    0.00   0.00   0.00   0.00   0.00   0.01   0.01   0.01   0.02   0.01   0.01   0.01   0.00   0.01   0.01   0.01   0.01
  9300.    0.00   0.00   0.00   0.00   0.00   0.01   0.01   0.01   0.02   0.01   0.01   0.01   0.00   0.01   0.01   0.01   0.01
  9400.    0.00   0.00   0.00   0.00   0.00   0.01   0.01   0.01   0.02   0.01   0.01   0.01   0.00   0.01   0.01   0.01   0.01
  9500.    0.00   0.00   0.00   0.00   0.00   0.01   0.01   0.01   0.02   0.01   0.01   0.01   0.00   0.01   0.01   0.01   0.01
  9600.    0.00   0.00   0.00   0.00   0.00   0.01   0.01   0.01   0.02   0.01   0.01   0.01   0.00   0.01   0.01   0.01   0.01
  9700.    0.00   0.00   0.00   0.00   0.00   0.01   0.01   0.01   0.02   0.01   0.01   0.01   0.00   0.01   0.01   0.01   0.01
  9800.    0.00   0.00   0.00   0.00   0.00   0.01   0.01   0.01   0.02   0.01   0.01   0.01   0.00   0.01   0.01   0.01   0.01
  9900.    0.00   0.00   0.00   0.00   0.00   0.01   0.01   0.01   0.02   0.01   0.01   0.01   0.00   0.01   0.01   0.01   0.01
 10000.    0.00   0.00   0.00   0.00   0.00   0.01   0.01   0.01   0.02   0.01   0.01   0.01   0.00   0.01   0.01   0.01   0.01
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1          ********************************* PLUME WATER DEPOSIT[illegible] TABLE (KG./(KM.**2-MO.)) ***********************************
                LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)-[illegible]
                SEASON=ANNUAL
DISTANCE ************************************************* WIND FROM *************************************************
  FROM       N     NNE     NE    ENE      E     ESE     SE    SSE      S     SSW     SW    WSW      W     WNW     NW    NNW    ALL
 TOWER   ************************************************* PLUME HEADED **********************************************
  (M)        S     SSW     SW    WSW      W     WNW     NW    NNW      N     NNE     NE    ENE      E     ESE     SE    SSE    AVG

   100. .56E+02.00E+00.39E+00.12E+03.96E+02.50E+03.39E+00.00E+00.56E+02.28E+02.12E+03.75E+04.26E+04.54E+04.14E+03.14E+03.10E+04
   200. .20E+04.43E+03.27E+03.92E+03.29E+04.70E+04.38E+04.53E+04.97E+04.81E+04.72E+04.12E+05.76E+04.11E+05.41E+04.37E+04.54E+04
   300. .29E+04.62E+03.43E+03.35E+03.13E+04.33E+04.57E+04.72E+04.14E+05.12E+05.92E+04.40E+04.20E+04.37E+04.50E+04.53E+04.48E+04
   400. .51E+03.18E+03.17E+03.10E+03.45E+03.95E+03.22E+04.16E+04.22E+04.11E+04.19E+04.12E+04.68E+03.12E+04.15E+04.71E+03.10E+04
   500. .66E+02.57E+02.36E+02.83E+02.40E+03.84E+03.35E+03.20E+03.15E+03.69E+02.52E+03.26E+03.21E+03.27E+03.41E+03.10E+03.25E+03
   600. .66E+02.57E+02.36E+02.40E+02.19E+03.41E+03.35E+03.20E+03.15E+03.69E+02.52E+03.94E+02.13E+03.15E+03.41E+03.10E+03.19E+03
   700. .66E+02.57E+02.36E+02.82E+01.35E+02.83E+02.35E+03.20E+03.15E+03.69E+02.52E+03.26E+02.16E+02.26E+02.41E+03.10E+03.14E+03
   800. .61E+02.53E+02.17E+02.82E+01.35E+02.83E+02.15E+03.19E+03.14E+03.64E+02.49E+03.26E+02.16E+02.26E+02.35E+03.94E+02.11E+03
   900. .39E+01.11E+01.27E+01.82E+01.35E+02.83E+02.13E+02.92E+01.96E+01.46E+01.48E+03.26E+02.16E+02.26E+02.30E+03.46E+01.64E+02
  1000. .39E+01.11E+01.18E+01.82E+01.35E+02.83E+02.12E+02.92E+01.96E+01.46E+01.22E+03.26E+02.16E+02.26E+02.14E+03.46E+01.37E+02
  1100. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  1200. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  1300. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  1400. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  1500. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  1600. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  1700. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  1800. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  1900. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  2000. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  2100. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  2200. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  2300. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  2400. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  2500. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  2600. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  2700. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  2800. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  2900. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  3000. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  3100. .39E+01.11E+01.93E+00.82E+01.35E+02.83E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.26E+02.53E+01.46E+01.16E+02
  3200. .39E+01.11E+01.93E+00.80E+01.34E+02.79E+02.11E+02.92E+01.96E+01.46E+01.40E+01.26E+02.16E+02.25E+02.53E+01.46E+01.15E+02
  3300. .39E+01.11E+01.93E+00.65E+01.27E+02.63E+02.11E+02.92E+01.96E+01.46E+01.40E+01.24E+02.12E+02.20E+02.53E+01.46E+01.13E+02
  3400. .39E+01.11E+01.93E+00.56E+01.24E+02.53E+02.11E+02.92E+01.96E+01.46E+01.40E+01.22E+02.98E+01.16E+02.53E+01.46E+01.12E+02
  3500. .39E+01.11E+01.93E+00.56E+01.24E+02.53E+02.11E+02.92E+01.96E+01.46E+01.40E+01.22E+02.98E+01.16E+02.53E+01.46E+01.12E+02
  3600. .39E+01.11E+01.93E+00.56E+01.24E+02.53E+02.11E+02.92E+01.96E+01.46E+01.40E+01.22E+02.98E+01.16E+02.53E+01.46E+01.12E+02
  3700. .39E+01.11E+01.93E+00.34E+01.13E+02.32E+02.11E+02.92E+01.96E+01.46E+01.40E+01.11E+02.76E+01.11E+02.53E+01.46E+01.83E+01
  3800. .39E+01.11E+01.93E+00.22E+01.76E+01.20E+02.11E+02.92E+01.96E+01.46E+01.40E+01.57E+01.62E+01.86E+01.53E+01.46E+01.65E+01
  3900. .39E+01.11E+01.93E+00.21E+01.71E+01.19E+02.11E+02.92E+01.96E+01.46E+01.40E+01.54E+01.59E+01.82E+01.53E+01.46E+01.63E+01
  4000. .39E+01.11E+01.93E+00.21E+01.71E+01.19E+02.11E+02.92E+01.96E+01.46E+01.40E+01.54E+01.59E+01.82E+01.53E+01.46E+01.63E+01
  4100. .39E+01.11E+01.93E+00.21E+01.71E+01.19E+02.11E+02.92E+01.96E+01.46E+01.40E+01.54E+01.59E+01.82E+01.53E+01.46E+01.63E+01
  4200. .39E+01.11E+01.93E+00.21E+01.68E+01.17E+02.11E+02.92E+01.96E+01.46E+01.40E+01.51E+01.58E+01.77E+01.53E+01.46E+01.61E+01
  4300. .39E+01.11E+01.93E+00.21E+01.65E+01.15E+02.11E+02.92E+01.96E+01.46E+01.40E+01.49E+01.56E+01.71E+01.53E+01.46E+01.59E+01
  4400. .39E+01.11E+01.93E+00.20E+01.57E+01.12E+02.11E+02.92E+01.96E+01.46E+01.40E+01.44E+01.47E+01.63E+01.53E+01.46E+01.56E+01
  4500. .39E+01.11E+01.93E+00.19E+01.56E+01.12E+02.11E+02.92E+01.96E+01.46E+01.40E+01.43E+01.46E+01.62E+01.53E+01.46E+01.56E+01
  4600. .39E+01.11E+01.93E+00.19E+01.56E+01.12E+02.11E+02.92E+01.96E+01.46E+01.40E+01.43E+01.46E+01.62E+01.53E+01.46E+01.56E+01
  4700. .39E+01.11E+01.93E+00.19E+01.56E+01.12E+02.11E+02.92E+01.96E+01.46E+01.40E+01.43E+01.46E+01.62E+01.53E+01.46E+01.56E+01
  4800. .39E+01.11E+01.93E+00.19E+01.56E+01.12E+02.11E+02.92E+01.96E+01.46E+01.40E+01.43E+01.46E+01.62E+01.53E+01.46E+01.56E+01
  4900. .39E+01.11E+01.93E+00.19E+01.56E+01.12E+02.11E+02.92E+01.96E+01.46E+01.40E+01.43E+01.46E+01.62E+01.53E+01.46E+01.56E+01
  5000. .39E+01.11E+01.93E+00.19E+01.56E+01.12E+02.11E+02.92E+01.96E+01.46E+01.40E+01.43E+01.46E+01.62E+01.53E+01.46E+01.56E+01
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1         ****************************** PLUME WATER DEPOSIT   TABLE (KG./(KM.**2-MO.)) ***************************  *****
          LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)-S A
          SEASON=ANNUAL
DISTANCE ***************************************************** WIND FROM *********************************************************
 FROM         N      NNE     NE     ENE      E      ESE     SE     SSE      S      SSW     SW     WSW      W      WNW     NW     NNW    ALL
 TOWER   *************************************************** PLUME HEADED ******************************************************
  (M)         S      SSW     SW     WSW      W      WNW     NW     NNW      N      NNE     NE     ENE      E      ESE     SE     SSE    AVG

  5100. .39E+01.11E+01.93E+00.18E+01.54E+01.12E+02.11E+02.92E+01.96E+01.46E+01.40E+01.42E+01.45E+01.60E+01.53E+01.46E+01.55E+01
  5200. .39E+01.11E+01.93E+00.16E+01.49E+01.10E+02.11E+02.92E+01.96E+01.46E+01.40E+01.38E+01.41E+01.56E+01.53E+01.46E+01.53E+01
  5300. .39E+01.11E+01.93E+00.16E+01.49E+01.10E+02.11E+02.92E+01.96E+01.46E+01.40E+01.38E+01.41E+01.56E+01.53E+01.46E+01.53E+01
  5400. .39E+01.11E+01.93E+00.16E+01.49E+01.10E+02.11E+02.92E+01.96E+01.46E+01.40E+01.38E+01.41E+01.56E+01.53E+01.46E+01.53E+01
  5500. .39E+01.11E+01.93E+00.16E+01.49E+01.10E+02.11E+02.92E+01.96E+01.46E+01.40E+01.38E+01.41E+01.56E+01.53E+01.46E+01.53E+01
  5600. .39E+01.11E+01.93E+00.16E+01.49E+01.10E+02.11E+02.92E+01.96E+01.46E+01.40E+01.38E+01.41E+01.56E+01.53E+01.46E+01.53E+01
  5700. .39E+01.11E+01.93E+00.16E+01.49E+01.10E+02.11E+02.92E+01.96E+01.46E+01.40E+01.38E+01.41E+01.56E+01.53E+01.46E+01.53E+01
  5800. .39E+01.11E+01.93E+00.13E+01.40E+01.76E+01.11E+02.92E+01.96E+01.46E+01.40E+01.30E+01.32E+01.48E+01.53E+01.46E+01.49E+01
  5900. .39E+01.11E+01.93E+00.13E+01.40E+01.76E+01.11E+02.92E+01.96E+01.46E+01.40E+01.30E+01.32E+01.48E+01.53E+01.46E+01.49E+01
  6000. .39E+01.11E+01.93E+00.13E+01.40E+01.76E+01.11E+02.92E+01.96E+01.46E+01.40E+01.30E+01.32E+01.48E+01.53E+01.46E+01.49E+01
  6100. .39E+01.11E+01.93E+00.13E+01.40E+01.76E+01.11E+02.92E+01.96E+01.46E+01.40E+01.30E+01.32E+01.48E+01.53E+01.46E+01.49E+01
  6200. .39E+01.11E+01.93E+00.13E+01.40E+01.76E+01.11E+02.92E+01.96E+01.46E+01.40E+01.30E+01.32E+01.48E+01.53E+01.46E+01.49E+01
  6300. .39E+01.11E+01.93E+00.13E+01.40E+01.76E+01.11E+02.92E+01.96E+01.46E+01.40E+01.30E+01.32E+01.48E+01.53E+01.46E+01.49E+01
  6400. .39E+01.11E+01.93E+00.10E+01.34E+01.64E+01.11E+02.92E+01.96E+01.46E+01.40E+01.26E+01.28E+01.42E+01.53E+01.46E+01.47E+01
  6500. .39E+01.11E+01.93E+00.23E+00.10E+01.22E+01.11E+02.92E+01.96E+01.46E+01.40E+01.13E+01.10E+01.17E+01.53E+01.46E+01.39E+01
  6600. .39E+01.11E+01.93E+00.23E+00.10E+01.22E+01.11E+02.92E+01.96E+01.46E+01.40E+01.13E+01.10E+01.17E+01.53E+01.46E+01.39E+01
  6700. .39E+01.11E+01.93E+00.23E+00.10E+01.22E+01.11E+02.92E+01.96E+01.46E+01.40E+01.13E+01.10E+01.17E+01.53E+01.46E+01.39E+01
  6800. .33E+01.92E+00.80E+00.23E+00.10E+01.22E+01.10E+02.84E+01.88E+01.43E+01.38E+01.13E+01.10E+01.17E+01.47E+01.40E+01.35E+01
  6900. .90E+00.25E+00.27E+00.23E+00.10E+01.22E+01.60E+01.52E+01.56E+01.32E+01.32E+01.13E+01.10E+01.17E+01.25E+01.17E+01.23E+01
  7000. .90E+00.25E+00.27E+00.18E+00.72E+00.16E+01.60E+01.52E+01.56E+01.32E+01.32E+01.11E+01.79E+00.13E+01.25E+01.17E+01.22E+01
  7100. .90E+00.25E+00.27E+00.18E+00.72E+00.16E+01.60E+01.52E+01.56E+01.32E+01.32E+01.11E+01.79E+00.13E+01.25E+01.17E+01.22E+01
  7200. .90E+00.25E+00.26E+00.18E+00.72E+00.16E+01.56E+01.52E+01.56E+01.32E+01.32E+01.11E+01.79E+00.13E+01.23E+01.17E+01.21E+01
  7300. .90E+00.25E+00.22E+00.18E+00.72E+00.16E+01.41E+01.52E+01.56E+01.32E+01.28E+01.11E+01.79E+00.13E+01.17E+01.17E+01.20E+01
  7400. .90E+00.25E+00.22E+00.18E+00.72E+00.16E+01.41E+01.52E+01.56E+01.32E+01.28E+01.11E+01.79E+00.13E+01.17E+01.17E+01.20E+01
  7500. .90E+00.25E+00.22E+00.18E+00.72E+00.16E+01.41E+01.52E+01.56E+01.32E+01.28E+01.11E+01.79E+00.13E+01.17E+01.17E+01.20E+01
  7600. .90E+00.25E+00.22E+00.18E+00.72E+00.16E+01.41E+01.52E+01.56E+01.32E+01.28E+01.11E+01.79E+00.13E+01.17E+01.17E+01.20E+01
  7700. .67E+00.22E+00.22E+00.18E+00.72E+00.16E+01.41E+01.32E+01.40E+01.24E+01.28E+01.11E+01.79E+00.13E+01.17E+01.11E+01.16E+01
  7800. .61E+00.21E+00.22E+00.18E+00.72E+00.16E+01.41E+01.27E+01.36E+01.22E+01.28E+01.11E+01.79E+00.13E+01.17E+01.96E+00.15E+01
  7900. .61E+00.21E+00.22E+00.18E+00.72E+00.16E+01.41E+01.27E+01.36E+01.22E+01.28E+01.11E+01.79E+00.13E+01.17E+01.96E+00.15E+01
  8000. .61E+00.21E+00.22E+00.18E+00.72E+00.16E+01.41E+01.27E+01.36E+01.22E+01.28E+01.11E+01.79E+00.13E+01.17E+01.96E+00.15E+01
  8100. .61E+00.21E+00.22E+00.18E+00.72E+00.16E+01.41E+01.27E+01.36E+01.22E+01.28E+01.11E+01.79E+00.13E+01.17E+01.96E+00.15E+01
  8200. .61E+00.21E+00.22E+00.18E+00.72E+00.16E+01.41E+01.27E+01.36E+01.22E+01.28E+01.11E+01.79E+00.13E+01.17E+01.96E+00.15E+01
  8300. .61E+00.21E+00.22E+00.18E+00.72E+00.16E+01.41E+01.27E+01.36E+01.22E+01.28E+01.11E+01.79E+00.13E+01.17E+01.96E+00.15E+01
  8400. .61E+00.21E+00.20E+00.18E+00.72E+00.16E+01.36E+01.27E+01.36E+01.22E+01.26E+01.11E+01.79E+00.13E+01.15E+01.96E+00.15E+01
  8500. .61E+00.21E+00.16E+00.18E+00.72E+00.16E+01.28E+01.27E+01.36E+01.22E+01.22E+01.11E+01.79E+00.13E+01.12E+01.96E+00.14E+01
  8600. .61E+00.21E+00.16E+00.18E+00.72E+00.16E+01.28E+01.27E+01.36E+01.22E+01.22E+01.11E+01.79E+00.13E+01.12E+01.96E+00.14E+01
  8700. .61E+00.21E+00.16E+00.18E+00.72E+00.16E+01.28E+01.27E+01.36E+01.22E+01.22E+01.11E+01.79E+00.13E+01.12E+01.96E+00.14E+01
  8800. .61E+00.21E+00.16E+00.18E+00.72E+00.16E+01.28E+01.27E+01.36E+01.22E+01.22E+01.11E+01.79E+00.13E+01.12E+01.96E+00.14E+01
  8900. .61E+00.21E+00.16E+00.18E+00.72E+00.16E+01.28E+01.27E+01.36E+01.22E+01.22E+01.11E+01.79E+00.13E+01.12E+01.96E+00.14E+01
  9000. .61E+00.21E+00.16E+00.18E+00.72E+00.16E+01.28E+01.27E+01.36E+01.22E+01.22E+01.11E+01.79E+00.13E+01.12E+01.96E+00.14E+01
  9100. .61E+00.21E+00.16E+00.18E+00.72E+00.16E+01.28E+01.27E+01.36E+01.22E+01.22E+01.11E+01.79E+00.13E+01.12E+01.96E+00.14E+01
  9200. .61E+00.21E+00.16E+00.18E+00.72E+00.16E+01.28E+01.27E+01.36E+01.22E+01.22E+01.11E+01.79E+00.13E+01.12E+01.96E+00.14E+01
  9300. .61E+00.21E+00.16E+00.18E+00.72E+00.16E+01.28E+01.27E+01.36E+01.22E+01.22E+01.11E+01.79E+00.13E+01.12E+01.96E+00.14E+01
  9400. .61E+00.21E+00.16E+00.18E+00.72E+00.16E+01.28E+01.27E+01.36E+01.22E+01.22E+01.11E+01.79E+00.13E+01.12E+01.96E+00.14E+01
  9500. .61E+00.21E+00.16E+00.18E+00.72E+00.16E+01.28E+01.27E+01.36E+01.22E+01.22E+01.11E+01.79E+00.13E+01.12E+01.96E+00.14E+01
  9600. .61E+00.21E+00.16E+00.18E+00.72E+00.16E+01.28E+01.27E+01.36E+01.22E+01.22E+01.11E+01.79E+00.13E+01.12E+01.96E+00.14E+01
  9700. .61E+00.21E+00.16E+00.18E+00.72E+00.16E+01.28E+01.27E+01.36E+01.22E+01.22E+01.11E+01.79E+00.13E+01.12E+01.96E+00.14E+01
  9800. .61E+00.21E+00.16E+00.18E+00.72E+00.16E+01.28E+01.27E+01.36E+01.22E+01.22E+01.11E+01.79E+00.13E+01.12E+01.96E+00.14E+01
  9900. .61E+00.21E+00.16E+00.18E+00.72E+00.16E+01.28E+01.27E+01.36E+01.22E+01.22E+01.11E+01.79E+00.13E+01.12E+01.96E+00.14E+01
 10000. .61E+00.21E+00.16E+00.18E+00.72E+00.16E+01.28E+01.27E+01.36E+01.22E+01.22E+01.11E+01.79E+00.13E+01.12E+01.96E+00.14E+01
```

