December 24, 2013

Mr. Edward D. Halpin
Senior Vice President and
Chief Nuclear Officer
Pacific Gas and Electric Company
P. O. Box 56
Mail Code 104/6
Avila Beach, CA 93424

SUBJECT: HUMBOLDT BAY POWER PLANT UNIT 3 – REQUEST FOR ADDITIONAL INFORMATION

Dear Mr. Halpin:

On May 3, 2013, Pacific Gas and Electric submitted to the U.S. Nuclear Regulatory Commission a License Amendment Request (LAR) to add License Condition 2.C.5 that approves the License Termination Plan (LTP) and adds a license condition that establishes the criteria for determining when changes to the LTP require prior NRC approval. In order to complete our review of your LAR we require additional information as detailed in the enclosure. Based on discussions we understand that you intend on responding to this request for additional information by January 31, 2014.

Sincerely,

/RA/
John B. Hickman, Project Manager
Reactor Decommissioning Branch
Decommissioning and Uranium Recovery
Licensing Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No. 50-133

Enclosure:
Request for Additional Information

cc w/enclosure: Humboldt Bay Service List

Mr. Edward D. Halpin
Senior Vice President and
Chief Nuclear Officer
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P. O. Box 56
Mail Code 104/6
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DATE	12 /24 / 2013	12 / 24 / 2013	12 /24 / 2013	12 / 24 / 2013

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Humboldt Bay Power Plant, Unit 3 Service List

cc:

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REQUEST FOR ADDITIONAL INFORMATION
BY THE OFFICE OF FEDERAL AND STATE MATERIAL
AND ENVIRONMENTAL MANAGEMENT PROGRAMS
LICENSE TERMINATION PLAN
FOR HUMBOLDT BAY POWER PLANT UNIT 3

Chapter 2 – Site Characterization

RAI 01

Basis for Request:

SRP Section B.2 acceptance criterion states that the LTP sufficiently details the site characterization to allow the NRC staff to determine the extent and range of radiological contamination. 10 CFR 50.75(g)(4)(iii) and § 50.83(a)(2) require the licensee to perform a historical site assessment (HSA) and maintain records of the assessment before the site is released for unrestricted use. 10 CFR 50.2 defines the HSA as the identification of sources of radioactive material and radioactive contamination based on existing or derived information for classifying a site as impacted or non-impacted. The licensee describes spills and events that may have affected the site and states in LTP Sections 2.1.4.4 and 2.1.4.5 that the licensee used personnel interviews and historical photographs to develop the HSA. However, the licensee states in LTP Section 2.1.4.2 that records maintained in accordance with 10 CFR 50.75(g)(1)provided a major source of documentation for the HSA review process. The licensee does not provide any additional information on what other information it used or derived to complete the HSA.

RAI

Describe other sources that the licensee used or derived to complete the HSA review.

RAI 02

Basis for Request:

SRP Section B.2 acceptance criterion states that the LTP sufficiently details the site characterization to allow the NRC staff to determine the extent and range of radiological contamination. SRP Section B.4 acceptance criterion states that the LTP discuss in detail how facility and site areas will be remediated and summarize the radiation protection methods and control procedures that the licensee will use including a summary of the procedures already authorized under the existing license. 10 CFR 50.75(g)(4)(iii) and § 50.83(a)(3) require the licensee to perform surveys adequate to demonstrate compliance with the radiological criteria for unrestricted use specified in 10 CFR 20.1402. LTP Section 2.1.5.3 text states that contaminated soils were disposed at an NRC-licensed facility and soils deemed noncontaminated according to procedures were placed on either side of the discharge canal. The licensee has not described how it determined if contamination was present or whether or not the licensee used threshold activity concentrations to determine if soils were contaminated vs. noncontaminated.

RAI

Describe how the licensee determined if soils were contaminated and threshold activity concentrations used to determine if contamination is present.

