Supplemental Filing

Responses to CEC Staff Data Requests 86 through 105

In support of the

Application for Certification

for the

Humboldt Bay Repowering Project

Eureka, California

(06-AFC-7)

Submitted to the:

California Energy Commission

Submitted by:

Pacific Gas and Electric Company

With Technical Assistance by:

CH2MHILL

Sacramento, California

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Contents

Introduction

Attached are Pacific Gas and Electric Company's (PG&E) responses to the California Energy Commission (CEC) Staff's Data Requests issued October 31, 2006 and numbered 86 through 105, for the Humboldt Bay Repowering Project (HBRP) (06-AFC-7) Application for Certification (AFC). The responses are grouped by individual discipline or topic area, with two topic areas, Air Quality, Cultural Resources, and Visual Resources represented. Within each of these two discipline areas, the responses are presented in the same order as CEC Staff presented them and are keyed to Data Request numbers (86 through 100 for Air Quality and 101 through 103 for Cultural Resources, and 104 through 105 for Visual Resources).

PG&E looks forward to working cooperatively with CEC Staff as the HBRP proceeds through the siting process. We trust that these responses address the Staff's questions and remain available to have any additional dialogue the Staff may require.

Air Quality (86-100)

Emergency Use Definition

86. *Please describe the basis for the definition of "emergency " (p. 8.1-76) and whether this definition is derived from the guidance, regulations, precedent, or policy of any air quality management agency, the California Public Utilities Commission, or the California Independent System Operator.*

Response: The definition of "emergency" in the revised air quality submittal was taken from the District's May 2007 draft Preliminary Determination of Compliance (PDOC).[1] However, the definition provided on p. 8.1-76 is no longer relevant because the District has proposed new definitions for "emergency" and "curtailment" in the October 24, 2007, PDOC. In the PDOC, the District has also imposed a plant-wide limit of 1000 engine-hours per year of operation in Diesel mode under conditions of natural gas curtailment, maintenance and testing and not "regardless of circumstance," as suggested by the background statement. Operation of the Wärtsilä engines in Diesel mode will still be restricted by the limitations of the ATCM. Finally, the District has included in the PDOC annual emissions caps that limit annual emissions of all pollutants from the engines regardless of the reason they are operated. We believe these limitations should be adequate to address the staff's concerns regarding potential impacts beyond those anticipated by the applicant.

2006 Operations

87. *Please identify whether the operations of Humboldt Bay Power Plant Unit 2 (HB2) on fuel oil between the months of August and September 1-28, 2006 (shown on AFC Revision Table 8.1A-9) and the operations of both HB1 and HB2 during the month of December 2006 would constitute an "emergency" as defined on p.8.1-76.*

Response: Please see the response to Data Request #86.

MEPPs Operations

88. *Please identify whether the operations of Mobile Emergency Power Plant Units 2 and 3 (MEPP2 and MEPP3) for virtually every month from October 2004 through December 2006 (shown on Table 8.1A-9) would constitute an "emergency" as defined on p. 8.1-76 of the AFC Revision.*

Response: Please see the response to Data Request #86.

Emergency Use Emissions

89. *Please quantify the emissions from the existing sources (specifically HB2, MEPP2, and MEPP3) that occurred during "emergency use" of the existing Humboldt Bay Power Plant over the 2-year period immediately preceding the date the AFC was filed –*

[1] 5-04 PG&E DRAFT ATC.doc, issued in early May.

September 29, 2004 through September 28, 2006 – according to the applicant's definition of "emergency use."

Response: The proposed definition of "emergency use" in the revised air quality submittal is no longer relevant because the District has not utilized this definition in the PDOC. The District has determined that the 2-year baseline period immediately preceding the date the AFC was filed meets the definition of Historic Actual Emissions in Rule 110, Section 6.2.2, and approved the use of this baseline period in March 2007. The PDOC issued by the District on October 24, 2007 also reflects the use of that baseline.

Emergency Use Table

90. *Please provide a table of "emergency use" emissions from the existing power plant in a format similar to that of AFC Revision Table 8.1A-1.*

Response: The proposed definition of "emergency use" in the revised air quality submittal is no longer relevant because the District has not utilized this definition in the PDOC.