```
1        ********************************* HOURS OF PLUME FO  NG TABLE ***********************************
              LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)-
              SEASON=ANNUAL
DISTANCE ******************************************** WIND FROM ********************************************
  FROM        N     NNE     NE    ENE     E     ESE     SE    SSE     S     SSW     SW    WSW     W    WNW     NW    NNW    ALL
 TOWER   ******************************************* PLUME HEADED *******************************************
  (M)         S     SSW     SW    WSW     W     WNW     NW    NNW     N     NNE     NE    ENE     E    ESE     SE    SSE    SUM

   100.     0.0    0.0    0.0    0.0    0.0    0.9    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.9
   200.     0.0    0.0    0.0    0.0    0.0    4.0    2.0    0.0    0.0    0.0    0.3    0.0    0.0    0.0    0.0    0.0    6.3
   300.     0.0    0.0    0.0    0.0    0.0    2.0    3.5    0.0    0.0    0.0    0.5    0.0    0.0    0.0    0.0    0.0    6.0
   400.     0.0    0.0    0.0    0.0    0.0    2.0    3.5    0.0    0.0    0.0    0.5    0.0    0.0    0.0    0.0    0.0    6.0
   500.     0.0    0.0    0.0    0.0    0.0    2.0    3.5    0.0    0.0    0.0    0.5    0.0    0.0    0.0    0.0    0.0    6.0
   600.     0.0    0.0    0.0    0.0    0.0    2.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    2.0
   700.     0.0    0.0    0.0    0.0    0.0    2.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    2.0
   800.     0.0    0.0    0.0    0.0    0.0    0.5    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.5
   900.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1000.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1100.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1200.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1300.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1400.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1500.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1600.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
1        *********************************** HOURS OF RIME ICING TABLE *************************************
              LINEAR MECHANICAL DRAFT COOLING TOWER (3 CELLS)-SCA
              SEASON=ANNUAL
DISTANCE ******************************************** WIND FROM ********************************************
  FROM        N     NNE     NE    ENE     E     ESE     SE    SSE     S     SSW     SW    WSW     W    WNW     NW    NNW    ALL
 TOWER   ******************************************* PLUME HEADED *******************************************
  (M)         S     SSW     SW    WSW     W     WNW     NW    NNW     N     NNE     NE    ENE     E    ESE     SE    SSE    SUM

   100.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
   200.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
   300.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
   400.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
   500.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
   600.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
   700.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
   800.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
   900.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1000.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1100.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1200.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1300.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1400.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1500.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
  1600.     0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
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PROCTER & GAMBLE COGENERATION PROJECT
SACRAMENTO COGENERATION AUTHORITY

RESPONSES TO CEC DATA REQUESTS
(Set 1, dated December 3, 1993)

HAZARDOUS MATERIALS

HAZ MAT - 1

Please provide a preliminary piping and instrumentation diagram for the ammonia pipeline between the storage facility and the ammonia injection skids.

SCA RESPONSE:

A preliminary flow diagram is being submitted that includes the aqueous ammonia storage tank and the piping from the storage tank to the aqueous ammonia injection skid (see Attachment HAZ-1). Also shown are the pipelines and connections associated with the unloading of aqueous ammonia from a tanker truck. The flow diagram depicts a pair of aqueous ammonia transfer pumps that will pump material from the storage tank to the injection skids for usage. Instrumentation has been shown that is designed to provide the plant operators with the necessary controls and equipment status at all times.

HAZ MAT - 2

Please describe the method of delivery (truck or rail) and the locations of the delivery facilities for sulfuric acid, hydrochloric acid, aqueous ammonia, and sodium hypochlorite.

The following requested information is needed to evaluate the potential for accidental release of ammonia during loading operations and potential consequences of such a release on the public.

SCA RESPONSE:

Bulk chemicals which are stored in storage tanks will be delivered as follows:

- Sulfuric acid will be stored in a carbon steel tank located outdoors, adjacent to the Water Treatment Building. The tank will be refilled from a delivery truck. A fill station will be provided near the tank in an accessible location. The fill station will be equipped with a safety shower and with chemical drains which will be routed into the neutralization facility. The delivery driver will fill the tank under the direction of plant operations personnel.

- Aqueous ammonia will be stored in a pressurized steel tank located outdoors, west of the combustion turbine. The tank will be refilled from a delivery truck. A fill station will be provided near the tank in an accessible location. The fill station will be equipped with a safety shower and with chemical drains which will be routed to the neutralization facility. The delivery driver will fill the tank under the direction of plant operations personnel. Vapors from the storage tank will be vented back to the delivery tank during the filling process and will not be released to the atmosphere.

- Sodium hypochlorite will be stored in a fiberglass tank located outdoors, in a curbed area, adjacent to the cooling tower. The tank will be refilled from a delivery truck. The delivery driver will fill the tank under the direction of plant operations personnel.

- Hydrochloric acid will be stored onsite temporarily (about 1 to 2 days) by the chemical cleaning contractor for the initial cleaning of the HRSG. Thereafter, hydrochloric acid for the HRSG cleaning will be stored onsite for 1 to 2 days every 3 to 5 years. The required amount of acid for chemical cleaning will be stored in the contractor's truck. There will not be provisions for storage of hydrochloric acid in the plant, and delivery of acid will not be required.

Each tank will be located in a curbed area, sized to contain 100 percent of the tank contents. The curbed area will be equipped with a safety shower and with chemical drains which will be routed to the neutralization facility.

HAZ MAT - 3

Please provide a complete discussion of the procedures and description of the facilities related to ammonia loading. This should include engineering diagrams of the storage facility, catchment basin(s), and all valves and piping between the storage tank and loading receptacle. This should also include a detailed discussion of all safety measures and safety equipment associated with loading operations.

SCA RESPONSE:

In reading this discussion it is appropriate to refer to the preliminary piping and instrumentation drawing provided in response to the inquiry HAZ MAT - 1.

The following equipment and facilities will be utilized.

Liquid Fill Line - Composed of truck filling connection, a shut-off valve, and piping to the top of the aqueous ammonia storage tank, and a redundant shut-off valve mounted on top of the storage tank. The liquid fill line allows for the product to be unloaded from a tanker truck. A pump on the truck transfers the liquid into the stationary storage tank from a delivery tanker.

Equalizing Line - Composed of a truck connection and a shut-off valve with piping to the top of the aqueous ammonia storage tank. A redundant shut-off valve is mounted on top of the storage tank. The equalizing line allows the tank vapor pressure to equalize between the delivery tanker and stationary storage tank prior to unloading and filling the storage tank. This line also transfers the displaced volume of ammonia vapor that results from emptying the tanker truck and filling the storage tank. This method prevents the discharge of aqueous ammonia vapor to the atmosphere.

Vapor Relief/Vacuum Breaker Valve - This valve is a dual purpose valve in that it protects the storage tank from pressure above the design point of the tank, and also prevents the internal tank pressure from dropping to a subatmospheric pressure that may be below the design pressure of the tank.

Level Indicator - A level indicator is provided to display a direct reading gauge for reference by the equipment operators. A metal float inside the tank is one method that provides an accurate reading of the tank contents.

Pressure Indicator - A pressure gauge is installed to provide direct reading information of the tank pressure for the equipment operators.

Temperature Indicator - A temperature gauge is installed to provide direct reading information of the tank contents temperature for the equipment operators.

Level Switch - An alarm contact is provided in the level switch that is to be connected to the plant alarm system to indicate the presence of a high level condition in the storage tank.

Pressure Switch - An alarm contact is provided that is connected to the plant alarm system to indicate high pressure in the storage tank.

Temperature Switch - An alarm contact is provided that is connected to the plant alarm system to indicate high temperature in the storage tank.

Liquid Process Valve - This valve is the connection on the storage tank that carries the liquid aqueous ammonia from the tank to the transfer pumps and system piping. This valve can be closed to isolate the aqueous ammonia system from the plant piping and equipment.

Drain Valve - This valve remains closed during normal operation of the aqueous ammonia supply system. It provides a point to which a truck connection can be installed to drain the tank for inspection and/or for maintenance of any of the devices mounted on the storage tank. It also provides a connection to drain cleaning fluid away from the tank and into another container should this storage tank require cleaning in the future.

Manway - The manway provided is for maintenance access into the tank after it has been drained of aqua ammonia and rinsed of ammonia. As a safety precaution the tank stand is allowed to open for several days to allow fresh air to come into the tank before a person enters. Appropriate safety measures should be observed when entering a tank such as this.

Aqua Ammonia Forwarding Pumps - Pumps are provided to transfer aqua ammonia from the storage tank to the injection skids at approximately 40-60 psig. Pressure above this will open the recirculation valve internal to the pump so that excessive pressure is not attained. A redundant pump is supplied to allow continued operation of the system in the event one pump requires maintenance.

System Piping and Valves - The system piping and valves are provided to transport the aqueous ammonia from the storage tank to the injection skid via the forwarding pumps. The piping system is to be welded. The system will be pressure tested prior to in-service use.

Unloading Procedure - One operator and the tanker delivery person are to be present at all times during the unloading process. Protective apparel including a hard hat, chemical splash goggles, a face shield, and gauntlet type rubber gloves shall be worn by each individual. Rubber or PVC/Nylon/PVC laminate protective clothing should also be used to prevent skin contact. Respiratory protection approved by NIOSH/MSHA for ammonia should be used when exposure limits are exceeded. A full face gas mask with industrial size oxygen tank shall be available in the event of an emergency. A safety shower with an emergency eye wash station will be located in the curbed storage area.

The truck tanker is to be positioned on the unloading apron with its wheels chocked but in a position so that the connection hoses to the storage tank do not become kinked or strained. The connections made to the storage tank will be checked for leaks prior to transferring aqueous ammonia to the storage tank. The tanker and the storage tank valves are to be opened and checked. The tanks will be given adequate time to equalize pressure prior to operating the truck tanker transfer pump. The liquid contents will then be pumped to empty the tanker or until the storage tank is filled to 95 percent of its capacity. Storage above this level will not be allowed. The local level indicator is provided for the operator and delivery person for this purpose. When the appropriate level has been reached, the transfer pump will be stopped and the valves on the tanker will be closed. A compressed air line is typically supplied on the tanker to blow out the liquid line before the storage tank valves are closed and any hoses are disconnected. The hoses will be removed and stored.

HAZ MAT - 4

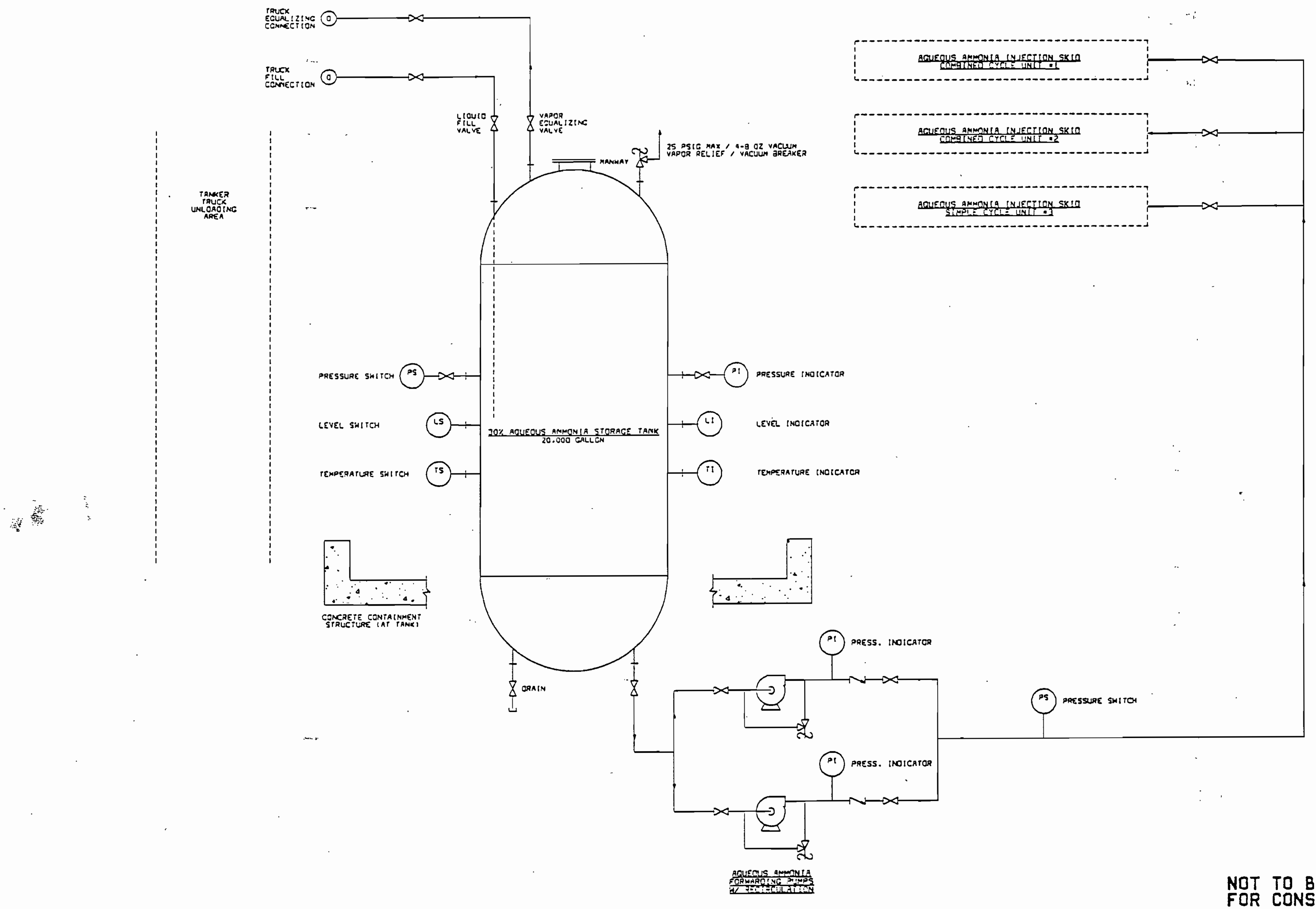
Please provide a complete description of all procedures, instrumentation, and safety related equipment to be utilized during start up of the HRSG to ensure that an explosive mixture is not present at start up.

SCA RESPONSE:

The HRSG will be furnished with a burner management system. This system will utilize flame scanners and flow switches. A permissive to operate the duct burners is to have the combustion turbine running. This is accomplished by the combustion turbine exhaust duct flow switch interlock.

The HRSG has no fresh air inlets.

Attachment HAZ-1



NOT TO BE USED
FOR CONSTRUCTION

DATE OF ISSUE ______

NO	DATE	REVISIONS AND RECORD OF ISSUE	BY	CHK	APP'D
A	12-17-93	INITIAL ISSUE	LK	BH	

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF

SIGNED ______

DATE ______ REG NO. ______

BLACK & VEATCH

ENGINEER LEK DRAWN TRB
CHECKED DATE

SACRAMENTO COGENERATION AUTHORITY
PROCTER & GAMBLE COGENERATION PROJECT

PIPING AND INSTRUMENT DIAGRAM
AQUEOUS AMMONIA STORAGE AND SUPPLY

PROJECT DRAWING NUMBER 23933-OM-0003
REV A
CODE
AREA

14230DELLAMY ACAD 12.c18
A1ASL006 01 1=1
12/10/93 14:14:19

PROCTER & GAMBLE COGENERATION PROJECT
SACRAMENTO COGENERATION AUTHORITY

RESPONSES TO CEC DATA REQUESTS
(Set 1, dated December 3, 1993)

TRANSPORTATION

TRANSPORTATION -1

The transportation setting discussion refers to numerous additional High Occupancy Vehicle (HOV) lanes and to the extension of light rail service (Figure 6.5-3). What is the likelihood of these measures being available in a time frame that encompasses the construction/operation of the Procter & Gamble project? What are the traffic and transportation implications for the Procter & Gamble project of such additional HOV lanes or light rail extension not being available?

SCA RESPONSE:

The 1992 Regional Transportation Plan lists numerous programs which could impact traffic levels and the level of service in the region. Those proposed programs which could have a direct impact on traffic in the vicinity of the project are discussed below. Reduced traffic levels resulting from these programs were not specifically modeled in the traffic analysis due to an uncertain implementation time frame and current lack of funding. Therefore, if these programs are not implemented, there would be no implication on local traffic as modeled in the analysis. To the degree that some programs could be implemented, traffic conditions in the vicinity of the project would improve over those estimated in the traffic analysis.

The proposed Central California Traction light rail line, a light rail extension to Grant Line Road over the existing Central California Traction railway, could directly impact traffic patterns in the plant vicinity. If this extension were implemented, it could result in light rail transportation within walking distance of the site vicinity, depending upon placement of the nearest station. In the 1992 Regional Transportation Plan, this extension is listed as a long range project meaning that it is not considered to be assured of funding at the present time. Therefore, this light rail extension will almost certainly not be in place during the construction phase of the Procter & Gamble Cogeneration Project and this assumption was carried forward to the traffic analysis for the construction and operational phases. If the light rail extension is placed into service during the operational life of the Procter & Gamble Cogeneration Project, then local traffic levels may decline. However, in the absence of funding and adopted placement of the light rail stations, impact projections must be considered uncertain.

The HOV lane additions which would most likely impact the traffic levels in the project vicinity would be those on Route 99 and Route 50. The 1992 Regional Transportation Plan lists three HOV project segments on Route 99 which, when completed, would extend the HOV segments from Elk Grove Boulevard north to L/Q streets. However, two of these projects (the widening from 4 to 6 lanes for HOV use from Elk Grove Boulevard to Grant Line Road, and the widening from 8 to 10 lanes from Martin Luther King Jr. Blvd to L/Q Streets for HOV use) are listed as long term projects and will not be available during the construction phase of the Procter & Gamble Cogeneration Project. Likewise, all HOV projects on Route 50 are listed as long term projects in the 1992 Regional Transportation Plan. Consequently, the traffic analysis did not specifically attribute any reduced traffic levels to these proposed projects.

The 1992 Regional Transportation Plan also lists several local roadway projects which should improve the LOS in the project vicinity, but which were not modeled in the construction or operational traffic analysis due to their designation as long term projects. As such, the operational analysis can be considered conservative since long term conditions should improve above those projected in the analysis provided the roadway projects eventually receive funding. The long range roadway projects in vicinity of the site are summarized below.

Florin-Perkins Road. This involves expansion of Florin-Perkins Road from 2 to 6 lanes from Folsom Boulevard to Florin Road.

Folsom Boulevard. This involves a grade separation at the intersection with Howe Ave/Power Inn Road.

Jackson Road. This involves expansion of Jackson Road from 2 to 4 lanes from Folsom Boulevard to Elk Grove-Florin Road.

Power Inn Road. This involves the expansion of Power Inn Road from 4 to 6 lanes from Folsom Boulevard to Fruitridge Road.

TRANSPORTATION - 2

Page 6.5-24 refers to information obtained from local building trades that indicates a vehicle occupancy ratio of 2:1 (2 workers per each vehicle). Past CEC staff experience has shown that the highest ratios which can normally be expected during construction are 1.5:1 with a reasonably aggressive carpooling effort.

a. *Please provide justification for the expected 2:1 ratio and provide the means used to obtain that ratio.*

SCA RESPONSE:

A 2:1 ratio of project construction workers to worker vehicles is expected based on the experience of the construction contractor and the experience of the local building trades in similar construction projects. A memo between Walsh Construction Company and the local building trades which documents the appropriateness of the 2:1 ratio is included in Attachment TRANS-1.