RAI 03

Basis for Request:

SRP Section B.2 acceptance criterion states that the LTP sufficiently details the site characterization to allow the NRC staff to determine the extent and range of radiological contamination. 10 CFR 50.75(g)(4)(iii) and § 50.83(a)(3) require the licensee to perform surveys adequate to demonstrate compliance with the radiological criteria for unrestricted use specified in 10 CFR 20.1402. The last paragraph before Table 2-4 states that the licensee performed an extensive characterization in 1997 and that Table 2-4 provides a summary of the characterization within the NOL01 survey area. The table lists only Cs-137 and Co-60. The licensee has not described whether it analyzed samples for other radionuclides, such as hard-to-detect radionuclides (HTD).

RAI

Provide a more complete description of the 1997 site characterization, additional analytical results, and the justification or rationale for not analyzing for other radionuclides of interest and HTD radionuclides.

RAI 04

Basis for Request:

SRP Section B.2 acceptance criterion states that the LTP sufficiently details the site characterization to allow the NRC staff to determine the extent and range of radiological contamination. 10 CFR 50.75(g)(4)(iii) and § 50.83(a)(3) require the licensee to perform surveys adequate to demonstrate compliance with the radiological criteria for unrestricted use specified in 10 CFR 20.1402. The last paragraph before Table 2-5 states that the licensee performed an extensive characterization in 1997 and that Table 2-5 provides a summary of the characterization within the OOL01 survey area. The table lists only Cs-137 and Co-60, but the text does not explain if the licensee analyzed for other isotopes.

RAI

Provide a more complete description of the 1997 site characterization, additional analytical results, and the justification or rationale for not analyzing for other radionuclides of interest and HTD radionuclides.

RAI 05

Basis for Request:

SRP Section B.2 acceptance criterion states that the LTP sufficiently details the site characterization to allow the NRC staff to determine the extent and range of radiological contamination. 10 CFR 50.75(g)(4)(iii) and § 50.83(a)(3) require the licensee to perform surveys adequate to demonstrate compliance with the radiological criteria for unrestricted use specified in 10 CFR 20.1402. The last paragraph in this section states that the licensee performed an additional site characterization in 2008 to examine the concentrations at depths greater than those sampled in 1997 did. The licensee states that the results of these surveys determined that the contamination was limited to the top 2 feet in the sediment. The licensee does not state what radioisotopes it analyzed.

RAI

Provide a more complete description of the 2008 site characterization, additional analytical results, and the justification or rationale for not analyzing for other radionuclides of interest and HTD radionuclides.

RAI 06

Basis for Request:

SRP Section B.2 acceptance criterion states that the LTP sufficiently details the site characterization to allow the NRC staff to determine the extent and range of radiological contamination. 10 CFR 50.75(g)(4)(iii) and § 50.83(a)(3) require the licensee to perform surveys adequate to demonstrate compliance with the radiological criteria for unrestricted use specified in 10 CFR 20.1402. This section describes the activity measured in survey area OOL02-Intake East, but like the NRC staff's comments for the previous sections in Chapter 2, the licensee only lists Co-60 and Cs-137 and does not describe any other isotopes that the licensee analyzed.

RAI

Provide a more complete description of what isotopes were included in the analysis.

RAI 07

Basis for Request:

SRP Section B.2 acceptance criterion states that the LTP sufficiently details the site characterization to allow the NRC staff to determine the extent and range of radiological contamination. 10 CFR 50.75(g)(4)(iii) and § 50.83(a)(3) require the licensee to perform surveys adequate to demonstrate compliance with the radiological criteria for unrestricted use specified in 10 CFR 20.1402. These sections describe the activity measured, but like the NRC staff's comments for the previous sections in Chapter 2, the licensee only lists Co-60 and Cs 137 and does not describe any other isotopes that the licensee analyzed.

RAI

Provide a more complete description of what isotopes were included in the analysis.

RAI 08

Basis for Request:

SRP Section B.2 acceptance criterion states that the LTP sufficiently details the site characterization to allow the NRC staff to determine the extent and range of radiological contamination. 10 CFR 50.75(g)(4)(iii) and § 50.83(a)(3) require the licensee to perform surveys adequate to demonstrate compliance with the radiological criteria for unrestricted use specified in 10 CFR 20.1402. This section describes unit survey area OOL10, Remainder of Land Area, as a Class 3 survey area and reports the Cs-137 mean activity in Table 2-13. As discussed in previous NRC staff comments on LTP Chapter 2, the licensee does not state that it analyzed for any other radioisotopes.