NOx Limit, 392 lb/hr

91. *Please provide the assumptions and calculations used to derive the 392 lb/hr NOx limit that is being requested or discuss why a limit of 353 lb/hr NOx would not be appropriate. This response should indicate whether PG&E would accept a limit of no more than two simultaneous diesel-mode startups during times of natural gas mode operation.*

Response: PG&E anticipates that under some conditions it may be necessary to start up more than two engines in Diesel mode simultaneously. Therefore, PG&E identified the maximum NOx emission rate that would result in a modeled ambient impact that, combined with background NO_2, would not cause a violation of the new 1-hour average NO_2 ambient air quality standard. [2] This value was determined to be 392 lbs/hr. The CEC Staff's calculation is based on the assumption that two engines are started in Diesel mode at precisely the same minute, and have emissions at precisely the maximum expected emission rates during both startup and operation. The 392 lbs/hr value allows for more operating flexibility through techniques such as slightly staggered startups, and takes into account the fact that expected emissions are likely to be lower than the maximum emission rates. For these reasons, PG&E cannot accept a limit of no more than two simultaneous diesel-mode startups during times of natural gas mode operation. Such a limit is not necessary, because PG&E will manage hourly NOx emissions (which will be continuously monitored) to ensure compliance with this hourly limit.

NOx Limit, 676 lb/hr

92. *Please provide the assumptions and calculations used to derive the 676 lb/hr NOx limit that is being requested. This response should indicate whether PG&E would accept a limit of no more than four simultaneous diesel-mode startups at any time.*

Response: PG&E anticipates that it may be necessary, under natural gas curtailment conditions, to start up more than four engines in Diesel mode simultaneously. Therefore,

[2] Although the CEC Staff has not yet implemented the new state 1-hour average NO_2 air quality standard for any project is has reviewed, HBRP is addressing this standard as if it were in effect.

PG&E identified the maximum NOx emission rate that would result in a modeled ambient impact that would not cause a violation of the new 1-hour average NO_2 ambient air quality standard[3]. This value was determined to be 676 lbs/hr. The CEC Staff's calculation is based on the assumption that four engines are started in Diesel mode at precisely the same minute, and have emissions at precisely the maximum expected emission rates during both startup and operation. The 676 lbs/hr value allows for more operating flexibility through techniques such as slightly staggered startups, and takes into account the fact that expected emissions are likely to be lower than the maximum emission rates. For these reasons, PG&E cannot accept a limit of no more than four simultaneous diesel-mode startups at any time. Such a limit is not necessary, because PG&E will manage hourly NOx emissions (which will be continuously monitored) to ensure compliance with the hourly limit. Under these curtailment conditions, operation of the engines alone would not cause a violation of the new NO_2 standard, without consideration of background NO_2.

Modeling Steps

93. *Please summarize the modeling steps leading to the NO_2 impacts shown in Table 8.1-27. For staff to verify the modeling behind these NO_2 results, this response should name the model used for each NO_2 impact in this table, name the specific modeling output files and DVD filepath that show each result, and identify the receptor location and time of each impact.*

Response: The hourly startup emission limit of 392 lb/hr is equivalent to an emission rate of 7.34 g/s per engine (for all ten engines) for 30 minutes and 2.47 g/s per engine for 30 minutes. One CTSCREEN run modeled all 10 engines at 50% load emitting 7.34 g/s per engine for one hour. The CTSCREEN output for this analysis was found to be 1419.96 $\mu g/m^3$.

The CTSCREEN output for this analysis is found in the file:

CTSCREEN\1hrSTDNOxA\FNgrid1.dat

This result was ozone-limited, as shown in Table 8.1B-11C (top half of the center table of ozone limiting calculations, labeled "Diesel – normal conditions") to obtain a 1-hour average ozone-limited concentration of 315.0 $\mu g/m^3$. A second CTSCREEN run modeled all 10 engines at full load emitting 2.47 g/s per engine for one hour. The CTSCREEN output for this analysis was found to be 356.13 $\mu g/m^3$.