It is noted that the difference between a 2:1 ratio and a 1.5:1 ratio for this project is only 15 vehicles. This difference would likely have minimal, if any, impacts on the expected LOS.

b. *Will the measures identified in Trans-2.a. above be used for the Procter & Gamble cogeneration project? Will such ratio be accomplished by incorporation as part of the Procter & Gamble Transportation Management Plan (TMP)? If yes, please explain if and how the TMP should be revised to accomplish this ratio.*

SCA RESPONSE:

The 2:1 ratio used in the analysis is not a specific target but rather the expected commuting ratio of project workers to the site. As such, the 2:1 ratio was used as an input in the traffic analysis but the SCA is not aware of any LORS which would require it to maintain the expected 2:1 ratio during construction, and the <u>TSM Employer Guidelines</u> specifically exclude temporary construction activities from compliance with the alternative mode of transportation requirements. See TRANS-2 d. for a response as to the role of the Procter & Gamble TMP.

c. *The mitigation discussion concludes that impacts during construction will not be significant because of a relatively small workforce and encouragement of carpooling; however, there is no discussion of a mechanism to assure that goals established for carpooling will be as effective as desired. Please justify this conclusion in a discussion which includes proposed mechanisms to monitor the effectiveness of carpooling.*

SCA RESPONSE:

Carpooling is routinely encouraged by Walsh Construction Company as a means to reduce traffic impacts and to provide a service to project workers. Encouragement is usually in the form of helping to provide information to workers regarding willing carpoolers. Mechanisms which can provide such information include an information bulletin board set aside for carpooling notices. Nonetheless, the conclusion that the project will not have a significant impact during construction is not dependent upon maintaining the 2:1 carpooling ratio assumed in the analysis. The conclusion is a result of the City's definition of project significance which is based on the build-out or operational increase in traffic levels and excludes temporary construction traffic impacts. Based on this definition, the relatively small workforce and expected 2:1 carpooling ratio are not necessary conditions for the conclusion in the analysis. Rather, these characteristics further demonstrate that the impacts will be manageable and not significant in a more general sense (will not greatly reduce the LOS).

d. The mitigation discussion also concludes that the project will comply with the City of Sacramento Transportation System Management (TSM) requirements. Please substantiate this conclusion. Will the project satisfy the city's TSM requirements independently, or as part of the overall Procter & Gamble TMP?

SCA RESPONSE:

The owner of the Procter & Gamble Cogeneration Project and site will be the SCA. The SCA will be responsible for initially contacting the city and establishing the applicability of the project to the TSM ordinance. However, the SCA plans to subcontract for the operation and maintenance (O&M) of the facility and will not be the primary employer on site. The O&M contractor, as the site employer, will be responsible for filing a TMP, if it is classified as a minor or major employer.

While not expected to qualify as a minor or major employer based on the Procter & Gamble site alone, an O&M contractor hired by the SCA could be classified as such if it were hired at more than one site in the City. Whatever the TSM classification of SCA and the O&M contractor, City ordinance requires compliance with the TSM guidelines, and the SCA intends that its sites comply fully with these requirements. The Procter & Gamble TMP will be unaffected by the project.

TRANSPORTATION - 3

Operation Impacts states that there will be 21 permanent plant staff.

a: Please discuss whether this staff will work in shifts, the number of shifts, the hours for the shifts, and the number of workers per shift.

SCA RESPONSE:

In section 6.7.3.1 the SCA anticipates the 21 permanent plant staff will be comprised of a plant manager, an operations manager, 3 maintenance technicians, 15 operations personnel, and 1 administrative worker. The SCA further envisions the plant manager, operations manager, maintenance technicians, and the administrative worker will work the day shift five days per week. The 15 operations personnel will provide three operations per eight hour shift to provide around the clock operation coverage seven days per week. The actual number of shifts, hours for the shifts and operators per shift will be determined by the operations and maintenance contractor to be hired later.

b. Please provide the breakdown of operations traffic numbers to *validate that the project will not contribute significantly to the 1998 baseline traffic plus project traffic conditions as shown in Table 6.5.-7*

SCA RESPONSE:

From the response to TRANS-3 a., the maximum number of day time project commuters is expected to be 9 (3 operations and 6 non-operations personnel). While the hours for the day time shift have not been established, the minimal impact of the project workforce at the March 1998 in-service date is illustrated in Table T-1 by assuming an 8:00 to 5:00 shift as was assumed in the traffic analysis.

Using the same breakdown of project traffic over the commuting routes as was assumed in the construction analysis, column 2 of Table T-1 lists the increase in traffic attributed to the project at each LOS intersection during the 7:00 to 8:00 a.m. hour, assuming the worst case scenario of 1 project worker per vehicle. Column 3 of Table T-1 lists the projected traffic volume in March, 1998 at each LOS location, based on a 3.3 percent average annual growth rate from the May, 1993 volumes included as Appendix I of the AFC. The 1998 traffic level for each intersection (column 3) can be calculated from Appendix I by taking the sum of the hourly traffic volume (HOUR VOL) listed in the 7:00-7:15 row for each approach, multiplied by 1.17 (the projected cumulative growth from May, 1993 through March 1998 is 17 percent). Thus, the 5,386 traffic level for Howe Ave./Power Inn Road equals: (1,551+1,309+1,388+355)x1.17

Column 4 lists the project traffic as a percent of the total projected 7:00 to 8:00 traffic levels at each intersection. The impact of the plant day shift commuters on the eight LOS locations is projected to range from a maximum of 0.66 percent (sixty-six one-hundredths of one percent) of the 7:00-8:00 traffic volume at the Power Inn Road/Fruitridge Road intersection, to a minimum of 0.04 percent (four one-hundredths of one percent) of the 7:00-8:00 traffic volume at Howe Avenue/Power Inn Road intersection. While the working hours at the plant may vary somewhat from those assumed, it is apparent that the impact of the project operational traffic will be extremely small regardless of the final adopted working hours.

Table T-1. Impact of Project Operational Traffic on A.M. Traffic Levels At LOS Locations, March, 1998

LOS Location	No. of Project Workers Through LOS Location	7:00-8:00 a.m. Traffic Level Through LOS Locations	Project Workers Divided by the Hourly Traffic Volume, 7:00-8:00 a.m.
Folsom Blvd/Power Inn Road	2	5,386	0.0004
Jackson Road/Florin Perkins Road	2	2,678	0.0007
Martin Luther King, Jr. Blvd/Fruitridge Road	4	2,898	0.0013
Stockton Blvd./Fruitridge Road	4	2,714	0.0015
65th Street Expwy./Fruitridge Road	5	2,893	0.0017
Power Inn Road/Fruitridge Road	6	3,411	0.0017
83rd Street/Fruitridge Road	7	1,052	0.0066
Fruitridge Road/South Watt Ave.	1	1,932	0.0005

ATTACHMENT TRANS-1

INTER-OFFICE CORRESPONDENCE

WALSH CONSTRUCTION COMPANY

Date: February 4, 1993

From: R. Simms

To: File

Subject: Procter & Gamble Project
Construction Vehicles on Site

In a meeting with Bill Mechan, Executive Secretary of the Sacramento Building Trades, on February 1, 1993 we discussed craftsman loading at the project and where the building trades craft would come from. Bill Mechan indicated that 90% of the craft would come out of the Sacramento local and based on his experience there typically will be an average of two craft per vehicle driving to the project.

Ron Simms

PROCTER & GAMBLE COGENERATION PROJECT
SACRAMENTO COGENERATION AUTHORITY

RESPONSES TO CEC DATA REQUESTS

STRUCTURAL

SUPPLEMENTAL INFORMATION

Mr. Ming Tsay of the CEC staff asked at the data request workshop on 12/15/93 that SCA identify the type of structural design to be used for the deaerator support structure.

SCA RESPONSE:

The elevated deaerator support structure will be designed as a building frame system in accordance with UBC Section 2.3.3.3 Paragraph F.

PROCTER & GAMBLE COGENERATION PROJECT
SACRAMENTO COGENERATION AUTHORITY

RESPONSES TO CEC DATA REQUESTS
(Set 1, dated December 3, 1993)

NOISE-1

Please provide estimated L_{max}, for emergency shut-down, start-up and upset conditions. In addition, please provide an estimate of the duration (minutes) of the emergency shut-down, start-up and upset conditions for the power plant. If the noise levels exceed 75 dBA at the sensitive receptors, please propose additional mitigation measures to ensure that the 75 dBA maximum permitted noise levels are not exceeded.

SCA RESPONSE:

During emergency shut-down of the facility, steam will be vented to atmosphere to relieve pressure within the system. Depending upon the operating mode of the facility at the time of shut-down, various amounts of steam will have to be released, therefore sound levels and duration will vary. The steam will be vented through pressure relief valves (PRV). This steam relief will last a duration of 1 to 2 minutes. The balance of steam will be piped to the condenser thereby reducing pressure without release to the atmosphere. The PRVs will be equipped with silencers to attain a level of 70 dBA or less at the nearest residential locations.

Several small vents will release steam to the atmosphere during start-up of the facility. Start up is anticipated to require approximately 20 minutes. These vents will be mitigated through venting to a blowdown tank or installing vent silencers. The design target is to limit start up vent noise to 60 dBA or less at the nearest residences.

NOISE-2

The table on page 6.10-8 accounts for 26 of the 33 hours monitored. Please provide the data collected after 4 a.m. on 05/27/93.

SCA RESPONSE:

Table N-1 summarizes the hourly Leq values and hourly L90 values which were recorded from the hours of 3:00 a.m. on May 26, 1993 to 8:00 a.m. on May 27, 1993. Thirty hours of continuous data were recorded. Two hours of data were also recorded on May 25, 1993. These measurements were discontinued because of rain.

N-1. Ambient Sound Levels - Procter and Gamble Cogeneration Project

Date	Measurement Start Time	Location 1		Location 2		Location 3		Location 4	
		Leq	L90	Leq	L90	Leq	L90	Leq	L90
May 26, 1993	3:00 a.m.	55.0	52.0	57.0	55.5	46.0	43.0	55.5	51.0
	4:00 a.m.	57.5	56.0	60.0	56.5	61.5	45.5	66.5	53.0
	5:00 a.m.	58.5	55.5	59.0	56.5	59.0	46.0	66.5	53.5
	6:00 a.m.	58.5	56.0	59.5	56.5	56.0	50.0	66.0	55.0
	7:00 a.m.	58.5	55.5	61.0	57.0	63.0	50.0	67.5	57.5
	8:00 a.m.	57.0	55.5	60.5	57.5	65.0	49.0	69.0	56.5
	9:00 a.m.	59.0	56.0	61.5	58.5	64.0	49.5	69.0	56.5
	10:00 a.m.	62.0	57.5	65.0	60.0	57.0	49.5	65.5	57.5
	11:00 a.m.	66.0	59.0	71.0	61.5	54.0	50.0	65.5	58.0
	Noon	65.5	58.5	70.5	60.5	56.0	49.5	65.0	57.5
	1:00 p.m.	66.0	58.0	67.5	60.0	53.5	49.0	66.0	57.5
	2:00 p.m.	63.0	57.5	69.0	56.5	64.0	44.5	72.5	57.5
	3:00 p.m.	60.5	56.0	57.5	55.0	56.0	44.5	65.5	54.5
	4:00 p.m.	60.5	55.0	57.5	54.5	50.0	45.0	62.5	55.0
	5:00 p.m.	63.5	56.0	63.0	55.0	49.5	45.0	62.5	53.5
	6:00 p.m.	68.0	56.0	59.5	56.0	62.5	45.0	64.0	50.5
	7:00 p.m.	64.5	54.0	59.5	56.0	63.0	43.0	64.0	51.0
	8:00 p.m.	55.5	54.0	58.0	56.0	62.0	43.0	64.5	51.0
	9:00 p.m.	55.5	54.0	57.5	55.5	58.5	43.0	67.5	51.5
	10:00 p.m.	55.5	54.0	57.5	55.5	64.5	41.5	67.0	51.0
	11:00 p.m.	54.0	52.0	57.0	54.5	66.5	41.5	68.0	50.0
May 27, 1993	Midnight	52.5	50.0	56.5	54.5	63.5	41.0	64.5	50.0
	1:00 a.m.	50.5	49.5	56.5	54.0	43.5	41.0	55.5	50.5
	2:00 a.m.	52.5	49.5	55.5	54.0	62.0	42.0	63.5	51.5
	3:00 a.m.	54.0	52.0	55.5	53.5	68.0	42.0	69.5	51.5
	4:00 a.m.	55.5	54.5	57.0	55.5	62.5	44.5	66.0	52.5
	5:00 a.m.	55.5	54.5	59.0	56.0	49.0	45.5	61.0	52.5
	6:00 a.m.	57.0	55.0	58.5	55.5	50.5	46.5	64.0	53.5
	7:00 a.m.	57.0	54.0	59.0	56.0	58.0	45.0	68.0	55.5
	8:00 a.m.	54.5	52.0	67.5	41.0	52.0	44.0	63.5	53.5

NOISE-3

Please explain the following anomalies:

a. The large swings in some noise level readings (e.g readings of 46 dBA at 3:00 a.m. and 61.6 dBA at 4:00 a.m. on 05/26/93 at NML - 3).

b. Why readings taken in the early morning hours are higher than in the afternoon when noise levels are expected to be higher due to traffic.

SCA RESPONSE:

The noise meters were not manned at all time periods and, therefore, the exact source of all noises can not be identified. However, some speculations can be drawn by studying the data.

Four graphs have been included with this response (see Attachment Noise-1). These graphs indicate the hourly Leq, L10 and L90 sound levels measured at each noise measurement location (NML) for the various time periods. Leq values are an energy average of all sound levels measured during the sampling period. The values are averaged on a logarithmic basis, therefore, high noise events greatly skew the averaging results upwards. Situations in which the sound level is relatively steady the Leq value will be less than the L10 value. (The L10 value being the sound level exceeded 10 percent of the measurement period.) When the measured Leq level is higher than the L10 level, it indicates the occurrence of high energy, short duration (less than 10 percent of the time) high energy noise events. This occurs quite often during the nighttime periods at NML-3 and NML-4 while not being noticed at NML-1 and NML-2. Both NML-3 and NML-4 are located near the Southern Pacific Railroad and Power Inn Road. It is therefore assumed that either railroad activity or occasional loud traffic noise was occurring at these locations.

The L90 values, which represent only the quiet background periods, show typical trends of minimum sound levels during nighttime periods and maximum levels during rush hour periods.

NOISE-4

Please provide an estimate of the noise levels at the nearest sensitive receptors from the steam blow operations.

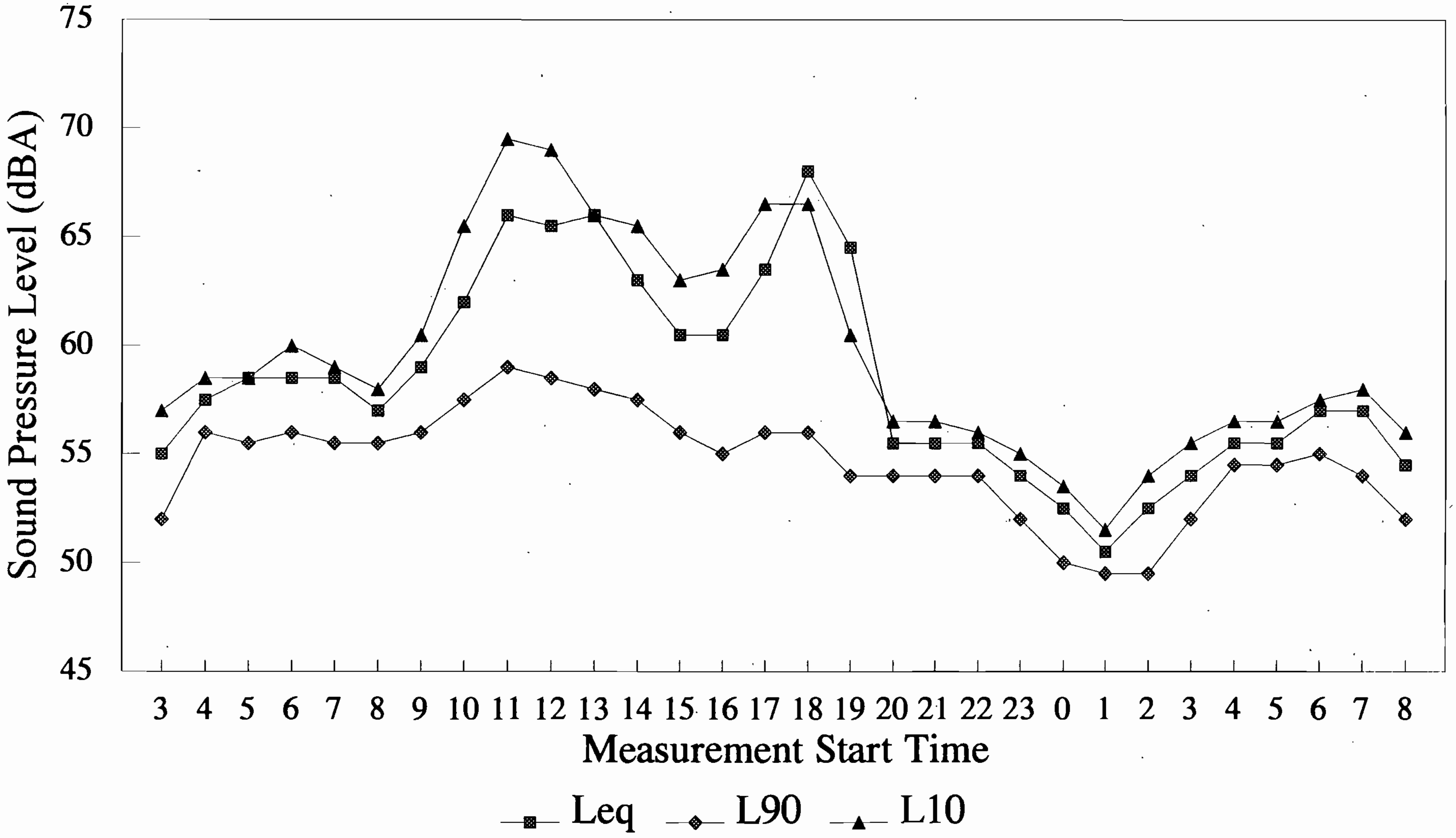
SCA RESPONSE:

Steam blow activities will be limited to normal construction hours for this project, 7:00 a.m. to 6:00 p.m. A temporary silencer will be installed to reduce the sound levels of this operation. It is difficult to predict actual steam blow decibel levels at this stage of the project design, however, the silencer design target is 60 dBA at the nearest residences. This level of silencing is anticipated to be readily attainable.