RAI

Provide a more complete description of what isotopes were included in the analysis.

RAI 09

Basis for Request:

SRP Section B.2 acceptance criterion states that the LTP sufficiently details the site characterization to allow the NRC staff to determine the extent and range of radiological contamination. 10 CFR 50.75(g)(4)(iii) and § 50.83(a)(3) require the licensee to perform surveys adequate to demonstrate compliance with the radiological criteria for unrestricted use specified in 10 CFR 20.1402. This section describes unit survey area OOL11, Intake West and reports the Co-60 and Cs-137 mean activity in Table 2-14. As discussed in previous NRC staff comments on LTP Chapter 2, the licensee does not state that it analyzed for any other radioisotopes.

RAI

Provide a more complete description of what isotopes were included in the analysis.

RAI 10

Basis for Request:

SRP Section B.2 acceptance criteria states that the LTP (1) sufficiently details the site characterization to allow the NRC staff to determine the extent and range of radiological contamination, and (2) identifies the background levels used during scoping or characterization surveys. 10 CFR 50.75(g)(4)(iii) and § 50.83(a)(3) require the licensee to perform surveys adequate to demonstrate compliance with the radiological criteria for unrestricted use specified in 10 CFR 20.1402. This section describes potential contaminants at the site. The licensee

explains that although the primary radioisotopes of concern are Fe-55, Co-60, Cs 134, Cs 137, Ni 63, Pu-238/241, and Am-241, but because the plant shutdown in 1976 and has been in SAFSTOR since 1976, Fe-55 and Co-60, both with short half-lives, have decayed to 0.1 percent and 1.6 percent, respectively. The licensee states that the most abundant radioisotopes of concern are Cs-1 37 and Ni-63. The licensee states that it has observed an increase in Am-241 from the beta decay of Pu-241 to Am-241. The licensee states that Am-241 will not reach equilibrium with Pu-241 and that the Am-241 will reach 90 percent of its maximum in 2013, approximately 48 years from the date of the last fuel cladding failure in 1965. The licensee should have included this information in the beginning, which would explain the analysis of Co-60 and Cs-137, but does not explain the rationale for the licensee omitting Ni-63 or Am-241 analysis in the site characterization. In addition, analysis should have confirmed the licensee's assumption that the radioisotopes of concern had decayed below activities of interest.

RAI

Provide a more complete description of what isotopes were included in the analysis and a justification or rationale for not analyzing other potential contaminants.

Chapter 5 – Final Status Survey Plan

RAI 11

Basis for Request:

Chapter 5, Section 5.2.1.3, Page 5-11. It was noted in Section 5.2.1.3 of the LTP that "when a surrogate ratio is established using data collected prior to remediation, post-remediation or FSS measurements will be reviewed to ensure that the established ratios are still appropriate."

RAI

When will surrogate ratios be developed? Once developed, what quality assurance measures will be taken to ensure that a surrogate ratio remains valid for a given data set? How many confirmation measurements will be performed to confirm the surrogate ratio? If such an analysis leads to a conclusion that the ratios were not appropriate, what contingencies are in place to handle hard to detect radionuclides?

RAI 12

Basis for Request:

Chapter 5, Section 5.2.2, Pages 5-13 to 5-14. Section 5.2.2 of the LTP discusses reclassification of survey areas and notes that "Once the FSS of a given survey unit begins, the basis for any reclassification will be documented, requiring a redesign of the survey unit package, if required (e.g., a Class 3 to a Class 2) and the initiation of a new survey using the redesigned survey unit package." The NRC staff encourages HBPP to consider the guidance in Appendix A.1 of NUREG-1757 which notes that "If a licensee plans to make use of reclassification during the RSSI process, the licensee should provide in the DP the criteria and

methodology the licensee plans to use for reclassification. In addition, a licensee contemplating use of reclassification is encouraged to consult with NRC staff."

RAI

Please clarify your criteria for reclassification.