The CTSCREEN output for this analysis is found in the file:

CTSCREEN\1hrSTDNOx2\FNgrid1.dat[4]

This result was ozone-limited, as shown in Table 8.1B-11C (bottom half of the center table of ozone limiting calculations, labeled "Diesel – full load") to obtain a 1-hour average ozone-limited concentration of 208.6 $\mu g/m^3$. Since the engines in startup will operate at 50% load for only 30 minutes, the one-hour average result is the average of 315.0 $\mu g/m^3$ and 208.6

[3] Although the CEC Staff has not yet implemented the new state 1-hour average NO_2 air quality standard for any project is has reviewed, HBRP is addressing this standard as if it were in effect.

[4] This file was inadvertently omitted from the modeling CD and is provided on the enclosed CD.

$\mu g/m^3$, or 261.8 $\mu g/m^3$ (shown at the bottom of the center table of ozone limiting calculations in Table 8.1B-11C). This is the "1-hour, startup" result shown in Table 8.1-27.

The emission limit of 676 lb/hr is equivalent to an emission rate of 8.53 g/s per engine for 10 engines. The CTSCREEN output for this analysis is found in the file:

CTSCREEN\1hrSTDNOxB\FNgrid1.dat

The maximum 1-hour average NOx concentration is 1650.18 $\mu g/m^3$. This result was ozone-limited, as shown in Table 8.1B-11C (bottom portion of the table, labeled "Diesel – emergency only") to obtain the 1-hour average ozone-limited concentration of 338.0 $\mu g/m^3$ in Table 8.1-27.

In each case, the receptor with the highest impact is #158 in receptor grid FNgrid1. This can be identified from the information in the enclosed file "HUM_CTSCREEN_receptsystem.xls" as being located at (398702, 4509200). Since CTSCREEN uses screening meteorological data and not sequential data, the maximum concentrations are associated with a particular set of meteorological conditions rather than a particular time. In each case, the highest concentration is associated with the following wind conditions:

Wind Direction: 339.2 deg

Wind Speed: 1.0 m/s

Unstable conditions

PM_{10} Limit, 1542 lb/day

94. *Please provide the assumptions and calculations used to derive the 1,542 lb/day PM_{10} limit that is being requested. This response should indicate whether PG&E would accept a limit of no more than 1,542 lb/day PM_{10} at any time.*

Response: The 1,542 lb/day PM_{10} limit was calculated assuming that all engines are operating in Diesel mode with an 85% capacity factor, and that an average 30% reduction in PM_{10} emissions will be achieved by the oxidation catalyst.[5]

10.8 lb/hr/engine * 10 engines * 24 hrs/day * 85% * (1-0.3) = 1,542 lb/day

The actual degree of reduction achieved by the oxidation catalysts will be determined through source testing, and daily PM_{10} emissions from the Wärtsilä engines will be calculated using the actual emission rates. The 1,542 lb/day PM_{10} limit has been included in the PDOC and is acceptable to PG&E.

PM_{10} Limit, 2203 lb/day

95. *Please provide the assumptions and calculations used to derive the 2,203 lb/day PM_{10} limit that is being requested, and explain the discrepancy between the requested limit of 2,203 lb/day and the maximum emissions of 2,592 lb/day PM_{10} in diesel mode.*

Response: The 2,203 lb/day PM_{10} limit has not been included in the PDOC so it is no longer relevant.

[5] Data supporting the anticipated 30% control of particulate matter from the oxidation catalyst was provided to the District on August 30, 2007, and was docketed on that same day.

PM_{10} Limit Application

96. *Please clarify which days the 1,542 lb/day limit would apply because p. 8.1-31 of the AFC Revision says that both this limit and the 2,203 lb/day limit would apply on any day when one or more engines are operated in Diesel mode. If necessary, please update the impacts analysis to reflect impacts during emissions of 2,203 lb/day PM_{10}.*

Response: The 1,542 lb/day limit will be the only PM_{10} limit applicable on days when Diesel fuel is fired in the Wärtsilä engines. The 2,203 lb/day PM_{10} limit has not been included in the PDOC so it is no longer relevant.