Attachment Noise -1

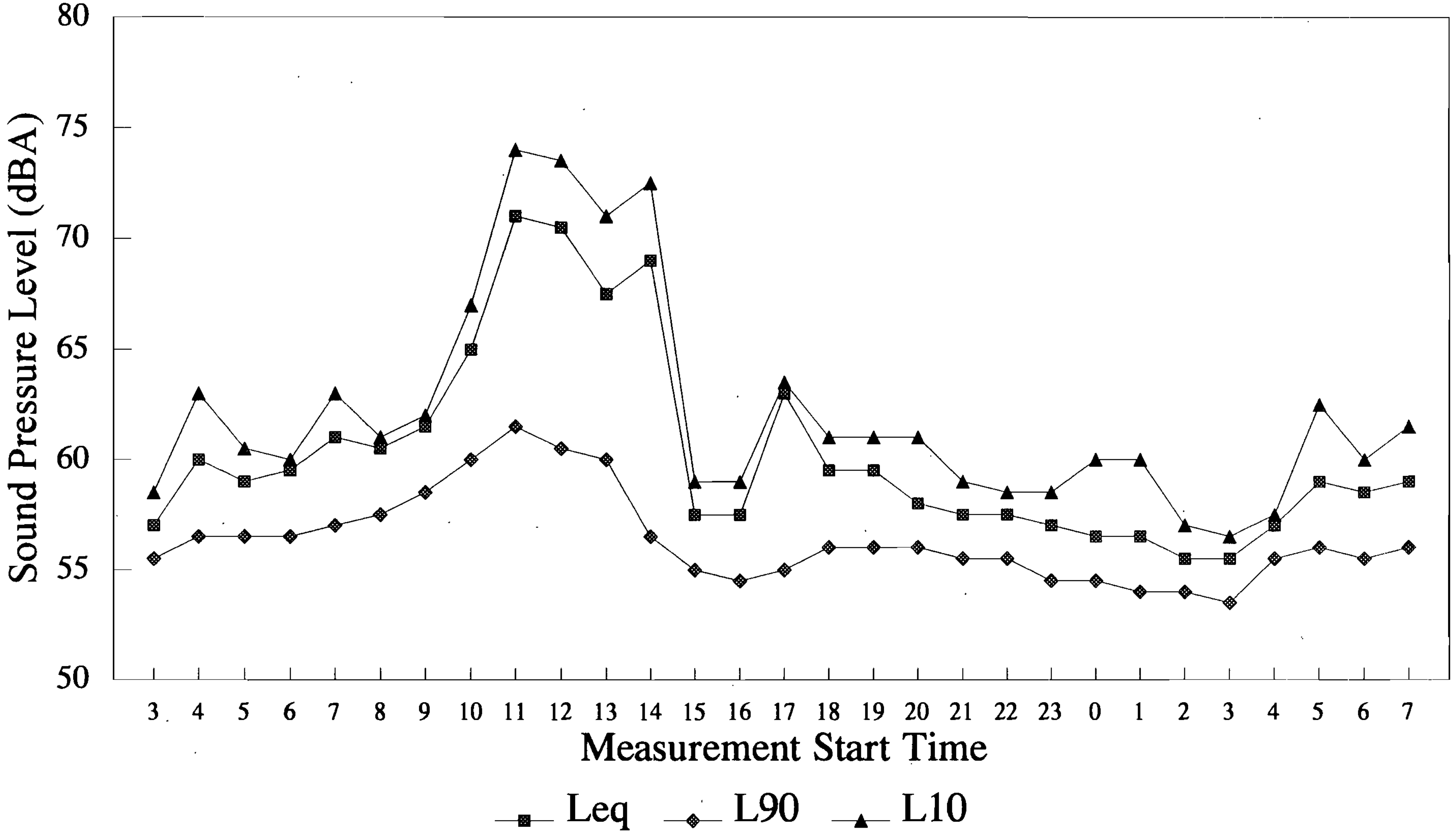
AMBIENT SOUND LEVELS

LOCATION 1



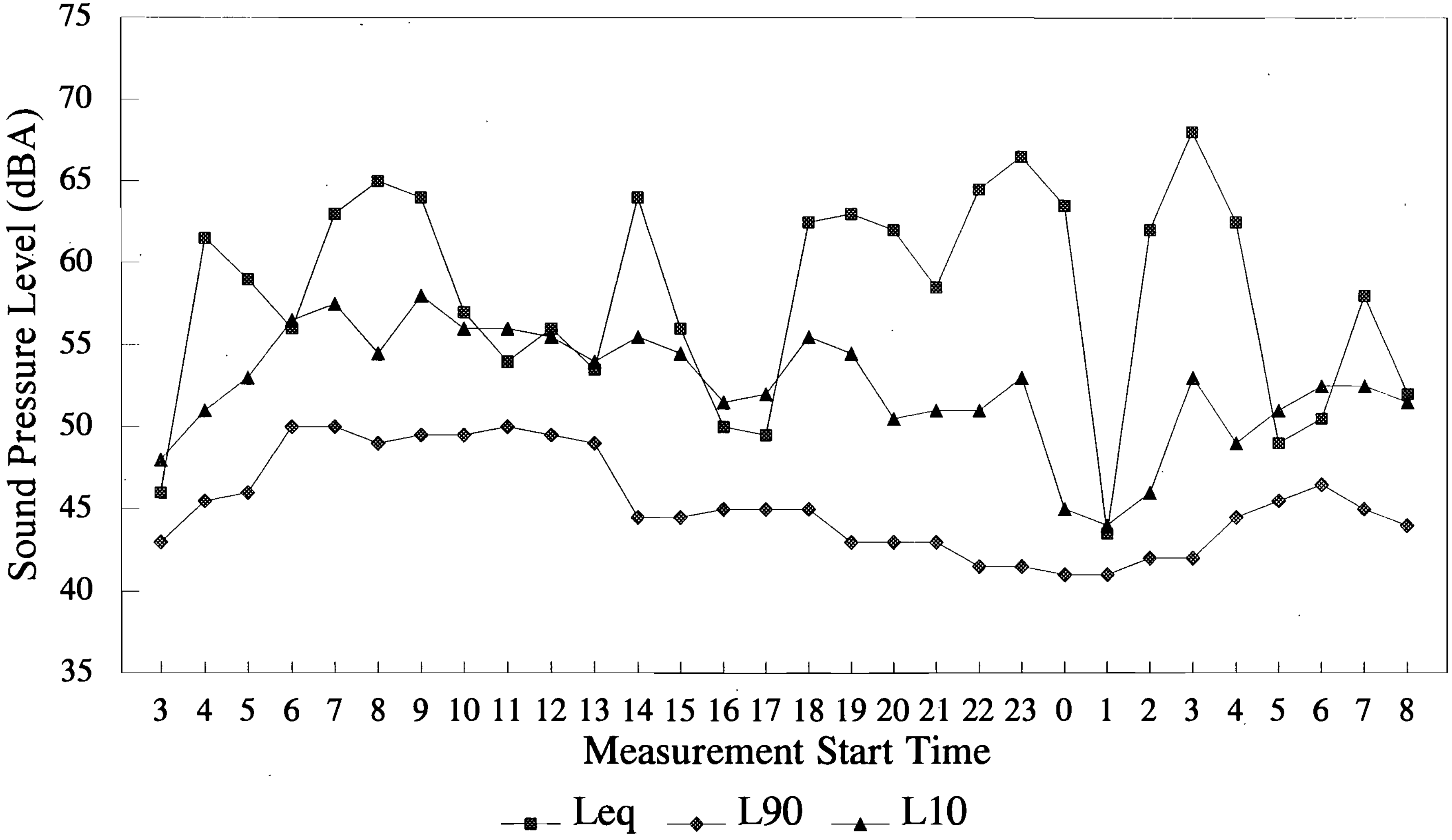
AMBIENT SOUND LEVELS

LOCATION 2



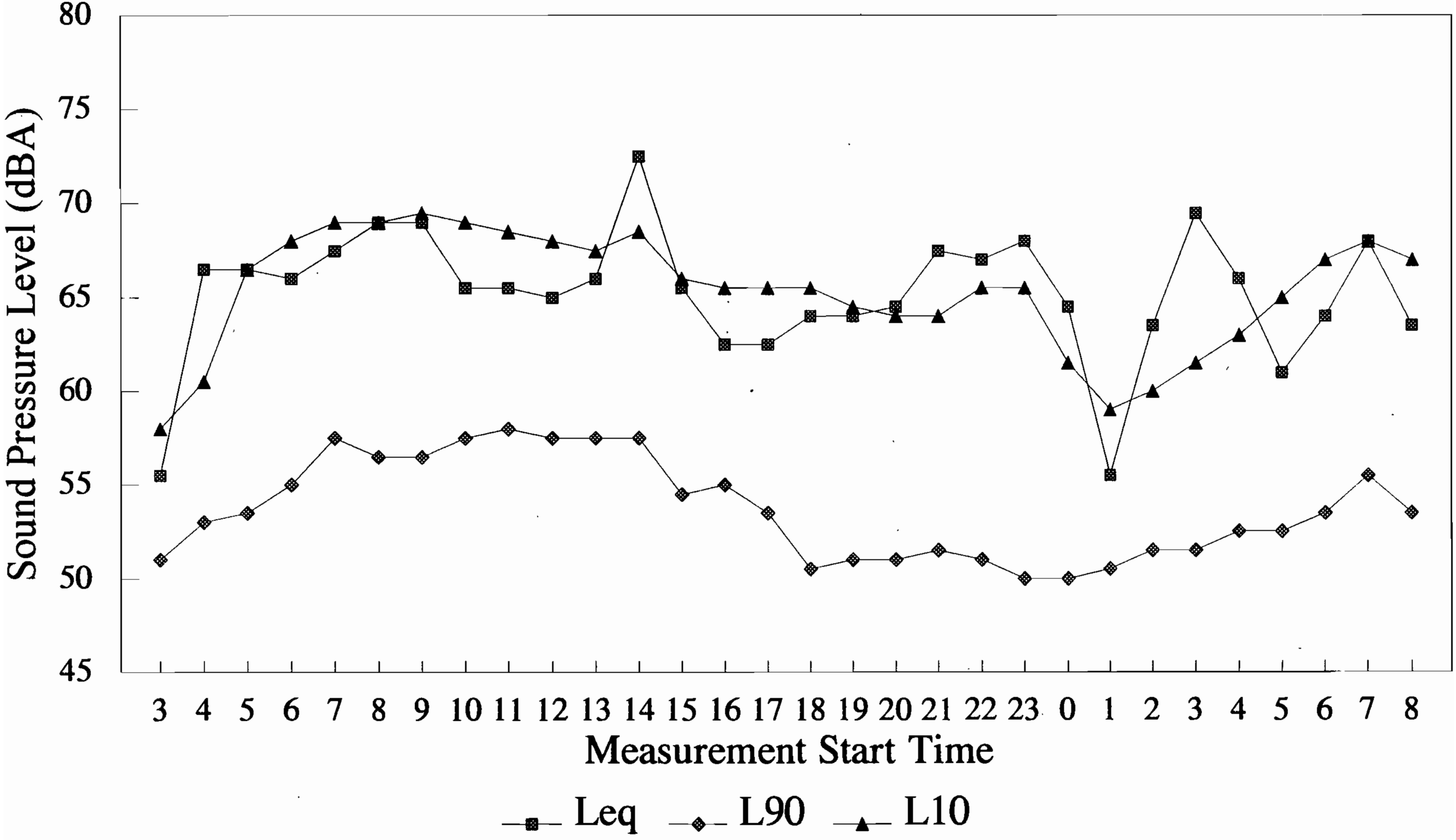
AMBIENT SOUND LEVELS

LOCATION 3



AMBIENT SOUND LEVELS

LOCATION 4



Potential Transmission Line Construction Emissions

This document describes the air pollutant emissions arising from the construction of auxiliary structures needed to distribute electrical power generated by the cogeneration facility. These structures consist of a new 230 kV transmission line, a new 230 kV switchyard, and relocated 69 and 12 kV transmission lines. Construction is expected to result in the emission of fugitive dust caused by construction activities. In addition, the construction vehicles will generate small quantities of exhaust emissions. The period of construction activity is expected to last approximately five months.

1. Fugitive Dust Emissions. Construction of the transmission lines and switchyard is expected to result in the emission of fugitive dust as particulate matter (PM). The primary sources of fugitive dust emissions during construction will include the following:

- Earthwork, including excavation, bulldozing, landscaping, grading, and other activities performed by heavy equipment.
- Fugitive dust emissions generated by construction and delivery vehicle traffic on the unpaved roads near the construction sites.

The potential emissions of fugitive dust generated by these construction activities are difficult to estimate because of the large variations in certain important parameters, including the type and characteristics of the soil, type and characteristics of construction equipment, and effectiveness of control measures. Each of these factors can vary considerably over the construction area during the construction period. Conservative estimates of the maximum monthly fugitive dust emissions due to construction have been generated. These estimates are conservative because not all of the construction activity is expected to occur at one time. Calculations of the conservative fugitive dust emissions are based on *Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources* (USEPA 1985a). The standard level of control which will be used for construction of the project will be the frequent application of water.

The quantity of fugitive dust emissions generated by general construction activities (excavation/grading) is proportional to the area of land being worked and the level of construction activity. According to USEPA (1985a), an acceptable fugitive dust emission factor for general construction activities is 1.2 tons of total particulate (PM) per acre of construction per month of activity. In estimating the PM_{10} portion of the PM emission level, it is assumed that 60 percent of the PM emissions are less than 10 μm in size (Bay Area Air Quality Management District). This factor applies to construction with medium activity levels, moderate soil silt content, and no controls. Because this factor is applied to excavation/grading of the site during site clearing and set-up, the primary fugitive dust emissions calculated using this factor will occur during the beginning of construction and will last approximately 1 month. In addition, the use of this factor is conservative since the amount of required excavation/grading construction activity will be limited for construction of the transmission lines.

The approximate size of the construction area being disturbed, which includes the area underneath the elevated transmission lines, is 6.62 acres. As part of this 6.62 acres, the approximate size of the disturbed area underneath the transmission lines was conservatively calculated by multiplying the length of the transmission line corridor by an assumed width of 40 feet. Because of the frequent application of water, a control efficiency of 50 percent is assumed, which is the average level of control achieved through application of water (USEPA 1985a). The fugitive dust emissions due to general transmission line construction activities are given in Table 1. The fugitive dust emissions due to general construction activities associated with switchyard construction have already been included in the facility construction fugitive dust emissions provided in Section 6.1.3.1 of the AFC.

In addition to the general transmission line construction activities described above, fugitive dust emissions will also be generated by construction and delivery vehicles travelling on the transmission line and switchyard construction areas. Because the construction and delivery vehicles will travel only on unpaved areas (parking lots, staging areas, and areas under transmission lines) fugitive dust emissions were calculated for this situation. It should be noted that the transmission line and switchyard construction workers will arrive onsite in construction vehicles (i.e., line trucks and pickups), and thus, no fugitive dust emissions will be generated onsite by construction worker vehicles. The fugitive dust emission factors (in lb/vehicle miles traveled) for unpaved areas are given in the USEPA (1985a) document. Water will be used to control the fugitive dust emissions from construction and delivery vehicles. This results in approximately a 50 percent control efficiency.

Table 1
Estimation of Monthly Fugitive Dust Emissions Due to Excavation/Grading for Transmission Line Construction Period with Maximum Activity

Uncontrolled PM_{10} Emission Factor*	0.72 ton/acre/month
Control Effectiveness	50 percent
Controlled PM_{10} Emission Factor	0.36 ton/acre/month
Maximum Construction Area**	6.62 acres
Maximum PM_{10} Emission Estimate***	2.38 tons/month

*Representative of PM_{10} emissions. Assumes that PM_{10} emissions are 60 percent of the total particulate emission factor of 1.2 tons/acre/month.

**This is the maximum area expected to contain construction activities at any time during the entire construction period.

***This is a conservative estimate of emissions during the period with the largest area of construction activity. This area is assumed to include the area under the transmission lines.

The following equation from AP-42 (USEPA 1985a) Section 11.2.1.1 was used to calculate the PM_{10} fugitive dust emissions generated by vehicle travel over the unpaved roads:

$$E\left(\frac{lb}{VMT}\right) = k5.9\left(\frac{s}{12}\right)\left(\frac{S}{30}\right)\left(\frac{W}{3}\right)^{0.7}\left(\frac{w}{4}\right)^{0.5}\left(\frac{365-p}{365}\right)$$

where

W = mean vehicle weight (28.5 tons for delivery vehicles and 8.4 tons for construction vehicles),

k = particle size multiplier (0.36) (for particles less than 10 μm in diameter),

S = mean vehicle speed (10 mph),

s = surface material silt content; (28.5 percent for vehicles which are assumed to travel on unpaved dirt roads),

w = mean number of wheels (18 wheels per delivery vehicle, and a mean 15 wheels per construction vehicle),

p = number of days with $\geq$0.01 in. precipitation (60).

Fugitive dust emissions from delivery vehicles and construction vehicles were computed assuming average vehicle weights of 28 and 8.4 tons, respectively. The particle size multiplier was determined from the *Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources (USEPA 1985b).* Construction vehicles are expected to travel and stop frequently, and thus, an assumed mean vehicle speed of 10 mph was used. It was also assumed that construction vehicles will be travelling the majority of time on unpaved dust roads, and thus, a conservative surface material silt content of 28.5 percent was used (USEPA 1985a). The mean number of wheels is expected to be 18 for delivery vehicles and 15 for onsite construction vehicles based on the combination of various types of construction vehicles. The mean number of days per year with precipitation $\geq$0.01 inches (60) was based on 30 years of climatological data for the Sacramento area (NOAA 1991).

The fugitive dust emissions due to plant traffic are listed in Table 2. The total fugitive dust emissions at 50 percent control for general transmission line construction (2.38 tons per month), construction vehicle traffic (1.06 tons per month), and delivery vehicle traffic (0.27 tons per month) is 3.71 tons per month. This figure is a calculation of the emissions during the period in which the maximum possible construction area will be potentially disturbed and the highest level of activities occur. During periods of wet weather, fugitive dust emissions are expected to be significantly less than this amount.

Table 2
Monthly Transmission Line and Switchyard Construction Fugitive Dust Emissions Due to Construction and Delivery Vehicle Traffic for the Period with Maximum Activity

Fugitive Dust Source	Maximum Number Onsite	Uncontrolled PM_{10} Emissions		Controlled PM_{10} Emissions**	
		lb/h*	ton/month	lb/h*	ton/month
Construction Vehicles***	8	17.48	2.12	8.74	1.06
Delivery Vehicles	5	24.92	0.55	12.46	0.27
Total				21.20	1.33

*"Worst-case" 1 hour period is based on a 1 hour period during which five delivery vehicles are onsite, and all eight construction vehicles are operating.

**Assuming 50 percent control through the use of watering.

***Construction vehicles include all vehicles that are not delivery vehicles or heavy-duty construction equipment.

2. Vehicle Exhaust Emissions. During construction, vehicles will also generate small quantities of exhaust emissions in addition to fugitive dust. This subsection addresses the amounts of emissions of CO, NO_2, SO_2, hydrocarbons (HC), and PM_{10} that are likely to be emitted by the construction vehicles. The results presented are based on projections of the maximum number, type, and use of vehicles generating exhaust emissions to be operated during the construction of the project. In addition, it was conservatively assumed that all NO_x is NO_2 and all PM is PM_{10}. Therefore, the following tables listing the exhaust emissions present NO_x as NO_2 and PM as PM_{10}.

Table 3 lists the maximum projected number and type of construction vehicles expected to be onsite during construction. In addition, the number of hours of operation per month, and the maximum expected quantities of exhaust emissions from each type of construction vehicle appear in Tables 4 through 7. Emission factors were obtained from the USEPA (1985b) document. For gasoline and diesel powered trucks, late model vehicles of 1987 through 1992 were assumed. The USEPA emission factors for these three vehicle types (which appear as grams per mile in the reference) were used to calculate tons per month based on the maximum expected number of vehicles onsite, the miles to be traveled per vehicle, and the number of hours of construction per month. With an expected 22 workdays per month, a daily operation of 8 hours results in 176 hours of operation per month for each type of construction vehicle.

The total number of construction vehicles (11) listed in Table 3 are not likely to all be operating concurrently at any one time during construction. For example, three line trucks and two cranes will not be operating simultaneously when the hole driller truck is operating. Therefore, because these vehicles are not used to this extent during any single construction period, the estimates of vehicle usage (176 hours) and associated total emissions are very conservative.

Table 7 lists vehicle exhaust emissions for the delivery vehicles (heavy-duty vehicles [diesel]). The frequency of delivery per month is estimated to be 22 which corresponds to the peak construction period. Table 8 shows the total construction vehicle exhaust emissions from the project construction vehicles. As shown in the table, vehicle exhausts will emit NO_2 in the greatest mass of any pollutant. Over the one month period, 0.64 ton will be emitted. Note that the combination of vehicle

Table 3
Numbers of Construction and Mobile Equipment for Construction of Transmission Lines and Switchyard

Name of Construction Vehicle	Construction Vehicle Type*	Maximum Number Onsite
Construction Vehicles		
Line Truck	Heavy-Duty Vehicle (diesel)	3
Hole Driller	Heavy-Duty Vehicle (diesel)	1
Cranes	Heavy-Duty Construction Equipment	2
Line Tensioner	Heavy-Duty Construction Equipment	1
150 foot Condor	Heavy-Duty Vehicle (diesel)	1
Fork Lift	Heavy-Duty Vehicle (diesel)	1
Pickups	Light-Duty Truck (gasoline)	2
Total		11
Miscellaneous Vehicles		
Delivery Vehicles	Heavy-Duty Vehicles (diesel)	22**

*As defined in the USEPA (1985b).