RAI 13

Basis for Request:

Chapter 5, Section 5.2.2.2, Page 5-14. Section 5.2.2.2 (Impacted Areas) of the LTP defines Class 1, 2, and 3 impacted areas and refers to NUREG-1757, Volume 2, Page A2 as the source. However, the LTP does not specify DCGLW in Class 1 and 2 definitions, but only refers to a "DCGL." Similar instances were also found in Section 5.3.6 and throughout the document.

RAI

Please ensure that DCGLw or DCGLEMC are being accurately distinguished in the discussion of Class 1 and Class 2 areas throughout the LTP.

RAI 14

Basis for Request:

Chapter 5, Section 5.2.4, Pages 5-17 to 5-18. An overview of access control measures is provided in Section 5.2.4 of the LTP, but limited details are provided on specific measures to prevent recontamination of remediated areas.

RAI

What procedures are in place to prevent recontamination of areas where Final Status Surveys have been performed? What administrative and engineering controls will be maintained to ensure that remediated areas are not recontaminated by ongoing site operations?

RAI 15

Basis for Request:

Chapter 5, Section 5.4.2, Page 5-35. Surveys of structures are discussed in Section 5.4.2, where it was noted that scan surveys, direct measurements, and when necessary, volumetric sampling will be performed. Beta/gamma surveys were discussed under Section 5.4.2.1 (Scan Surveys), and no particular detector or types of radiation being measured were discussed under Section 5.4.2.2 (Direct Measurements).

RAI

Please provide additional details on the types of instrumentation that will be used for direct structure surveys and demonstrate that they are capable of adequately detecting the expected radionuclides. Since there is a concern for alpha contamination due to failed fuel, how will alpha contamination be measured?

RAI 16

Basis for Request:

Chapter 5, Section 5.4.2.4, Page 5-36. It was noted that "the thickness of the layer of building surface to be removed as a sample should be consistent with the development of the HBPP site model and the DCGLs (i.e., less than 10 mm in depth)."

RAI

Please provide additional details on the establishment of the site model and the usage of a 10 mm thickness. No other mention of this thickness was found in the discussion of DCGL development.

RAI 17

Basis for Request:

Chapter 5, Section 5.4.2.5.2, Page 5-37. It was indicated under the Volumetric Sampling discussion that "If a survey area has already been excavated and remediated to the soil DCGL, this area will be treated as surface soil, and the FSS will be performed on the excavated area. Soil samples will be collected to depths at which there is high confidence that deeper samples will not result in higher concentrations."

RAI

What defines a depth at which there is a high confidence that deeper samples will not result in higher concentrations?

RAI 18

Basis for Request:

Chapter 5, Section 5.4.2.5.2, Page 5-37. It was noted under the Volumetric Sampling discussion that "Alternatively, a sodium iodide detector or in situ object counting system (ISOCS) of sufficient sensitivity to detect DCGL concentrations may be used to identify the presence or absence of subsurface contamination (i.e. greater than 15 cm in depth), and the extent of such contamination. If the detector identifies the presence of contamination at a significant fraction of the DCGL (as referenced in Table 5-5), confirmatory investigation and analyses of soil samples of the suspect areas will be performed." The staff reviewed the "In Situ Object Counting System™ (ISOCS) as Applied to Scan Requirements in Support of the Final

Status Survey at HBPP" document provided as an Enclosure to the HSA and noted that it relates to surface soil scanning. As such, it has not been demonstrated that sodium iodide or ISOCS instrumentation would be sufficient to quantify sub-surface contamination.

RAI

Please provide a technical basis document for review to demonstrate these instruments' subsurface detection capabilities. This RAI also relates to the RAIs on Characterization and Remedial Action Support Surveys in that the survey methodologies and approaches to verify the full extent of contamination and to demonstrate that remediation has been successful have not been discussed.

RAI 19

Basis for Request:

Chapter 5, Section 5.4.3.1, Page 5-38. The LTP states that "the survey design of paved/concrete areas will be based on soil survey unit sizes since they are outdoor areas where the exposure scenario is most similar to direct radiation from surface soil," and that "the applicable DCGL will be the soil DCGL."

RAI

Has an analysis been performed to justify this usage of soil DCGLs for paved/concrete areas? Is this a conservative approach?