$PM_{2.5}$ Standards

97. *Please provide information demonstrating that the project would not cause or substantially contribute to violations of the $PM_{2.5}$ standards over five years. This response should involve reasonable assumptions of background conditions during 2005 for missing background data (e.g., an assumption of maximum background levels similar to those shown in AFC Revision Table 8.1-25 or interpolation of gaps could be used).*

Response: Demonstrating compliance with ambient air quality standards normally involves consideration of background data for three years.[6] The analysis provided by PG&E goes beyond the usual 3-year analysis in utilizing 4 years of background data for the $PM_{2.5}$ analysis. It is important to note that in a 1997 memo to the United States Environmental Protection Agency (USEPA) Regional Directors, John Seitz, Director of USEPA Office of Air Quality Planning and Standards, indicated that compliance with the federal $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) for both New Source Review (NSR) and Prevention of Significant Deterioration (PSD) purposes should be established through compliance with the PM_{10} NAAQS, rather than through direct permitting for $PM_{2.5}$.[7] The applicability of this guidance was reaffirmed in the February 9, 2006 Advanced Notice of Proposed Rulemaking (ANPRM) for transition to the new 24-hour $PM_{2.5}$ standard.[8] Therefore, EPA guidance does not require or even recommend demonstrating compliance with the new 24-hour $PM_{2.5}$ standard through ambient air quality modeling.

Nevertheless, at the request of the Air Resources Board (ARB) and the North Coast Unified Air Quality Management District (NCUAQMD), an assessment of the potential impacts of the project on ambient $PM_{2.5}$ concentrations in the District was prepared in accordance with

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[6] See, e.g., Final Staff Assessment for the Russell City Energy Center (July 2, 2007) at p. 4.1-3. "The second criterion that staff used is whether the project's construction and operational emissions would cause a new violation to the ambient air quality standards. Air dispersion models provide a means of predicting the location and ground level magnitude of the impacts of a new emissions source. These models consist of several complex series of mathematical equations, which are repeatedly calculated by a computer for many ambient conditions. In general, the inputs for the modeling include stack information (exhaust flow rate, temperature, and stack dimensions), specific turbine emission data and meteorological data, such as wind speed, atmospheric conditions, and site elevation. The model results are often described as a unit of mass per volume of air, such as micrograms per cubic meter ($\mu g/m^3$). Staff added the modeled impacts to the available highest ambient background concentrations recorded during the previous ***three*** years from nearby monitoring stetions. Staff then compared the results with the ambient air quality standards for each respective air contaminant to determine whether the project's emission impacts would cause a new violation of the ambient air quality standards or if the emissions would contribute to an existing violation." (emphasis added)

[7] Memo from John S. Seitz, Director, OAQPS, to EPA Regional Directors, New Source Review staff and others, dated October 21, 1997 (REF: OZPMRH-2-97).

[8] 71 FR 6718, February 9, 2006, p. 6727.

the modeling protocol submitted in July. The protocol, which was reviewed by the CEC staff as well as the staffs of the District, ARB and USEPA Region 9, indicated that 2005 would not be included in the assessment of $PM_{2.5}$ impacts.

The reason the 2005 data were not included in the ambient air quality impact analysis is that ARB has indicated that 2005 (as well as 2003 and 2006) $PM_{2.5}$ data for the Eureka monitoring station are not valid.[9] According to the ambient air quality monitoring data on ARB's website[10], five months of data (June 27 through November 27) were missing for 2005. Because of the large amount of missing data in 2005, the protocol indicated that 2005 would not be included in the evaluation of $PM_{2.5}$ impacts. Because the $PM_{2.5}$ analysis was based on individual daily background values, it would not be reasonable to assume maximum background levels, and the period of missing data was too long to perform any technically defensible interpolation of gaps.

Because only one month of data (June) was missing for 2003, the missing data were filled in using interpolation so the additional year could be utilized. Since the proposed analytical approach required the use of meteorological data and concurrent ambient data, and since only four valid years of ambient data were available, the air quality impact analysis was conducted using the four available years. This approach was approved by the NCUAQMD and the ARB.

PM_{10} Limit, 1542 lb/day

98. *Please describe the role of CTSCREEN in modeling $PM_{2.5}$ impacts. This response should include an example calculation for any CTSCREEN results used in determining the highest three-year average 98th percentile daily concentrations (as implied on p.19 of the protocol in Attachment 8.1B-1).*

Response: CTSCREEN was not used in modeling the $PM_{2.5}$ impacts presented in Table 8.1-28 or Appendix 8.1, Table 8.1B-12. The impacts were modeled using AERMOD and CTDMPLUS (for refined modeling in complex terrain).