**Deliveries per month.

Table 4
Estimation of Monthly Heavy-Duty Construction Equipment Exhaust Emissions During Construction of Transmission Lines and Switchyard

Pollutant	Emission Factor* (lb/h)	Number of Units	Emissions** (tons/month)
CO	0.68	3	0.18
NO_2	1.7	3	0.45
SO_2	0.14	3	0.04
PM_{10}	0.14	3	0.04
HC	0.15	3	0.04

*Per unit. Based on Table II-7.1 in AP-42 (USEPA 1985b).

**Based on 176 hours per month of operation.

Table 5
Estimation of Monthly Heavy-Duty Diesel Vehicle Exhaust Emissions During Construction of Transmission Lines and Switchyard[a]

Pollutant	Emission Factor (Travel)[b] (g/mile)	Emissions[c] (lb/day)	Emission Factor (Idle)[d] (g/min)	Emissions[e] (lb/day)	Total Emissions[f] (ton/month)
CO	8.67	0.10	0.72	0.19	0.29
NO_2	11.44	0.13	0.22	0.06	0.19
SO_2	Negl.	--	1.1[g]	0.29	0.29
PM_{10}	Negl.	--	1.1[g]	0.29	0.29
HC	2.53	0.03	0.27	0.29	0.32

[a] Assumes that vehicles are 1987-1992 models, 50,000 miles on odometer, and no tampering of emission systems.

[b] From Table 1.7-1 in AP-42 (USEPA 1985b).

[c] Assumes one heavy-duty vehicle travelling 5 miles per day onsite.

[d] From Table 1.7.3 in AP-42 (USEPA 1985b) per vehicle.

[e] Assumes vehicles each idle for 2 hours per day.

[f] Assumes 22 work days per month and a total of 6 heavy-duty vehicles.

[g] SO_2 and PM_{10} emission factors not available. Calculation assumes heavy-duty construction equipment emission factor from Table 4.

Table 6
Estimation of Monthly Light-Duty Gasoline Truck Exhaust Emissions During Construction of Transmission Lines and Switchyard[a]

Pollutant	Emission Factor[b] (g/mile)	Emission Rate per Truck[c] (lb/day)	Emissions[d] (ton/month)
CO	10.15	0.112	0.002
NO_2	1.06	0.011	0.0003
SO_2	--	--	--
PM_{10}	--	--	--
HC	0.81	0.009	0.0002

[a] Assumes that vehicles are 1987-1992 models, 50,000 miles on odometer, and no tampering of emission systems.

[b] From Table 1.3.1A in AP-42 (USEPA 1985b).

[c] Assumes five miles per day traveled onsite.

[d] Based on 2 light-duty gasoline trucks and 22 work days per month.

Table 7
Estimation of Monthly Vehicle Exhaust Emissions From Delivery Vehicles During Construction of Transmission Line and Switchyard[a]

Pollutant	Emission Factor (Travel) (g/mile)	Emission (Travel) (ton/month)	Emission Factor (Idle) (g/minute)	Emissions (Idle) (ton/month)	Total Emissions (ton/month)
CO	8.67[b]	0.00015[c]	0.72	0.00105[d]	0.00120
NO_2	11.44[b]	0.00019[c]	0.22	0.00032[d]	0.00051
SO_2	Negligible	–	1.1	0.00160[d]	0.00160
PM_{10}	Negligible	–	1.1	0.00160[d]	0.00160
HC	2.53[b]	0.00004[c]	0.27	0.00039[d]	0.00043

[a] Assumes that vehicles are 1987-1992 models, 50,000 miles on odometer, no tampering of emission systems, and worker vehicles do not idle.

[b] From Table 1.7-1 in AP-42 (USEPA 1985b).

[c] Based on 0.7 mile travelled per vehicle, per delivery; 22 deliveries/month.

[d] Based on 60 minutes of idling per delivery; 22 deliveries/month.

Table 8
Estimation of Total Monthly Vehicle Exhaust Emissions per Vehicle Type During Construction of Transmission Line and Switchyard[a]

		Emissions									
		CO		NO_2		SO_2		HC		PM_{10}	
Vehicle Type[b]	Operation (hours/ month)	lb/h[c]	tons/ month	lb/h[c]	tons/ month	lb/h[c]	tons/ month	lb/h[c]	tons/ month	lb/h[c]	tons/ month
Light-Duty Truck (gasoline)	176	0.0224	0.002	0.022	0.0003	–	–	0.018	0.0002	--	--
Heavy-Duty Vehicle	176	0.57	0.29	0.76	0.19	0.087	0.29	0.214	0.32	0.087	0.29
Heavy-Duty Construction Equipment	176	2.04	0.18	5.10	0.45	0.42	0.04	0.15	0.04	0.14	0.04
Delivery Vehicles	22[d]	0.476	0.00120	0.146	0.00051	0.728	0.00160	0.728	0.00043	0.179	0.00160
Total Emissions	--	3.31	0.473	6.028	0.641	1.235	0.332	1.110	0.361	0.406	0.332

[a] Number of construction vehicles per type is listed on Table 3.

[b] For gasoline powered vehicles, emission rate (lb/h) is based on a gram per mile EPA emissions factor. For diesel powered vehicles, the emission rate shown is the EPA emission factor multiplied by the total number of vehicles in each type. All vehicles are diesel powered, except as noted.

[c] "Worst-case" 1 hour emission rates, based on all equipment operating.

[d] Assuming 22 deliveries per month as worst-case situation.

type and use assumed in the emission calculations will not occur during any one month construction period. The assumption was made so that a conservative estimate of potential construction vehicle exhaust emissions could be made. Actual emissions during construction are likely to be substantially lower.

3. Total Potential Transmission Line Construction Emissions. Because construction activities generate both fugitive dust (excavation/grading, and construction and delivery vehicle traffic) and vehicle exhaust emissions, the total construction emissions for each pollutant was a summation of both types of emissions. Table 9 lists the total annual emission rates for CO, NO_2, SO_2, HC, and PM_{10}. As shown in the table, the annual emissions (in tons per year [tpy]) for CO, NO_2, SO_2, and HC were calculated by multiplying the tons/month emissions by five which corresponds to the number of months of construction activity. Because the tons/month fugitive dust emission (PM_{10}) due to excavation/grading will primarily occur during a one month period, the tons/month emissions for PM_{10} were multiplied by one to determine the annual emissions (in tpy). In addition, the tons/month emissions due to the other sources of PM_{10} (fugitive dust due to delivery and construction vehicle traffic plus vehicle exhaust emissions) were multiplied by five to determine annual emissions (in tpy).

As shown in Table 9, the total annual construction emissions for CO, NO_2, SO_2, HC, and PM_{10}, are 2.37, 3.21, 1.66, 1.81, and 10.69 tpy, respectively. These levels of total construction emissions are conservative because it was assumed that all construction activities occur simultaneously and for periods of time much longer than expected.

4. References

National Oceanic and Atmospheric Administration (NOAA), 1991, *Local Climatological Data--Annual Summary with Comparative Data, Part IV--Western Region*, Sacramento, California, National Climatic Data Center, Asheville, North Carolina.

US Environmental Protection Agency (USEPA), 1985a, *Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources,* AP-42, Office of Air and Radiation , Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, September 1985.

Table 9
Total Monthly and Annual Potential Emissions Due to Switchyard and Transmission Line Construction

Pollutant	Total Monthly Emissions[a] (tons/month)	Total Annual Emissions[b] (tpy)
CO	0.473	2.37
NO_2	0.641	3.21
SO_2	0.332	1.66
HC	0.361	1.81
PM_{10}		
(c)	2.38	2.38[d]
(e)	1.33	6.65
(f)	0.332	1.66
Total PM_{10}[g]	4.04	10.69

[a] Refer to Table 8.

[b] Total annual emissions (tpy) = total monthly emissions x 5 months/year (5 months is the expected duration of construction).

[c] PM_{10} due to excavation/grading (Table 1).

[d] PM_{10} due to excavation/grading (ton/month) x one month/year.

Note: The ton/month for excavation/grading is equal to annual emissions because one month is the length of time in which the peak amount of excavation/grading will occur.

[e] PM_{10} due to delivery and construction vehicle traffic (Table 2).

[f] PM_{10} due to vehicle exhaust emissions (Table 8).

[g] Total PM_{10} = (c) + (e) + (f).

US Environmental Protection Agency (USEPA), 1985b, *Compilation of Air Pollutant Emission Factors, Volume II: Mobile Source,* AP-42, Office of Air and Radiation, Office of Mobile Sources, Test and Evaluation Branch, Ann Arbor, Michigan, September 1985.

PROCTER & GAMBLE COGENERATION PROJECT
SACRAMENTO COGENERATION AUTHORITY

RESPONSES TO CEC DATA REQUESTS
(Set 1, dated December 3, 1993)

AIR QUALITY - 1

Please clarify if the air pollutant emissions for the construction of the transmission line are included in the construction emission identified in AFC Section 6.1.3, and identify the expected transmission line construction air emissions sources, duration of operation, emission rates and proposed mitigation measures.

SCA RESPONSE:

Air pollutant emissions for the construction of the transmission line were not included in the construction emission of the AFC (Section 6.1.3). A separate analysis titled Potential Transmission Line Construction Emissions, included with this response as Attachment AQ-1, identifies the expected transmission line construction air emissions sources, duration of operation, emission rates, and proposed mitigation measures.

AIR QUALITY - 2

Please provide the documentation from the photochemical modeling study which substantiates the statement that "preliminary indications are that 1 pound of ROC will offset at least 1 pound or more of NO_x *(AFC p. 6.1-166).*

SCA RESPONSE:

The Sacramento Metropolitan Air Quality Management District (SMAQMD) is currently developing ratios for interpollutant trades. The SMAQMD expects to make public its recommended ratios later in January 1994. SCA will review the ratios at that time and, if necessary, adjust the number of offsets assigned to the project.

AIR QUALITY - 3

Please provide copies (on 3 1/2" disks of all input files used for the screening, refined, and cumulative modeling analyses presented in the AFC. (At this time, for data response filing purposes, only 5 copies of each disk are required; additional copies will be required upon the request of the CEC regulatory project manager.)

SCA RESPONSE:

Five archived copies of the dispersion modeling input files are included on five separate 3 1/2" disks. These dispersion modeling input files are described in Table AQ-1. Instructions for unarchiving the model input files are as follows:

1. On an IBM compatible personal computer, copy the file SCAOCT93.EXE to the directory where the model input files are to be placed.
2. Type the command: SCAOCT93
3. The files will be unarchived to the directory where the file SCAOCT93.EXE is located.

AIR QUALITY - 4

Please describe the performance criteria P&G and/or the Sacramento Cogeneration Authority (SCA) will use to determine when the project equipment operation and steam supply (from the new cogeneration project) are "demonstrated to be reliable."

SCA RESPONSE:

The Engineer, Procure, and Construct (EPC) contract requires the contractor "to demonstrate that the plant is capable of providing the guaranteed net power output (KW) on the high side of the main transformers at the guaranteed heat rate (BTU/KWH) in a reliable manner by performing a 21 day acceptance test. During the first 18 days of this 21 day test the plant shall maintain at least a 90 percent availability factor defined as operating 90 percent of the time at the guaranteed output and at the guaranteed heat rate." (EPC CONTRACT EXHIBIT D SECTION 6.6.3.3)

The steam sales contract with P&G requires SCA to perform a production test "to demonstrate the capability of such facilities to provide the temperature, pressure, quantity, and reliability" of the steam supply. "The production test shall continue until 30 continuous days of successful operation have been achieved." (STEAM SALES AGREEMENT ARTICLE 5.1)

AIR QUALITY - 5

Please describe the anticipated time frame (days, weeks, months or years) within which P&G or SCA will be satisfied that the new cogeneration facility will be "demonstrated to be reliable."

Table AQ-1
Description of Dispersion Modeling Input Files

Run Name (.DAT)[a]	Pollutant	Model	Description
Screening Level I Dispersion Modeling Input Files			
LM6SC	NOM[b]	ISCST2	Dispersion modeling run to determine impact of the SCCT[c] LM6000 at 50%, 75%, 100%, and peak loads under ambient conditions of 18F, 48F, and 115F.
LM6CC	NOM	ISCST2	Dispersion modeling run to determine impact of the #1 CCCT[d] LM6000 at 50%, 75%, and 100% loads under ambient conditions of 18F, 48F, and 115F.
LM6CC2	NOM	ISCST2	Dispersion modeling run to determine impact of the #2 CCCT LM6000 at 50%, 75%, and 100% loads under ambient conditions of 18F, 48F, and 115F.
AUXBOIL	NOM	ISCST2	Dispersion modeling run to determine impact of the auxiliary boiler at 50%, 75%, and 100% loads.
DIESEL80	NOM	ISCST2	Dispersion modeling run to determine impact of the diesel generator at 50%, 75%, and 100% loads.
Screening Level II Dispersion Modeling Input Files			
COSCRN	CO	ISCST2	Dispersion modeling run to determine worst-case facility CO impacts. Source group A produces results for Scenario 1 described in the AFC. Source group C produces results for Scenario 7 described in the AFC.
SO2SCRN	SO_2	ISCST2	Dispersion modeling run to determine worst-case facility SO_2 impacts. Source group A produces results for Scenario 1 described in the AFC. Source group C produces results for Scenario 7 described in the AFC.
NOXSCRN	NO_2	ISCST2	Dispersion modeling run to determine worst-case facility NO_2 impacts. Source group A produces results for Scenario 1 described in the AFC. Source group C produces results for Scenario 7 described in the AFC.
PMSCRN	PM_{10}	ISCST2	Dispersion modeling run to determine worst-case facility PM_{10} impacts. Source group A produces results for Scenario 1 described in the AFC. Source group C produces results for Scenario 7 described in the AFC.
SC1CO	CO	VALLEY	VALLEY equivalent COMPLEX I run to determine facility CO impacts in complex terrain for Scenario 1.
SC7CO	CO	VALLEY	VALLEY equivalent COMPLEX I run to determine facility CO impacts in complex terrain for Scenario 7.

Table AQ-1
Description of Dispersion Modeling Input Files
(Continued)

Run Name (.DAT)[a]	Pollutant	Model	Description
$SC1SO_2$	SO_2	VALLEY	VALLEY equivalent COMPLEX I run to determine facility SO_2 impacts in complex terrain for Scenario 1.
$SC7SO_2$	SO_2	VALLEY	VALLEY equivalent COMPLEX I run to determine facility SO_2 impacts in complex terrain for Scenario 7.
$SC1NO_X$	NO_2	VALLEY	VALLEY equivalent COMPLEX I run to determine facility NO_2 impacts in complex terrain for Scenario 1.
$SC7NO_X$	NO_2	VALLEY	VALLEY equivalent COMPLEX I run to determine facility NO_2 impacts in complex terrain for Scenario 7.
SC1PM	PM_{10}	VALLEY	VALLEY equivalent COMPLEX I run to determine facility PM_{10} impacts in complex terrain for Scenario 1.
SC7PM	PM_{10}	VALLEY	VALLEY equivalent COMPLEX I run to determine facility PM_{10} impacts in complex terrain for Scenario 7.
Cumulative Source Dispersion Modeling Input Files			
CO1HR85	CO	ISCST2	Dispersion modeling run to determine cumulative CO impact for 1-hour 1-hour non start-up period using 1985 meteorological data.
CO1HR86	CO	ISCST2	Dispersion modeling run to determine cumulative CO impact for 1-hour 1-hour non start-up period using 1986 meteorological data.
CO1HR87	CO	ISCST2	Dispersion modeling run to determine cumulative CO impact for 1-hour 1-hour non start-up period using 1987 meteorological data.
CO1HR88	CO	ISCST2	Dispersion modeling run to determine cumulative CO impact for 1-hour 1-hour non start-up period using 1988 meteorological data.
CO1HR89	CO	ISCST2	Dispersion modeling run to determine cumulative CO impact for 1-hour 1-hour non start-up period using 1989 meteorological data.
CO8HR85	CO	ISCST2	Dispersion modeling run to determine cumulative CO impact for 8-hour 1-hour non start-up period using 1985 meteorological data.

Table AQ-1
Description of Dispersion Modeling Input Files
(Continued)

Run Name (.DAT)[a]	Pollutant	Model	Description
CO8HR86	CO	ISCST2	Dispersion modeling run to determine cumulative CO impact for 8-hour 1-hour non start-up period using 1986 meteorological data.
CO8HR87	CO	ISCST2	Dispersion modeling run to determine cumulative CO impact for 8-hour 1-hour non start-up period using 1987 meteorological data.
CO8HR88	CO	ISCST2	Dispersion modeling run to determine cumulative CO impact for 8-hour 1-hour non start-up period using 1988 meteorological data.
CO8HR89	CO	ISCST2	Dispersion modeling run to determine cumulative CO impact for 8-hour 1-hour non start-up period using 1989 meteorological data.
COST85	CO	ISCST2	Dispersion modeling run to determine cumulative CO impact for 1-hour start-up period using 1985 meteorological data.
COST86	CO	ISCST2	Dispersion modeling run to determine cumulative CO impact for 1-hour start-up period using 1986 meteorological data.
COST87	CO	ISCST2	Dispersion modeling run to determine cumulative CO impact for 1-hour start-up period using 1987 meteorological data.
COST88	CO	ISCST2	Dispersion modeling run to determine cumulative CO impact for 1-hour start-up period using 1988 meteorological data.
COST89	CO	ISCST2	Dispersion modeling run to determine cumulative CO impact for 1-hour start-up period using 1989 meteorological data.
SO2ST85	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for 1-hour start-up period using 1985 meteorological data.
SO2ST86	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for 1-hour start-up period using 1986 meteorological data.
SO2ST87	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for 1-hour start-up period using 1987 meteorological data.
SO2ST88	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for 1-hour start-up period using 1988 meteorological data.
SO2ST89	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for 1-hour start-up period using 1989 meteorological data.

Table AQ-1
Description of Dispersion Modeling Input Files
(Continued)

Run Name (.DAT)[a]	Pollutant	Model	Description
SO21385	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for 1-hour (non start-up) and 3-hour periods using 1985 meteorological data.
SO21386	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for 1-hour (non start-up) and 3-hour periods using 1986 meteorological data.
SO21387	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for 1-hour (non start-up) and 3-hour periods using 1987 meteorological data.
SO21388	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for 1-hour (non start-up) and 3-hour periods using 1988 meteorological data.
SO21389	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for 1-hour (non start-up) and 3-hour periods using 1989 meteorological data.
SO22485	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for 24-hour period using 1985 meteorological data.
SO22486	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for 24-hour period using 1986 meteorological data.
SO22487	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for 24-hour period using 1987 meteorological data.
SO22488	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for 24-hour period using 1988 meteorological data.
SO22489	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for 24-hour period using 1989 meteorological data.
SO2ANN85	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for annual period using 1985 meteorological data.
SO2ANN86	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for annual period using 1986 meteorological data.
SO2ANN87	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for annual period using 1987 meteorological data.
SO2ANN88	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for annual period using 1988 meteorological data.