RAI 20

Basis for Request:

Chapter 5, Section 5.4.3.2, Page 5-38. It was noted in the Bulk Materials discussion that "Excavated soil may be reused onsite. Prior to reuse, excavated soil will be characterized to determine its suitability. Any surface scanning or volumetric analyses will be directly compared with DCGL values."

RAI

Additional details should be provided on the characterization methodology and instrumentation that will be utilized for reused soils. The NRC staff notes that other licensees have been allowed to reuse excavated soils from impacted areas on site, but only after a demonstration that surveys and characterization of soils are comparable to the rigor of a Final Status Survey. This process can be complex, and has generally necessitated the removal and survey of soils via automated sorting systems or in systematic lifts where the depth of soil is limited to a height that can be adequately scanned by a technician. Please provide additional details on the methodologies for soil reuse and demonstrate that surveys will be performed to the rigor of a Final Status Survey.

RAI 21

Basis for Request:

Chapter 5, Section 5.4.3.2, Page 5-38. The discussion of reuse soils also indicated that "Soils satisfying the criteria for unrestricted release may be stockpiled for use as HBPP onsite backfill material."

RAI

Please describe the administrative and engineering controls that will be maintained to prevent recontamination of stockpiled soils.

RAI 22

Basis for Request:

Chapter 5, Section 5.4.3.3, Page 5-38 to 5-39. The section on Embedded Piping and Buried Piping states that separate FSS plans will be developed for embedded/buried piping, which will include survey unit DQOs. A general overview was provided in the text, but further details are required for the staff to perform an adequate technical review.

RAI

Please provide the FSS Plan for embedded piping be provided for staff review.

RAI 23

Basis for Request:

Chapter 5, Section 5.4.3.6, Page 5-40 to 5-41. Section 5.4.3.6 discusses surveys of exterior surfaces of building foundations. Core boring through foundation walls and soil sampling were proposed, and it was indicated that the HSA would be used to evaluate the potential for exterior surface contamination.

RAI

Has this approach changed based upon plans to remove the caisson? If these areas are considered impacted, have they been classified as a Class 1, 2, or 3 area with plans for a MARSSIM based Final Status Survey?

RAI 24

Basis for Request:

Chapter 5, Section 5.4.4.1, Page 5-44. Instrument selection was discussed in Section 5.4.4.1 of the LTP, and Table 5-10 provides "Typical FSS Detection Sensitivities."

RAI

Is there a reference for these sensitivities?

RAI 25

Basis for Request:

Chapter 5, Section 5.4.4.4.7, Page 5-53. Section 5.4.4.4.7 of the LTP describes pipe survey instrumentation and notes that "accessible portions of the remaining embedded piping will be surveyed to ensure residual remaining activity is less than the DCGL."

RAI

How will inaccessible areas be accounted for? If piping is impacted and considered to be a Class 1 area, how would a 100% surface scan be performed?

RAI 26

Basis for Request:

Chapter 5, Section 5.5.3, Page 5-55. Under "Data Verification and Validation" one of the review criteria is that "the instrumentation MDC for fixed or volumetric measurements was below the DCGLW or if not, it was below the DCGLEMC for Class 1, below the DCGLW for Class 2, and below 0.5 DCGLW for Class 3 survey units." This is not consistent with MARSSIM, which states that "for direct measurements and sample analyses, minimum detectable concentrations (MDCs) less than 10% of the DCGL are preferable while MDCs up to 50% of the DCGL are acceptable."

RAI

Please update the review criteria and direct measurement MDCs to be consistent with MARSSIM.

RAI 27

Basis for Request:

Chapter 5, Section 5.7.2, Page 5-63 to 5-64. The Final Status Survey Report is discussed in Section 5.7.2 of the LTP. The minimum topics presented appear to be consistent with NUREG-1700 acceptance criteria.

RAI

The NRC staff encourages the licensee to consider a slightly more comprehensive acceptance checklist provided in NUREG - 1757, Vol. 1, Rev. 2, Appendix D, XIV.e., "FINAL STATUS SURVEY REPORT". Additional topics are included, such as ALARA and discussions of investigations that are taken in the event of a failed survey unit.