Impact Modeling Method

99. *Please summarize the steps taken leading to the data shown in Table 8.1B-12. Ideally, this response would choose one day of high modeled impacts in CTDMPLUS (e.g., the June 20, 2003 modeled impact level of 33.21 $\mu g/m^3$) and identify the name of each model and pre- or post-processing executable file used to arrive at the value in Table 8.1B-12, name the specific modeling output files and DVD filepath that show the interim results of the models and executables, and identify the receptor location for the impact.*

Response: Attachment DR99-1 explains how the June 20, 2003, modeled impact level of 33.21 $\mu g/m^3$ was obtained from the files provided on the DVD.

PM_{10} Increments Analysis

100. *Please provide the PM_{10} increments analysis.*

Response: The increments analysis will be provided in a future submittal.

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[9] Personal communication to Gary Rubenstein from Kitty Howard, ARB.

[10] *http://www.arb.ca.gov/adam/ welcome.html*

Attachment DR99-1

Modeling Method Roadmap

Modeling Method Roadmap

The following roadmap describes the procedure for running CTDMPLUS and the postprocessors using DOS commands to obtain the 2003 PM10 maximum impact of 33.21 ug/m3, modeled on 03/06/20 (June 20, 2003). All file names given in the text are listed in double quotes (" "). All DOS commands are preceded by ">".

1. Run CTDMPLUS

From batch file "ctp.bat" - the DOS commands to run CTDMPLUS are:

```
>copy ctdm_die.in ctdm.in
>copy hill1_pm24_fine RECEPTOR
>copy oakh_m03.sfc SURFACE
>copy oakh_a03.pfl PROFILE
>ctdmplus
>copy conc conccu05
>copy ctdm.out ctdmcu05.out
```

2. Run the first postprocessor to extract the highest value for each day for that set of receptors.

Following the CTDMPLUS run, give DOS commands from batch file "neti6.bat", which uses postprocessor "netimp3.exe". The DOS command used to run the postprocessor and process the 1-hr averages in the CTDMPLUS output file "conccu05" into 24-hour averages is:

```
>netimp3 conccu05 cn_dcu05.out
```

3. Run the second postprocessor to collect the highest results from multiple output files.

Following the "netimp3" run, give commands from batch file "tr_b.bat", which uses postprocessor "three_b.exe". Among the "netimp3.exe" output files listed in postprocessor "three_b.exe" input file "readlist.prn" is "cn_dcu05.out". (Note that for this example "cn_dcu05.out" should be the ONLY file name listed in file "readlist.prn". This postprocessor would only need to be run when results need to be extracted from multiple files. For this example, since we know which output file produced the highest concentration, it would not be necessary to run the second postprocessor.)

The DOS command to run the "three_b" postprocessor and process the "netimp3" output file "cn_dcu05.out" is as follows:

```
>three_b readlist.prn readlist.out
```

4. Locate the highest impact.

The following output is yielded by postprocessor "three_b" in the output file "readlist.out", which originates from "netimp3" output file "cn_dcu05.out", and ultimately from the CTDMPLUS output file "conccu05", and identifies the highest impact at receptor #144 on 03/06/20 (June 20, 2003):

Highest
144 3 6 20 33.21056

H2H
153 3 6 14 22.65667

5. Find the location of the receptor with the highest impact.

Open the receptor file "hill1_pm24_fine RECEPTOR" in Word. Add line numbers to the document as follows:

- On the **File** menu, click **Page Setup**, and then click the **Layout** tab.
- In the **Apply to** box, click **Whole document**.
- Click **Line Numbers**.
- Select the **Add line numbering** check box, and then select **Continuous**.

Receptor 144 (at line 144) is given in the receptor file as:

Local X (m)	Local Y (m)	Flag Z (m)	Z (m)	Hill #
641.2	4817.0	0.0	100.7	1

Local coordinates can then be converted to NAD27 UTM coordinates by adding the following:

Local		UTM-E	UTM-N
(0,0)	=	397308.8	4503908.0

so that the actual location of the modeled highest concentration is (397950.0, 4508725).