Table AQ-1
Description of Dispersion Modeling Input Files
(Continued)

Run Name (.DAT)[a]	Pollutant	Model	Description
SO2ANN89	SO_2	ISCST2	Dispersion modeling run to determine cumulative SO_2 impact for annual period using 1989 meteorological data.
NOX1HR85	NO_2	ISCST2	Dispersion modeling run to determine cumulative NO_2 impact for 1-hour period using 1985 meteorological data.
NOX1HR86	NO_2	ISCST2	Dispersion modeling run to determine cumulative NO_2 impact for 1-hour period using 1986 meteorological data.
NOX1HR87	NO_2	ISCST2	Dispersion modeling run to determine cumulative NO_2 impact for 1-hour period using 1987 meteorological data.
NOX1HR88	NO_2	ISCST2	Dispersion modeling run to determine cumulative NO_2 impact for 1-hour period using 1988 meteorological data.
NOX1HR89	NO_2	ISCST2	Dispersion modeling run to determine cumulative NO_2 impact for 1-hour period using 1989 meteorological data.
NOXST85	NO_2	ISCST2	Dispersion modeling run to determine cumulative NO_2 impact for 1-hour start-up period using 1985 meteorological data.
NOXST86	NO_2	ISCST2	Dispersion modeling run to determine cumulative NO_2 impact for 1-hour start-up period using 1986 meteorological data.
NOXST87	NO_2	ISCST2	Dispersion modeling run to determine cumulative NO_2 impact for 1-hour start-up period using 1987 meteorological data.
NOXST88	NO_2	ISCST2	Dispersion modeling run to determine cumulative NO_2 impact for 1-hour start-up period using 1988 meteorological data.
NOXST89	NO_2	ISCST2	Dispersion modeling run to determine cumulative NO_2 impact for 1-hour start-up period using 1989 meteorological data.
NOXANN85	NO_2	ISCST2	Dispersion modeling run to determine cumulative NO_2 impact for annual period using 1985 meteorological data.
NOXANN86	NO_2	ISCST2	Dispersion modeling run to determine cumulative NO_2 impact for annual period using 1986 meteorological data.
NOXANN87	NO_2	ISCST2	Dispersion modeling run to determine cumulative NO_2 impact for annual period using 1987 meteorological data.
NOXANN88	NO_2	ISCST2	Dispersion modeling run to determine cumulative NO_2 impact for annual period using 1988 meteorological data.
NOXANN89	NO_2	ISCST2	Dispersion modeling run to determine cumulative NO_2 impact for annual period using 1989 meteorological data.
PM2485	PM_{10}	ISCST2	Dispersion modeling run to determine cumulative PM_{10} impact for 24-hour period using 1985 meteorological data.

Table AQ-1
Description of Dispersion Modeling Input Files
(Continued)

Run Name (.DAT)[a]	Pollutant	Model	Description
PM2486	PM_{10}	ISCST2	Dispersion modeling run to determine cumulative PM_{10} impact for 24-hour period using 1986 meteorological data.
PM2487	PM_{10}	ISCST2	Dispersion modeling run to determine cumulative PM_{10} impact for 24-hour period using 1987 meteorological data.
PM2488	PM_{10}	ISCST2	Dispersion modeling run to determine cumulative PM_{10} impact for 24-hour period using 1988 meteorological data.
PM2489	PM_{10}	ISCST2	Dispersion modeling run to determine cumulative PM_{10} impact for 24-hour period using 1989 meteorological data.
PMANN85	PM_{10}	ISCST2	Dispersion modeling run to determine cumulative PM_{10} impact for annual period using 1985 meteorological data.
PMANN86	PM_{10}	ISCST2	Dispersion modeling run to determine cumulative PM_{10} impact for annual period using 1986 meteorological data.
PMANN87	PM_{10}	ISCST2	Dispersion modeling run to determine cumulative PM_{10} impact for annual period using 1987 meteorological data.
PMANN88	PM_{10}	ISCST2	Dispersion modeling run to determine cumulative PM_{10} impact for annual period using 1988 meteorological data.
PMANN89	PM_{10}	ISCST2	Dispersion modeling run to determine cumulative PM_{10} impact for annual period using 1989 meteorological data.
Fumigation Dispersion Modeling Input Files			
AUXBCO	CO	SCREEN2	Dispersion modeling run to determine 1-hour CO fumigation impact for auxiliary boiler.
AUXBNOX	NO_2	SCREEN2	Dispersion modeling run to determine 1-hour NO_2 fumigation impact for auxiliary boiler.
AUXBSO2	SO_2	SCREEN2	Dispersion modeling run to determine 1-hour SO_2 fumigation impact for auxiliary boiler.
DGENCO	CO	SCREEN2	Dispersion modeling run to determine 1-hour CO fumigation impact for diesel generator.
DGENNOX	NO_2	SCREEN2	Dispersion modeling run to determine 1-hour NO_2 fumigation impact for diesel generator.
DGENSO2	SO_2	SCREEN2	Dispersion modeling run to determine 1-hour SO_2 fumigation impact for diesel generator.

Table AQ-1
Description of Dispersion Modeling Input Files
(Continued)

Run Name (.DAT)[a]	Pollutant	Model	Description
F6C2CO	CO	SCREEN2	Dispersion modeling run to determine 1-hour CO fumigation impact for #2 LM6000 CCCT.
F6C2NOX	NO_2	SCREEN2	Dispersion modeling run to determine 1-hour NO_2 fumigation impact for #2 LM6000 CCCT.
F6C2SO2	SO_2	SCREEN2	Dispersion modeling run to determine 1-hour SO_2 fumigation impact for #2 LM6000 CCCT.
F6SCCO	CO	SCREEN2	Dispersion modeling run to determine 1-hour CO fumigation impact for LM6000 SCCT.
F6SCNOX	NO_2	SCREEN2	Dispersion modeling run to determine 1-hour NO_2 fumigation impact for LM6000 SCCT.
F6SCSO2	SO_2	SCREEN2	Dispersion modeling run to determine 1-hour SO_2 fumigation impact for LM6000 SCCT.

[a] File extension for all of the model input files.

[b] NOM = nominal 1 gram per second emission rate was modeled for these runs. The nominal impact was then multiplied by the actual emission rate for each pollutant to determine the actual impact for each pollutant.

[c] SCCT = simple cycle combustion turbine.

[d] CCCT = combined cycle combustion turbine.

SCA RESPONSE:

The SCA anticipates that the startup testing program culminating in the successful completion of the Acceptance Test (SCA) and the concurrent Production Test (P&G) will take 6 months.

AIR QUALITY - 6

AQ-6 - Please discuss the ultimate fate (permits surrendered and equipment removed, or permits kept current and equipment used as standby) of the existing P&G boilers once it is determined that the new cogeneration facility is demonstrated to be reliable and the P&G boilers are no longer needed to be operated.

SCA RESPONSE:

P&G has indicated that the existing boilers will be placed in cold layup upon successful completion of the production test for a period of 6 to 9 months and then probably removed after that. P&G intends to keep the permits current. There is no contractual obligation between the parties that specifies the ultimate fate of the boilers or the permits. The steam sales agreement between SCA and P&G does specify that SCA will be the exclusive provider of the first 120,000 pph of P&G's steam requirements. (STEAM SALES AGREEMENT ARTICLE 5.4)

AIR QUALITY - 7

Please discuss the ultimate fate (permits surrendered and equipment removed, or permits kept current and equipment used as standby) of the existing P&G LM2500 combustion turbine generator (CTG) once it is determined that the new cogeneration facility is demonstrated to be reliable and the P&G LM2500 CTG no longer needs to be operated.

SCA RESPONSE:

SCA has a contract with P&G for the purpose of the existing LM2500. Ownership will transfer on the Closing Date specified in the contract but not before completion of the cogeneration project and successful demonstration of the LM2500 performance. SCA is required to remove any of the purchased equipment within 12 months after transfer of ownership. SCA anticipates selling the LM2500 to a third party. P&G will surrender the operating permit upon transfer of ownership.

AIR QUALITY - 8

Please discuss whether the SCA/P&G Steam Sales Contract includes conditions and circumstances whereby the existing P&G boilers and LM2500 CTG would provide steam to P&G.

SCA RESPONSE:

The steam sales contract provides that if P&G anticipates a permanent increase in its steam requirement above 120,000 pph SCA may elect to provide all, any, or none of the increase. If SCA elects to provide less than all of the increased requirement, P&G may pursue alternative means to satisfy the remaining requirement provided that SCA continues to have the right to supply its maximum obligation (STEAM SALES AGREEMENT ARTICLE 6.1)

The contract does not limit P&G's use of the existing boilers to satisfy the unfulfilled increased need. After completion of the cogeneration plant SCA would own the LM2500 and P&G would have relinquished its operating permit. This would preclude P&G from using the LM2500 to provide the additional steam.

AIR QUALITY - 9

Re: The applicability of the standby emergency generator exemption to the proposed internal combustion engine used when there is an actual interruption of power. It is stated that the engine will be used if there is a plant trip. It is unclear if a plant trip, in all cases, will cause a loss of power to the facility. Therefore, please elaborate on what constitutes a plant trip and the status of electrical power to the facility during such an occurrence.

SCA RESPONSE:

As stated in Section 3.13.2 of the AFC (page 3-42), the standby diesel generator set will be used following a plant electrical system trip. The purpose of the standby generator is to supply emergency electrical power to turn the combustion turbines (and operate other key unit equipment such as cooling fans) to avoid an extended lock-out period. During an electrical system trip the facility CTG units will trip due to some form of electrical grid failure (e.g., system blackout or switchyard failure due to a lightning strike) such that electricity generated by the CTGs cannot be distributed and thus the units must be tripped off-line. Because electrical power is not available to turn the CTGs during this trip period, the standby generator must be brought up to supply the required power to turn the CTGs. Except for operation for testing and maintenance periods (as allowed under the District air rule), the standby generator will operate only during an interruption of electrical power to provide emergency plant power. Thus, the standby generator qualifies for the emergency electrical generator exemption as allowed under District air rules.

AIR QUALITY - 10

Re: The best available control technology (BACT) determination for the standby generator internal combustion engine, it was stated that natural gas would not be appropriate due to its reliability as compared to diesel fuel during a natural gas curtailment episode. The generator in question is defined under the District's rules as standby generator only for use during electrical outages. This appears to be consistent with the Applicant's apparent intention to use it in an emergency mode, following a plant "trip," to maintain turbine spin in order to prevent the need for "start-up" once power from the transmission grid is restored (AFC pp. 3-25 and 3-43). However, under the Applicant's assumed "natural gas curtailment" scenario, neither the gas turbine nor the standby generator would be operating, and a diesel fuel option would provide no benefit. If this is not the case, please provide further explanation which justifies the use of diesel fuel in the standby generator. The explanation should also include a discussion of the appropriateness of the use of alternative fuels, such as methanol, in the generator.

SCA Response:

It is correct that neither the combustion turbines nor the standby generator would be operating during an episode of natural gas curtailment. A standby emergency generator fueled by natural gas is considered to be less reliable than one fueled by diesel fuel, but the curtailment of natural gas was not a factor in this determination.

Information from the suppliers of natural gas fueled engine-generator sets indicates that natural gas engines are not well suited for emergency generator service where large blocks of load are frequently added and removed. They have indicated that a rapid load increase or decrease of more than 25 percent of the generator rating will cause variations in the generator output voltage and possibly shut the unit down. A large swing in generator voltage may also cause the motors that are required to be started with this generator to trip on high current. The quick response of the diesel engine generator allows for large block load increases and decreases that will not vary the output voltage significantly or cause the engine to shut down. Additionally, the suppliers have indicated that the starting reliability of a natural gas engine is lower than that of a diesel engine following periods of inactivity. Due to the additional starting reliability and load swing capabilities, the diesel fueled generator was determined to be better suited to the intended service of the standby emergency generator.

We have discussed with equipment suppliers the suitability of alternative fuels, including methanol, to be used in engines for the standby generator. Replies received from the suppliers indicated that testing with these fuels has occurred, but apparently with somewhat limited success. Their tests indicate that methanol fuel burns in a diesel engine, but creates heat problems from the combustion process, which dramatically lowers the life expectancy of diesel engines as they are designed today. The use of methanol also causes internal engine friction problems due to the lack of lubricating properties in methanol that are present in diesel fuel. Various manufacturers have tested blends of diesel and methanol with limited success in various engine types and manufacture. We have been advised by an equipment supplier that the size of engine that would be required to drive the 750 kW standby generator, approximately 1,000 horsepower, is not of a size that has been approved for use with a blend of diesel and methanol.

AIR QUALITY - 11

The BACT determination for the auxiliary boiler discounts the use of selective catalytic reduction (SCR) due to an expected service factor of less than 50 percent. However, the entire analysis is based on a 50 percent service factor. This raises questions as to the classification of this boiler as standby. Please clarify the use of the auxiliary boiler.

SCA Response:

The purpose of the auxiliary boiler is to serve as a standby process steam source for Procter & Gamble in the event that one or both combined cycle CTGs are out of service. The expected service factor for each combined cycle unit is 95 percent. Thus, the expected service factor for the auxiliary boiler is 5 percent. However, in the unlikely event that the service factor of the combined cycle units is significantly reduced during an extended period, the Applicant desires to have the capacity to operate the auxiliary boiler significantly more than the expected 5 percent of the year. For this reason, the Applicant has indicated that the maximum service factor for the auxiliary boiler will be set to 50 percent. The air quality analyses provided in the AFC have appropriately been based on the worst-case assumption of an auxiliary boiler service factor of 50 percent.

In the BACT discussion for auxiliary boiler NO_x emissions (pages 6.1-154 and 6.1-155 of the AFC) it is concluded that SCR is not appropriate based on consideration of its purpose and anticipated service factor. An economic impact analysis was not included as part of the BACT discussion in the AFC. In response to this CEC data request and to further justify the BACT conclusion, an economic impact analysis has been prepared and is presented in the following paragraphs. It should be noted that this BACT analysis is based on an auxiliary boiler service factor of 50 percent (4,380 hours per year), a NO_x emission level of

0.03 lb/MBtu without SCR (i.e., with combustion controls only), and a NO_x control efficiency of 80 percent with SCR.

Table AQ-2 presents the capital and operating costs of adding SCR to the auxiliary boiler proposed for the project. The costs listed are the differential costs between the low NO_x burners with 20 percent flue gas recirculation (FGR) and the low NO_x burners, FGR, and SCR system. The SCR system evaluated can achieve 70 to 80 percent removal efficiency. The costs presented are differential from the base of combustion controls only. The economic criteria used to develop these cost estimates are listed in Table AQ-3. The SCR would add approximately $1.4 million to the capital cost of the facility.

As shown in the table, the total 1993 annual cost is $264,400 for the SCR system. This results in an incremental NO_x reduction cost of $51,843 per ton of NO_x removed per year. Operating costs include operating personnel, maintenance, reagent costs, electrical energy costs, and catalyst replacement. Due to the load profile for this facility, the unit would not be in operation for 50 percent of the year. Therefore, the catalyst would have a longer life than one installed on a plant operating continuously. It is for this reason that catalyst replacement costs are calculated assuming a 5 year catalyst life.

Based on the installed, annual, and incremental reduction costs for installing an SCR system on the auxiliary boiler at the project, SCR is not considered to be a cost-effective NO_x emission control device for the auxiliary boiler on this project. Therefore, BACT for the project auxiliary boiler is proposed to be a combination of low NO_x burners and flue gas recirculation. It is estimated that the auxiliary boiler at the project will have controlled NO_x emissions of 2.93 lb/h (0.03 lb/MBtu, 25 ppmvd at 3 percent O_2).

Table AQ-2
Selective Catalytic Reduction System Costs for the Auxiliary Boiler

Cost Item	Cost ($)
Capital Costs	
Direct Costs	
Purchased equipment costs	819,300
Direct installation costs	234,000
Total Direct Cost	1,053,300
Indirect Costs	
Contingencies (15 percent)	122,900
Other indirects	229,400
Total Indirect Cost	352,300
Total Capital Cost	1,405,600
Annual Costs	
Direct Annual Cost	
Utilities	
Fuel	6,000
Electricity	3,200
Catalyst replacement	17,100
Ammonia	600
Operating Labor	5,200
Maintenance	10,000
Total Direct Costs	42,100
Indirect Annual Cost	
Overhead, taxes, administration	65,400
Capital recovery	156,900
Total Indirect Costs	222,300
Total Annual Cost	264,400
Uncontrolled Emission, tpy	6.4*
Annual NO_x Emissions, tpy	1.3*
Differential tpy removed, tpy	5.1*
Differential Removal Cost, $/ton	51,843*

Note: Emission rates based on one Nebraska Boiler Co. Model NS-E-75, 80,000 lb/h steam boiler operating at 80 F.

*Based on a 50 percent service factor which corresponds to 4,380 hours per year of operation.

Table AQ-3
Economic Evaluation Criteria

Item	Value
Economic Recovery Period	20 years
Contingency Cost Factor	15 percent
Present Worth Discount Rate	10 percent
1993 Maintenance Personnel Wage	$18.20/h
1993 Operating Personnel Wage	$16.54/h
1993 Ammonia Cost	$250/ton
1993 Natural Gas Cost	$3.44/MBtu
1993 Fuel Oil Cost	$6.62/MBtu
1993 Energy Cost	$0.059/kWh

Attachment AQ-1

PROCTER & GAMBLE COGENERATION PROJECT
SACRAMENTO COGENERATION AUTHORITY

RESPONSES TO CEC DATA REQUESTS
(Set 1, dated December 3, 1993)

SOILS

SOILS-1

Please provide a description of the proposed measures for monitoring the success of the revegetation program. Include a description of the maintenance and monitoring program.

SCA RESPONSE

Seeded areas will be examined periodically after planting to assess the success of grass and shrub establishment. Critical periods for monitoring include just after seed sowing/planting and during droughts. Monitoring will include the visual inspection of seeded areas for successful germination and establishment of grass, healthy growth, and fungal, viral, and weedy infestations. Monitoring will extend for approximately 1 year after planting.

Maintenance will include resowing in unsuccessful or sparsely vegetated areas, replacement of dead shrubs, and spraying to reduce fungal, viral, or weedy infestations.

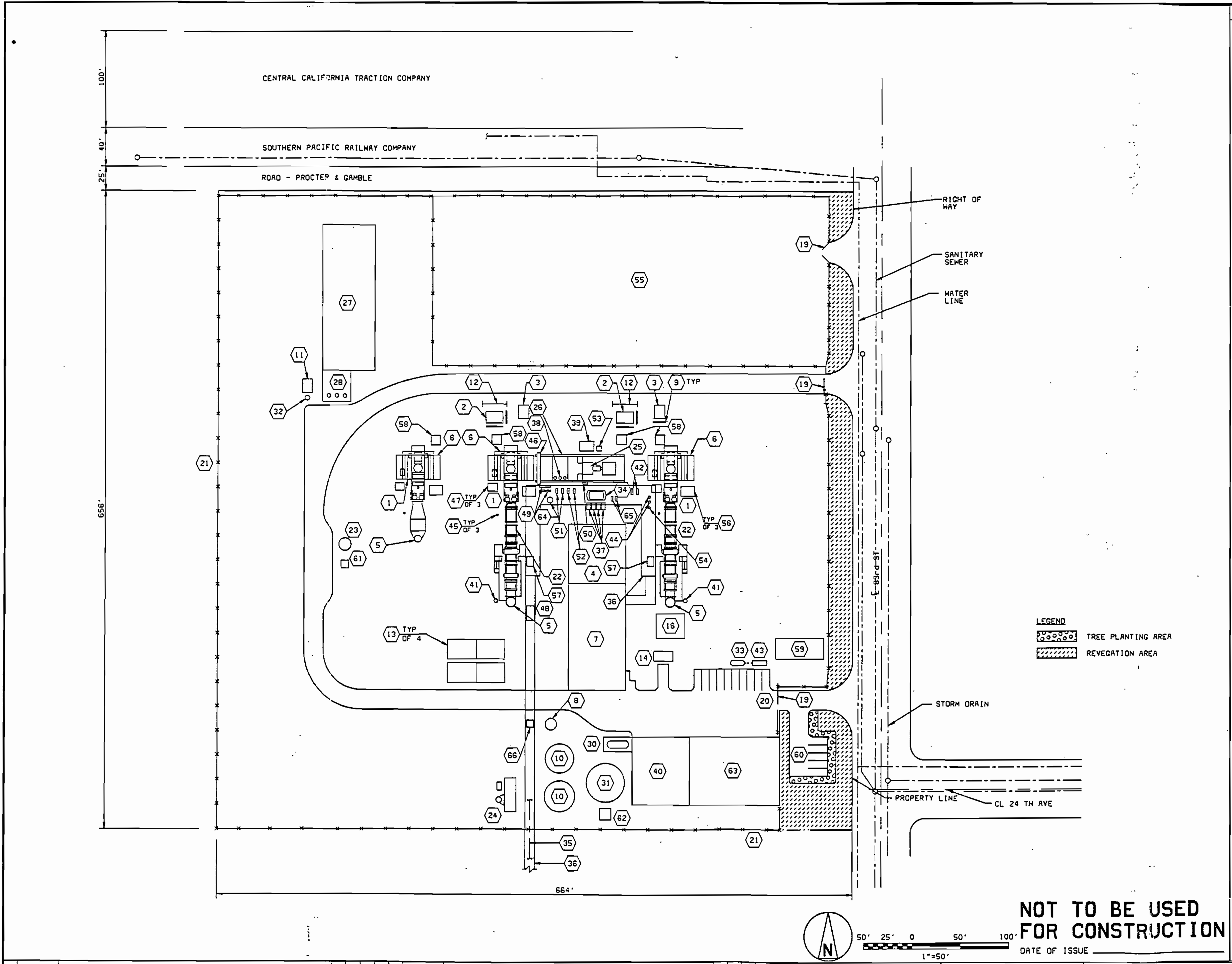
SOILS - 2

Page 6.2-10 of the AFC (revised Nov. 5, 1993) under Mitigation indicates that seeding will be one soil erosion measure that will be used. Please identify all areas to be revegetated, as well as the plant species that will be used. Planting techniques, including seeding and fertilizer rates and irrigation schedules should be identified. If container plants are to be used, the size and the planting density should also be identified.