Cultural Resources (101-103)

Oily Water Separator

101. *Please provide a complete list of the structures and facilities that are 45 years of age or older and that would be demolished to accommodate the construction of the HBRP.*

Response: Structures that would be demolished to accommodate the HBRP and that may be older than 45 years include a portion of the rail spur, a 115 kV transmission tower currently connected with the Mobile Emergency Power Plants (but originally constructed to convey power from Unit 3), and the Storage Building. Neither the oily water separator, steam cleaning station, nor low-volume waste facility would be removed to accommodate the HBRP.

Circuit Breakers

102. *For the proposed replacement of three circuit breakers in the HBPP Substation, please provide the following:*

   a. *An evaluation by a qualified architectural historian as to whether the three circuit breaker replacements at the HBPP would be a significant impact; and*

   b. *The resume of the evaluator.*

Response: The replacement of the three circuit breakers would be a modification to the existing Humboldt Bay Power Plant substation. The Applicant's evaluation indicates that the collection of properties related to power generation at the Humboldt Bay Power Plant (including Units 1, 2, and 3 and ancillary facilities) makes up a district of functionally related properties, but that this district does not meet the criteria for listing in the National Register as a district and Units 1 and 2 do not meet the criteria for National Register listing as individual properties. Unit 3 is individually eligible for listing in the National Register under Criterion Consideration G, "exceptional significance."

The switchyard serves Units 1 and 2, but is not connected with Unit 3 and is included in our existing evaluation. Unit 3, when operating, connected with a 115 kV transmission line that extended to the Humboldt Substation, several miles to the northeast. Because the Humboldt Bay Power Plant does not qualify as a National Register historic district, replacing breakers at the substation would not have an adverse effect on a historic property.

As indicated previously, the evaluation was conducted by Ms. Jessica Feldman. Ms. Feldman's resume was included in Volume II of the AFC, Appendix 8.3C.

115 kV Transmission Tower

103. *For the proposed alterations to the Humboldt Bay/Humboldt #1 115-kV transmission line, please provide the following.*

   a. *The results of research by a qualified historian as to the age of the Humboldt Bay/Humboldt #1 115 kV transmission line and its association, if any, with the installation or operation of Unit 3.*

b. *If the Humboldt Bay/Humboldt #1 115 kV transmission line is 45 years of age or older, or if it was associated with the installation or operation of Unit 3, an evaluation by a qualified architectural historian as to whether the proposed HBRP interconnection to this line would be a significant impact; and*

c. *The resume of the evaluator.*

Response: As indicated in the response to Data Request 102, the Humboldt Bay to Humboldt #1 115 kV transmission line is associated with the operation of Humboldt Bay Power Plant Unit 3. Unit 3 was found eligible for National Register listing under criterion consideration G "exceptional significance" in a 2003 evaluation by Mary Maniery of PAR Environmental Resources for the Independent Spent Fuel Installation (ISFSI) project. It would be necessary for the Applicant to conduct an independent evaluation of Unit 3 to determine conclusively whether or not the transmission line is an element that contributes to its significance, as this topic is not addressed in the PAR report. This evaluation will be provided in a future submittal.

Visual Resources (104-105)

Exhaust Stack Platform

104. *Please provide a written description of the design, color and finish, location, and size of platform(s) and associated equipment on the exhaust stacks in accordance to (sic) the North Coast Air District requirements.*

Response: The response to this Data Request will be provided in a future submittal.

Exhaust Stack Platform

104. *Please provide a revised photo simulation and electronic file of the proposed project for KOP 1 (Figure 8.13-5) and KOP 2 (Figure 8.13-6) showing the design, color and finish, location, and size of the platform(s) and associated equipment on the exhaust stacks in individual life-size (approximately tabloid size) photos..*

Response: The response to this Data Request will be provided in a future submittal.

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HUMBOLDT BAY REPOWERING PROJECT
APPLICATION FOR CERTIFICATION
DOCKET NO. 06-AFC-7

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I declare that I transmitted the foregoing document via e-mail, or as indicated by first class postal mail, to the above named on the date indicated thereby. I declare under penalty of perjury that the foregoing is true and correct.

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