SCA RESPONSE

Areas to be seeded include the narrow strip of land between the project fence and 83rd Street extending from the northwest corner of the project site to the visitor's parking lot as well as the land adjacent to the visitor's parking lot. Figure SV-1 shows these areas.

Areas will be seeded with creeping red fescue at a seeding rate of 12 pounds per acre. Seeding areas will have a firm seedbed after proper preparation such as disking, chiseling, or harrowing. A commercial fertilizer, such as one containing 16% nitrogen, 20% available phosphoric acid, and 0% water soluble potash, will be distributed uniformly over the seedbed at a rate of 500 pounds per acre. The fertilizer will be applied hydraulically by hydroseeder in the form of a slurry which will also contain the seed. A straw



NOT TO BE USED FOR CONSTRUCTION

DATE OF ISSUE ____

LEGEND

1. COMBUSTION TURBINE (3)
2. GENERATOR TRANSFORMER (2)
3. AUXILIARY TRANSFORMER (2)
4. CHILLER BUILDING
5. STACK (3)
6. INLET FILTER (3)
7. CONTROL/ADMIN BUILDING
8. CONDENSATE STORAGE TANK
9. TRANSFORMER FIREWALL (5)
10. DEMINERALIZED WATER STORAGE TANK (2)
11. CIRC WATER CHEMICAL FEED
12. COMBINATION TAKEOFF TOWER AND DISCONNECT SWITCH (2)
13. GAS COMPRESSORS (4)
14. STANDBY GENERATOR
15.
16. CYCLE CHEMICAL FEED
17.
18.
19. GATE (3)
20. PAVED SITE ACCESS ROAD
21. SITE FENCE
22. HEAT RECOVERY STEAM GENERATOR (2)
23. AMMONIA STORAGE TANK
24. AUXILIARY BOILER
25. STEAM TURBINE
26. CONDENSER
27. COOLING TOWER
28.
29.
30. ACID STORAGE TANK
31. NEUTRALIZATION TANK
32. SODIUM HYPOCHLORITE TANK
33. OIL/WATER SEPARATOR
34. DEAERATOR
35. STEAM LINE TO PROCTER & GAMBLE
36. PIPE RACK
37. BOILER FEED PUMPS (4)
38. CONDENSATE PUMPS (3)
39. TURBINE LUBE OIL UNIT
40. WATER TREATMENT BUILDING
41. BOILER BLOWDOWN TANK (2)
42. AIR COMPRESSORS (2)
43. SANITARY DISCHARGE FLOWMETER AND SAMPLE STATION
44. DESICCANT AIR DRYERS (2)
45. INLET GAS SCRUBBERS (3)
46. ST MAINTENANCE CRANE
47. NOX WATER INJECTION SKID (3)
48. CT WASH SKID (2)
49. AUX COOLING WATER HEAT EXCHANGERS (2)
50. CONDENSER AIR EJECTOR
51. CLOSED CYCLE COOLING WATER PUMPS (2)
52. CONDENSER VACUUM PUMPS (2)
53. LUBE OIL CONDITIONER
54. AIR RECEIVER
55. OWNER'S SUBSTATION
56. AUXILIARY SKID (3)
57. AMMONIA FLOW CONTROL SKID (2)
58. GENERATOR BREAKER ENCLOSURE (4)
59. GAS METER STATION
60. VISITOR PARKING
61. AMMONIA TRANSFER PUMPS
62. NEUTRALIZATION BASIN PUMPS
63. WAREHOUSE AND MAINTENANCE SHOP BUILDING
64. CLOSED COOLING WATER HEAD TANK
65. AUX BOILER FEED PUMPS (2)
66. CONDENSATE MAKEUP PUMPS

NO	DATE	REVISIONS AND RECORD OF ISSUE	BY	CHK	APP	FLM
A	9-3-93	ISSUED FOR PRELIMINARY ARC REVIEW				

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF CALIFORNIA

SIGNED ____

DATE ____ REG NO. ____

BLACK & VEATCH

ENGINEER VBD DRAWN JWD

CHECKED DATE

SACRAMENTO COGENERATION AUTHORITY
PROCTER & GAMBLE COGENERATION PROJECT

SITE ARRANGEMENT
REVEGATION & TREE PLANTING AREAS

PROJECT DRAWING NUMBER 23933-CSTU-S1010 REV A

CODE

AREA

FIGURE SV-1

06269SE1BERT ACAD 12.clb
A01SL006 01 PLOT SCALE: 1"=50', 1=600
12/15/93 16:49:52

mulch will also be distributed uniformly over the seeded area to limit evaporation and erosion.

A number of shrubby and herbaceous species will also be planted within the areas to be sowed to grass to increase aesthetic value. Suggested species include century plant (*Agave americana*), aloe (*Aloe arborescens*), bougainvillea (*Bougainvillea* sp.), western redbud (*Cercis occidentalis*), flannel bush (*Fremontia californica*), juniper (*Juniperus squamata* var. *Meyeri*), wax myrtle (*Myrica californicum*), laurestinus (*Viburnum tinus*), and our Lord's candle (*Yucca whipplei*), all of which are native to California or commonly used as landscape plants. The use of these species is dependent on availability and cost. These species will be planted in clumped or scattered arrangements depending on size and type of shrub. Table S-1 indicates the amount of and container sizes of landscape plants to be installed.

Table S-1. Suggested Landscape Plants to be Installed in Designated Revegetation Areas

Scientific Name	Common Name	Number	Container Size
Agave americana	century plant	1	5 gallon
Aloe arborescens	aloe	2	3 gallon
Bougainvillea sp.	bougainvillea	3	5 gallon
Cercis occidentalis	western redbud	4	7 gallon
Fremontia californica	flannel bush	2	3 gallon
Juniperus squamata var. *Meyeri*	juniper	15	3 gallon
Myrica californicum	wax myrtle	4	7 gallon
Viburnum tinus	laurestinus	2	3 gallon
Yucca whipplei	our Lord's candle	1	5 gallon

Irrigation will be applied as needed following standard landscaping procedures and guidelines specified in the City of Sacramento's Water Conserving Landscape Ordinance. The proposed irrigation schedule consists of a four-season water schedule, which is based on average rainfall levels and evapotranspiration rates for the Sacramento Region. The schedule briefly described below is conceptual in nature and serves only as a preliminary guide. It may vary depending on local weather patterns, such as excessive drought or rainfall, and soil conditions. In general, irrigation should be implemented whenever evapotranspiration levels are greater than rainfall amounts. In such an instance, the deficit in precipitation should be compensated for by irrigation applied periodically each week.

<u>Winter (January to March)</u>: No irrigation is planned during the winter as rainfall amounts are far greater than evapotranspiration levels.
<u>Spring (April to June)</u>: Watering should start after the month of April when

evapotranspiration is greater than rainfall. Water deficits of 2.1 inches and 4.4 inches typically occur in May and June. Therefore, revegetation areas should be irrigated approximately 0.5 inch and 1.1 inches per week during May and June, respectively.
<u>Summer (July to September)</u>: The majority of irrigation will occur during the summer when the greatest deficits are experienced. Approximately 6.4 inches, 5.6 inches, and 3.7 inches of water should be applied during the months of July, August, and September, respectively. For those months, weekly waterings should be about 1.6 inches, 1.4 inches, and 0.9 inch, respectively.
<u>Fall (October to December)</u>: Little or no watering is anticipated during the fall season. Only in October will irrigation be conducted and will consist of approximately 0.4 inch of water per month.

The construction of the proposed transmission line and installation of the fiber optic line will not alter the existing cut slopes. Therefore, revegetation methods for erosion control will not be required for the construction of these facilities.

PROCTER & GAMBLE COGENERATION PROJECT
SACRAMENTO COGENERATION AUTHORITY

RESPONSES TO CEC DATA REQUESTS

WATER RESOURCES

WATER RES - 1

To determine the magnitude of the impact, if any, please provide description of cut and fill volumes of earthwork and/or added foundation structures.

SCA RESPONSE:

The proposed project is being built in an area shown as Zone A99 on the November 15, 1989, Flood Insurance Rate Map (FIRM). Zone A99 is defined as an area "To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined."

The completion date for the Federal protection construction has not been determined. Therefore, the decision was made to place the project facilities above the previously determined flood elevation. This elevation was provided by the US Army Corps of Engineers (COE) from their study information. The COE also calculated the flood elevations using a program which does not consider the effect of floodwater storage on the elevations. The flood elevations were based on conveyance areas available near the impacted stream or river. The COE then used the calculated elevations and area topography to determine which adjacent areas would be included in the flood plain.

The site is located in a backwater area, about two miles from the river, at the edge of the regulatory flood plain. No conveyance across the site was considered in the COE analysis. Therefore, placing fill on the site will not affect the elevation of floodwaters in the area. Raising a small portion of the site above the flood elevation will not enlarge the existing A99 flood plain boundaries.

Based on the flood elevation of 41.7 ft. msl provided by the COE, a portion of the site is currently outside (above) the flood plain. This area is the planned location of the major plant equipment. However, much of the developed site will remain below the flood elevation.

Since the site earthwork will not affect the flood plain boundary or elevation, the volume of fill is insignificant. It is expected that the volume of excavation for the foundations will be used as fill on the site. No fill is expected to be imported except for aggregate surfacing.

WATER RES - 2

Please provide a discussion that addresses a response to the County of Sacramento, Department of Public Works, Water Quality Division, correspondence dated october 7, 1993, that suggests that the SCA should formally investigate alternative disposal options for wastewater since the discharge of cooling water does not routinely contain conventional pollutants which are treatable at the Regional Plant and viable discharge option alternatives exist.

SCA RESPONSE:

Upon receipt of the letter from the County of Sacramento, SCA has met with the Water Quality Division, the Regional Water Quality Control Board, and the Department of Fish and Game. The SCA has conducted water sampling of City water at the Procter and Gamble site. A lab analysis of the water sampling has been completed as has a forecasting of the concentrations of the detectable constituents for the plant processes. Based upon these results, SCA intends to confer with the Regional Water Quality Control Board and the Department of Fish and Game regarding the feasibility of obtaining an NPDES permit. If an NPDES permit is feasible, SCA will modify the Procter & Gamble AFC. If an NPDES permit is not feasible, SCA will continue discussion with the County of Sacramento Water Quality Division.

PROCTER & GAMBLE COGENERATION PROJECT
SACRAMENTO COGENERATION AUTHORITY

RESPONSES TO CEC DATA REQUESTS
(Set 1, dated December 3, 1993)

LAND USE

LAND USE - 1

Page 6.6-7, Section 6.6.1.3 states that, "It is anticipated that the cogeneration facility will occupy the entire site during operation." Is there a possibility that additional uses may be added to the site? If so, what are they? Please discuss the reasons for their addition their function, and their impact on the cogeneration plant.

RESPONSE:

The only use currently planned for the site is the cogeneration facility. There is a possibility that SCA may decide to install combustion turbine facilities at this site in the future. Such additional power generation facilities would be added at this site to take advantage of the proposed facilities which could be shared with future units (e.g., switchyard, transmission facilities, maintenance facilities, control rooms, operating and maintenance personnel, etc.). Addition of such facilities would not impact construction or operation of the proposed facilities.

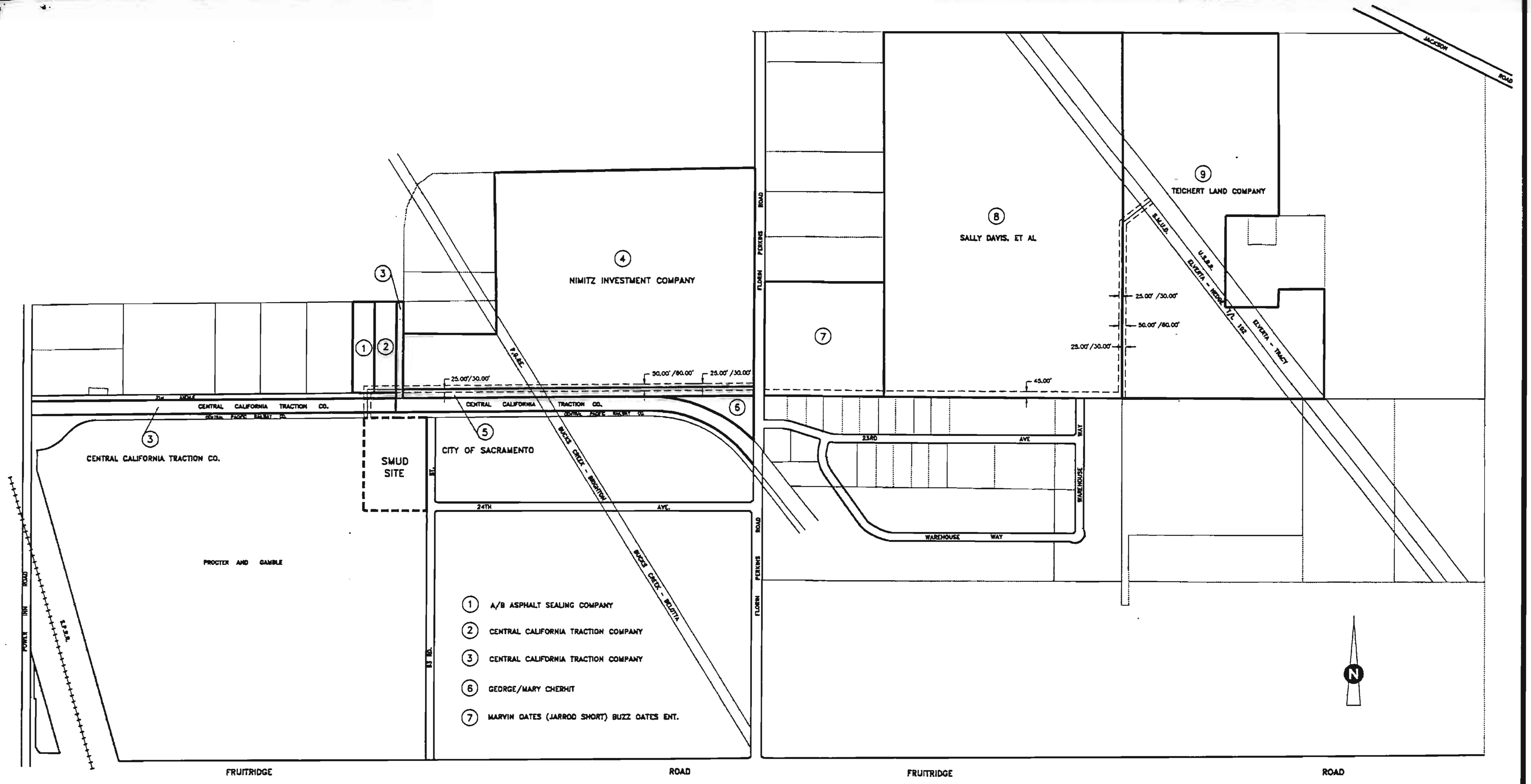
LAND USE - 2

Page 6.6-8, Section 6.6.1.4 states that, "Public and private easements will be necessary to construct the transmission line." Please identify all existing easements, the owner of each easement, and whether access rights have been arranged. Also, identify where easements do not exist or access rights have not been secured and a schedule when these easements will be acquired.

SCA RESPONSES:

Figure LU-1 shows the existing property owners along the route of the proposed transmission line. No rights-of-way have been obtained to date. SMUD will obtain rights-of-way after the project is licensed and before construction begins.

Access for surveys of the proposed route is requested of the existing property owner on a case by case basis.



Property Owners Along
Transmission Line Route
Figure LU-1

SMUD
SACRAMENTO MUNICIPAL UTILITY DISTRICT

In addition, permits for construction of the proposed transmission line will be obtained from Central California Traction, Pacific Gas and Electric, and the City of Sacramento.

LAND USE - 3

Page 6.6-14, Section 6.6-2 includes a discussion of relevant Sacramento General Plan policies. However, this section discusses only proposed sections of the draft General Plan. Because of the uncertainty that the draft General Plan will be approved prior to the decision on the AFC, please provide a similarly detailed review of the existing General Plan and affiliated community plans. Please address all relevant policies, objectives, and goals and discuss to what extent the proposed policy complies with them.

SCA RESPONSE:

The Sacramento County Planning and Development Department was contacted to discuss the existing General Plan for Sacramento. The Department indicated that a detailed review of the existing plan would not be necessary since the Revised Draft General Plan is more comprehensive then the existing plan (see the telephone memos in Attachment LU-1).

Regarding the request, ". . . please provide a similarly detailed review of . . . affiliated community plans," an analysis of plans implemented by the City of Sacramento in 1988 is included in Section 6.6, pages 6.6-19 to 6.6-24 of the AFC for the Procter & Gamble Cogeneration Project.

As explained on page 6.6-24 of the AFC, the proposed project site and associated transmission line are not within a community planning area. The southern edge of the study area lies within the South Sacramento Community Plan Area. The AFC includes a discussion of the project's compliance with relevant policies detailed in the South Sacramento Community Plan, adopted in August of 1986. The discussion occurs on pages 6.6-24 through 6.6-26.

LAND USE - 4

Re: Page 6.6-30, please update the status on the Sacramento Army Depot reuse commission activities.

SCA RESPONSE:

According to Mark Kraft of the City of Sacramento Planning and Development Department, the US Army Depot Re-Use commission is scheduled to recommend in May 1994 a land use plan to the City Council for the Army Depot site. The City Planning Department is preparing the draft land use plan. The assumed land uses for the Army Depot site continue to be industrial with no more than 15,000 employees.

LAND USE - 5

Please revise Section 6.6.7.4 on page 6.6-33 to include the existing Sacramento County General Plan and community plans.

SCA RESPONSE:

As stated in Land Use-3, the Revised Draft of the Sacramento County General Plan was formally adopted by the County Board of Supervisors on Wednesday, December 15th. Consequently, an analysis of the "existing" Sacramento County General Plan is not necessary. Please see Land Use-3 for a detailed response to the question.

ATTACHMENT LU-1

BLACK & VEATCH

TELEPHONE MEMORANDUM

Sacramento Cogeneration Authority	B&V Project 23933
Procter & Gamble	B&V File 32.0405.01A
Status of the County of Sacramento Revised	December 7, 1993
Draft of the General Plan	11:00 a.m.

To:	Mike Winter
Company:	County of Sacramento Planning & Development
Phone No.:	(916) 440-6221
Recorded by:	Robin Goldman RRG

I called Mike to request information regarding the status of the County of Sacramento Revised Draft of the General Plan (Plan). I briefly outlined the project specifics applicable to land use with Mike to familiarize him. I explained that some adequacy comments have been received from the CEC. One of the comments concerning land use states:

> 6.6-14, Section 6.6.2 includes a discussion of relevant Sacramento General Plan policies. However, this section discusses only proposed sections of the draft General Plan. Because of the uncertainty that the draft General Plan will be approved prior to the decision on the AFC, please provide a similarly detailed review of the existing General Plan and affiliated community plans. Please address all relevant policies, objectives, and goals and discuss to what extent the proposed policy complies with the proposed policy complies with them.

Mike said the Plan is scheduled to be formally adopted by the Sacramento County Board of Supervisors (Board) either tomorrow (December 8) or next Wednesday (December 15). According to Mike, the review and commenting period is complete; the Board simply needs to sign the resolution and formally adopt the Plan.

I expressed my reservation to order the currently existing General Plan and analyze the project's compliance since the Revised Draft is scheduled to be adopted so soon. Mike agreed that it would be a wasted effort to show compliance with the existing General Plan. First of all, the current Plan is out dated and is not as inclusive as the Revised Draft Plan. Secondly, by the time the analysis has been written and revised by B&V and SMUD and finally submitted to the CEC, the Revised Draft will be approved.

Mike asked who I was working with at the CEC. I told him Jeff Evans is the person handling land use issues for this project at the CEC. Mike said that he used to work with Jeff. In addition, Mike told me that if there were any further concerns regarding this particular adequacy question, he is willing to talk to Jeff about the justifications of his recommendation.

Finally, Mike asked if the date on my copy of the Revised Plan is December 9, 1992. When I told him it was, Mike said that the Plan I have is fairly comprehensive. Some minor changes have been made to the text in certain Elements of the Plan since December, 1992. However, those changes will not be available to the public until a couple of weeks after the Plan has been adopted by the Board.

I thanked Mike for his help and insight and indicated that I would be contacting him again next week to check on the status of Plan adoption and availability of changes to the Revised Draft.

BLACK & VEATCH

TELEPHONE MEMORANDUM

Sacramento Cogeneration Authority
Procter & Gamble
CEC Land Use Adequacy Questions

B&V Project 23933
B&V File 32.0405.01A
December 13, 1993
10:00 a.m.

To: Mark Kraft
Company: City of Sacramento Planning & Development
Phone No.: (916) 264-8116

Recorded by: Robin Goldman

I explained to Mark that I had received comments and data adequacy requests from Jeff Evans of the CEC regarding land use. One of the questions was posed during a telephone conference call on November 15th. Jeff wanted to know whether FIgure 6.6-3, "Existing Land Use in the Project Vicinity" depicts future or existing land use.

I explained to Mark that I had used the County's Land Use Diagram to determine existing land used in the project vicinity. Mark said that the County of Sacramento does not keep records or maps of existing land use. In order to construct a map precisely depicting exact, current land use, a windshield survey combined with zoning maps would be the best way to accurately show existing land use. The drawback to this approach is that it would be extremely time consuming and very costly.

Mark said the problem with using the Land Use Diagram is that there are places where it depicts a certain land use when, in fact, another usage exists (e.g. a few houses in an area designated for industry). I told Mark that the map scale is 1:24,000 at the CEC's request and a few discrepancies will not show on a map of that scale. Zoning maps as a guide for land use were discussed but it was agreed that zoning maps are likely to be even less accurate for existing land use.

Mark said that given the circumstances, usage of the County's Land Use Diagram was the most accurate way available to document existing land use in the County of Sacramento.

PROCTER & GAMBLE COGENERATION PROJECT
SACRAMENTO COGENERATION AUTHORITY

RESPONSES TO CEC DATA REQUESTS
(Set 1, dated December 3, 1993)

INDUSTRIAL SAFETY

SAFETY - 1

Please provide a draft copy of an Emergency Action Plan and a Fire Prevention Plan.

SCA RESPONSE:

Attachment SAFETY-1 includes detailed outlines of the following:

- Emergency Action/Natural Disasters Plan.
- Emergency Action/Fire Protection Plan.
- Emergency Action/Hazardous Substance Release Plan.
- Medical Emergency Plan.

ATTACHMENT

SAFE - 1

PROCTER & GAMBLE COGENERATION PROJECT
EMERGENCY ACTION / NATURAL DISASTERS
OUTLINE

I. Purpose

The purpose of this plan is to provide immediate action for the safety of the employees in the event of a natural disaster such as an earthquake or flood occurring either during the construction phase or operation phase of the Procter & Gamble Cogeneration Project.

II. Scope

The scope of this plan includes natural disasters such as an earthquake or flood occurring at the cogeneration site or at the Procter & Gamble site.

The plan will incorporate Procter & Gamble's (P&G) emergency action plan for construction and operations personnel working on P&G premises.

III. Emergency Actions

A. Flood

1. Notification procedure
2. Evacuation procedures
3. Procedures to account for employees during evacuation.

B. Earthquake

1. Notification procedure
2. Evacuation procedure
3. Procedure to account for employees during evacuation.
4. Procedures for employees who are involved with rescue and medical duties and trained employees capable of providing first aid and CPR.

12/28/93

PROCTER & GAMBLE COGENERATION PROJECT
EMERGENCY ACTION / FIRE PROTECTION PLAN
OUTLINE

I. Purpose

To provide a thorough and effective plan for the safety of employees in the event of a fire.

II. Scope

The plan will provide procedures for notification, evacuation, off-site emergency assistance and protection of personnel while working on the cogeneration site as well as when working at the Procter & Gamble plant site.

The plan will incorporate Procter & Gamble emergency response requirements into the project's plan for fire emergencies.

III. Emergency Actions

A. Identify emergency escape routes and procedures for evacuation.

   1. Cogen site (Construction and operation phases)
   2. P&G site (Construction and operation phases)

B. Procedures to account for all employees following the evacuation

   1. Cogen site (Construction and operation phases)
   2. P&G site (Construction and operation phases)

C. Procedures for employees who must remain to operate critical equipment before they can evacuate the facility (operations only).

D. Procedures for employees who are involved with rescue and medical duties and identification of trained employees capable of providing first aid and CPR.

   1. Cogen site (Construction and operations phases)
   2. P&G site (Construction and operations phases)

E. Means of reporting fires and other types of emergencies to offsite emergency procedures.

   1. Cogen site (Construction and operations phases)
   2. P&G site (Construction and operations phases)

F. Means of obtaining off-site medical assistance including ambulance, hospital location and contact.

1. Cogen site (Construction and operations phases)
2. P&G site (Construction and operations phases)

G. Names of job titles of persons who can be contacted about the emergency action plan.

1. Construction phase
2. Operation phase

IV. Fire Protection

A. Training for employees on the fire hazards of the materials to which the employees are exposed and reviewing with each employee upon initial assignment those parts of the fire prevention plan that the employee must know to protect the employee in an emergency.

1. Cogen site (Construction and operations phases)
2. P&G site (Construction and operations phases)

B. Procedures for plant checkout and maintenance of emergency equipment. (Operations only).

C. Identification of potential fire hazards and proper procedures for handling them, potential ignition sources and procedures for controlling them, and the type of fire protection equipment or systems that can control a fire involving them.

1. Combustible materials
   a. Cogen site (Construction and operations phase)
   b. P&G site (Construction and operations phase)

2. Ignition sources

   a. Cogen site (Construction and operations phase)
   b. P&G site (Construction and operations phase)

D. List job titles or names of individuals responsible for maintaining equipment and systems installed to prevent or control ignition fires.

   1. Operations phase

E. List job titles or names of individuals responsible for the control of accumulation of flammable or combustible waste material.

   1. Construction phase
   2. Operations phase

F. Procedure for housekeeping which will control accumulation of flammable and combustible waste materials and residues so they do not contribute to a fire emergency.

   1. Construction phase
   2. Operations phase

G. Description of Fire Protection System used at the cogeneration plant.

   1. Operations phase

      a. System requirements.

      b. Performance requirements.

      c. System configuration.

H. Procedures used when welding and cutting during construction to prevent fires.

   1. Cogen site (Construction phase)
   2. P&G site (Construction phase)

PROCTER & GAMBLE COGENERATION PROJECT
EMERGENCY ACTION / HAZARDOUS SUBSTANCE RELEASE
OUTLINE

I. Purpose

To provide a plan designed to protect employee's in the event of a hazardous substance release.

II. Scope

This plan will provide procedures and emergency actions in the event of a hazardous substance release during the construction phase and during the operation phase of the Procter & Gamble Cogeneration Plant (P&G).

Since some of the construction personnel will be performing work on the P&G premises this plan will incorporate P&G's emergency action plan for the release of hazardous materials.

III. Emergency Action

A. Cogen site

1. Develop procedures for notification of hazardous substance spill including employees, P&G, and adjacent neighbors.
2. Develop emergency escape routes and procedures for evacuation.
3. Procedures for obtaining off site medical/fire/containment assistance.
4. Procedures for personnel involved with first aid or CPR treatment.
5. Procedures to account for employees following an evacuation.
6. Names and agencies that must be contacted in the event of a hazardous substance release.

12/28/93

PROCTER & GAMBLE COGENERATION PROJECT
MEDICAL EMERGENCY PLAN
OUTLINE

I. Purpose

To provide a medical emergency plan which will be in effect at the Procter & Gamble cogeneration project to provide for prompt care of employees in the event of an injury or illness.

II. Scope

The plan includes all employees working at the cogeneration power plant during the construction phase and during the operation phase.

Since some of the construction work will be conducted on Procter & Gamble's premises the medical emergency plan will incorporate P&G's emergency response requirements for personal injury into the plan.

III. Emergency Actions

A. Define escape routes and procedures for evacuation (if required).

B. Develop procedures for employees who are involved with rescue and medical duties and identification of trained employees capable of providing emergency first aid.

C. Procedure for maintaining emergency telephone numbers.

D. Procedure for reporting a medical emergency to off site emergency responders.

E. Define means of obtaining off-site medical assistance including ambulance, hospital location and contact.

F. Define how the project shall provide for adequate and efficient first aid and medical care of injured employees.

12/28/93

PROCTER & GAMBLE COGENERATION PROJECT
SACRAMENTO COGENERATION AUTHORITY

RESPONSES TO CEC DATA REQUESTS
(Set 1, dated December 3, 1993)

EFFICIENCY

EFFICIENCY - 1

Public Resources Code (PRC) Sec. 25540.6(a) allows a project to bypass a Notice of Intention and move directly to an Application for Certification (AFC) if it qualifies as a cogeneration plant. PRC Sec. 25134 sets forth the requirements for qualification as a cogeneration plant. Please provide the following information.

a. Describe how the project will qualify as a cogeneration power plant under PRC Sec. 25134. Demonstrate how it will meet these operating and efficiency standards, showing assumptions and calculations.

SCA RESPONSE:

PRC Section 25134 defines cogeneration as "the sequential use of energy for the production of electrical and useful thermal energy," and requires qualifying facilities to meet the following standards:

(a) At least 5 percent of the cogeneration project's total annual energy output shall be in the form of useful thermal energy.

(b) Where useful thermal energy follows power production, the useful annual power output plus one-half the useful annual thermal energy output equals not less than 42.5 percent of any natural gas and oil energy input.

Requirements (a) and (b) are referred to as the "Operating Standard" and "Efficiency Standard," respectively.

Calculations were performed for three operating scenarios to determine whether the proposed facility will meet the operating and efficiency standards necessary for qualification as a cogeneration plant. Table EFF-1 summarizes the input parameters and the results of the calculations for the three modes of operation.

The first case, referred to as "SMUD Case 2," is the guaranteed average annual operating condition. This case has a 17.73 percent Operating Standard and a 50.57 percent Efficiency Standard which will comply with the PRC minimum of a 5 percent Operating Standard and 42.5 percent Efficiency Standard.

TABLE EFF-1. COGENERATION PLANT QUALIFICATION UNDER PRC 25134

CASE	SMUD CASE 2 GUARANTEE	1 CTG	SMUD CASE 6 MAXIMUM
Process Steam Flow, lb/h	65,000	65,000	65,000
Process Steam Enthalpy, Btu/lb	1,208.50	1,208.50	1,208.50
Percent Process Condensate Return, %	0.00%	0.00%	0.00%
Process Condensate Return Enthalpy, Btu/lb	0	0	0
Makeup Enthalpy, Btu/lb	47	47	47
Net Heat to Process, MBtu/h	75.5	75.5	75.5
Gross Combustion Turbine Output, kW	86,166	43,083	85,220
Gross Steam Turbine Output, kW	21,110	8,312	36,692
Total Gross Plant Output, kW	107,276	51,395	121,912
Auxiliary Power, kW	4,642	3,095	5,007
Net Plant Output, kW	102,634	48,300	116,905
HHV/LHV Ratio	1.1067	1.1067	1.1067
Combustion Turbine Heat Input, MBtu/h (HHV)	849.1	424.6	849.1
Combustion Turbine Heat Input, MBtu/h (LHV)	767.3	383.6	767.3
Supplemental Firing, MBtu/h (HHV)	0.0	0.0	89.1
Supplemental Firing, MBtu/h (LHV)	0.0	0.0	80.5
Total Cycle Heat Input, MBtu/h (HHV)	849.1	424.6	938.2
Total Cycle Heat Input, MBtu/h (LHV)	767.3	383.6	847.8
Net Plant Heat Rate, Btu/kWh (HHV)	8,274	8,790	8,026
Net Plant Heat Rate, Btu/kWh (LHV)	7,476	7,943	7,252
Fuel Charged Power (FCP), Btu/kWh (LHV)	6,740	6,380	6,606
PRC 25134 (PURPA) Operating Standard	**17.73%**	**31.41%**	**15.91%**
PRC 25134 (PURPA) Efficiency Standard	**50.57%**	**52.81%**	**51.52%**

The second case on the table, referred to as "1 CTG," refers to the operation of one combustion turbine in combined cycle with the steam turbine. In this operating mode, the estimated Operating Standard is 31.41 percent and the Efficiency Standard is 52.81 percent which will comply with the PRC requirements.

The third case, referred to as "SMUD Case 6," is the operating mode which produces maximum generator output on a hot day. In this mode of operation, the Operating Standard is 15.91 percent and the Efficiency Standard is 51.52 percent, which will also comply with the PRC requirements.

It should be noted that it is possible for the auxiliary boiler to send steam directly to the process steam line, without passing through the steam turbine. In this case, the "sequential use of energy for the production of electrical and useful thermal energy" does not occur, which may disqualify the facility as a cogeneration plant for at least the period of time of this operational mode.

b. *The Project Description and Air Quality sections imply that the two gas turbines used for combined cycle might operate simultaneously at 50 percent load. Is there a projected operating scenario in which only <u>one</u> combustion gas turbine generator would operate in combined cycle with the steam turbine generator (refer to the AFC, Table 3.19-2)? If so, include this in the calculations.*

SCA RESPONSE:

Inclusion of two combustion turbines with associated HRSGs in the combined cycle provides the redundancy necessary to allow the plant to continue to operate, at reduced load, when one combustion turbine or HRSG is out of service. In this case, the remaining combustion turbine and HRSG will operate in combined cycle with the steam turbine.

As described in the response to EFF-1(a), calculations were performed to demonstrate that the plant will meet the required operating and efficiency standards for qualification as a cogeneration plant. This case is referred to as "1 CTG" in Table EFF-1.

c. *Describe how compliance with these operating and efficiency standards will be demonstrated over the life of the project.*

SCA RESPONSE:

In order for SCA to demonstrate compliance with the requirements set forth by the PRC in Section 25134, a running log of the operating conditions necessary to perform the qualifying calculations must be maintained. The parameters included in this log will be as follows:

- Combustion Turbine Output
- Steam Turbine Output
- Process Steam Conditions (Flow, Temperature and Pressure)
- Combustion Turbine Fuel Input
- Auxiliary Boiler Fuel Input
- Duct Burner Fuel Input
- Condensate Return Conditions (Flow, Temperature and Pressure), if applicable.

The distributed control and information system (DCIS) to be included with the facility will have the capability to monitor, record and report these parameters as required to demonstrate compliance.

PROCTER & GAMBLE COGENERATION PROJECT
SACRAMENTO COGENERATION AUTHORITY

RESPONSES TO CEC DATA REQUESTS
(Set 1, dated December 3, 1993)

TRANSMISSION SYSTEM EVALUATION

TRANSMISSION SYSTEM EVALUATION - 1

Please provide conductor size and type (e.g., Aluminum Conductor Steel Reinforced (ACSR) stranding, and normal/emergency ratings) for the following lines/circuits:

> *Western Area Power Authority (WAPA) 230 kV Double Circuit Tower Line (DCTL)*
>
> *Pacific Gas and Electric (PG&E) 230 kV DCTL for Brighton Substation*
>
> *PG&E 115 kV leaving Brighton Substation*

SCA RESPONSE:

Unless otherwise noted, the following data are based on summer ratings, and the most limiting conductor within the circuit.

- WAPA Hurley to Tracy 230 kV #1
  - -- 795 ACSR, 26/7 stranding
  - -- 800 A normal rating
  - -- 800 A emergency rating
- WAPA Hurley to Tracy 230 kV #2
  - -- 954 ACSR, 45/7 stranding (limited by equipment)
  - -- 800 A normal rating
  - -- 800 A emergency rating
- PG&E Bellota to Brighton 230 kV
  - -- 795 ACSR, 54/7 stranding
  - -- 300 MVA normal rating
  - -- 344 MVA emergency rating
- PG&E Bellota to Rio Oso 230 kV
  - -- 795 ACSR, 54/7 stranding
  - -- 300 MVA normal rating
  - -- 344 MVA emergency rating

- PG&E Brighton to Davis 115 kV
  - --- 336 MCM, 26/7 stranding
  - --- 88 MVA normal rating
  - --- 101 MVA emergency rating

- PG&E Brighton to Grand Island 115 kV #1 (currently terminates at Procter & Gamble with open line section to Grand Island)
  - --- 3/0 7 strand copper
  - --- 65 MVA normal rating
  - --- 75 MVA emergency rating

- PG&E Brighton to Grand Island 115 kV #2
  - --- 3/0 7 strand copper
  - --- 65 MVA normal rating
  - --- 75 MVA emergency rating

TRANSMISSION SAFETY EVALUATION - 2

Please identify and discuss the range of wheeling rates considered for Table 3.15-4: identify the source (e.g., recent contracts), and date of each rate.

SCA RESPONSE:

- WAPA firm wheeling rate assumed = $0.481/kW-mo with 2.0 percent losses.

  --- Wheeling rate of $0.481/kW-mo is from the Western Area Power Administration Central Valley Project, California Contract for Transmission Service to the Sacramento Municipal Utility District (SMUD Contract No. E-950; WAPA Contract No. 92-SAO-40007, Schedule CV-FT1, effective May 1, 1988). A recent revision to this contract, effective May 1, 1993, results in a current rate of $0.43/kW-mo.

  --- At the time of the study, the losses were estimated at 2.0 percent. Losses from Exhibit A of the stated contract, dated January 15, 1993, are 2.75 percent, which remains effective with the contract revision effective May 1, 1993.

- PG&E firm wheeling rate assumed = $0.60/kW-mo with 3.6 percent losses.

  --- The $0.60/kW-mo was an estimated low-end wheeling rate based on the $0.57/kW-mo rate for transmission service between points of interconnection and delivery over generation tie transmission facilities from the Slab Creek Powerhouse Interconnection and Transmission Service Agreement between PG&E and SMUD (SMUD Contract B-158, dated January 30, 1984).

--- The $0.60/kW-mo was selected to represent the minimum rate expected through negotiation. Use of the $1.32/kW-mo for reserved transmission service from the Interconnection Agreement between PG&E and SMUD (SMUD Contract No. D-663, Appendix B, Rates and Ceiling Prices, Page B-8, dated March 20, 1990) would increase the cost associated with the PG&E wheeling alternative.

--- 3.6 percent losses was based on the loss factor of 0.963818 for transmission service provided in the Interconnection Agreement between PG&E and SMUD (Appendix C, Transmission Losses, page C-1).

STATE OF CALIFORNIA

State Resources Conservation
and Development Commission

In the Matter of:	)	
	)	
Application for Certification of	)	Docket No. 93-AFC-2
the Sacramento Cogeneration	)	
Authority's Procter &	)	PROOF OF SERVICE
Gamble Cogeneration Project	)	(REV. 12/03/93)
	)	
	)	

PROOF OF SERVICE

I, Douglas C. Timpe, declare that on December 30, 1993, I deposited copies of the attached Reponses to the First Set of Data Requests for the Procter & Gamble Cogeneration Project ___ in the United States mail at Overland Park, KS, with first class postage thereon fully prepaid and addressed to the following:

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(Docket Unit - 12 copies required)

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I am and was at the time of the service of the attached paper over the age of 18 years and not a party to the proceeding involved.

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

Douglas C

Attachment

INTERNAL DISTRIBUTION LIST

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