RAI 28

Basis for Request:

Chapter 4 and 5. As noted in NUREG–1757, Vol. 2, Rev. 1, a description of field screening methods and instrumentation, and a demonstration that field screening should be capable of detecting residual radioactivity at the DCGLW.

RAI

Please describe the in-process or Remedial Action Support Surveys that will be performed to demonstrate that site remediation is complete.

Chapter 6 and Supplemental Information

RAI 28

Basis for Request:

Chapter 6, Section 6.2.2.2 and Appendix F. In Section 6.2.2.2, it is stated that borehole data indicated that to a depth of 15-35 feet, the strata are compact clay, clayey sands, and clayey silt and that below this layer lies a sand body. Additionally, the document ENG-HB-001 (Tables 1A, 1B, and 1C) contains information on the soil type determination that shows that a variety of soil types were found on the site. In Appendix F, it is stated that a soil type of clay loam was selected based on the average density and porosity of the soil. The selection of a soil type is generally based on more than just its density and porosity. The expected transport of radionuclides is a lot less in a clay loam than in other types of soil because the sorption tends to be a lot higher and the flow is lower. If another type of soil is present on the site, then water dependent doses could be higher.

RAI

More information is needed regarding the soil types present on site and the basis for the soil type used to select parameters for the RESRAD modeling. Provide additional justification for the selection of clay loam as the soil type for the contaminated, unsaturated, and saturated zones in RESRAD.

RAI 29

Basis for Request:

Section 6.4.4.2. The model room assumed was selected because little remediation will be required in this room and because the room was slated to be occupied by administrative personnel on the most continuous basis. The model room is 8.47 m by 5.64 m. It is expected that a smaller room would lead to a higher dose. Because the use of rooms may change in the future, it is important to understand the potential dose implications if another room on site were to be used in a more continuous manner.

RAI

Provide information on whether there are smaller rooms on the site that could potentially be occupied by personnel on a more continuous basis in the future. Also provide the size of these rooms. If the rooms are significantly different in size than what was assumed in the model, provide an assessment of the DCGLs based on this room size.

RAI 30

Basis for Request:

Chapter 6, Table 6-6. Table 6-6 presents area factors for building surfaces. The document "Gross Activity DCGL in Support of the Final Status Survey at HBPP" describes the gross beta/gamma DCGL for building surfaces.

RAI

Provide information on the method that will be used to assess the DCGLs for elevated areas on building surfaces (i.e., is a gross DCGL value going to be generated for the elevated areas using the area factors?).

RAI 31

Basis for Request:

Chapter 6, Appendix C. The results of the sensitivity analysis for building surfaces indicate that certain parameters are sensitive for some walls, but not others. This result indicates that the sensitivity analysis may not have been run with enough observations because it is not logical for the sensitivity of a parameter to be different for different walls, particularly when the walls have the same geometry.

RAI

For key radionuclides, provide results of a sensitivity analysis that has been run for more observations to confirm that the results obtained were correct.

RAI 32

Basis for Request:

Chapter 6, Appendix D. The basis for how the indoor fraction was determined was not clear from NUREG/CR-5512 Vol 3.

RAI

Provide additional information on how the indoor fraction was determined.

RAI 33

Basis for Request:

Chapter 6, Appendix D. The deposition velocity for Am-241, Cm-243, Cm-244, Cm-245, Cm-246, Np-237, Pu-238, Pu-239, Pu-240, and Pu-241 was based on the 25% of the distribution. However, the results of the sensitivity analysis indicated that this was not a sensitive parameter for these radionuclides. Therefore, the value should be set at the 50%, rather than the 25%.

RAI

Provide the basis for using the 25% for these parameters or provide updated results reflecting the use of the 50% value. Alternatively, provide a justification for why the particular value selected for this parameter is not significant to the dose.

RAI 34

Basis for Request:

Chapter 6, Appendix D. A value of 0.1 was assumed for the removable fraction in the calculation of building surface DCGLS.

RAI

What method is going to be used to confirm that the removable fraction in the building is 0.1 or less?

RAI 35

Basis for Request:

Chapter 6, Appendix G, Appendix I. The thickness of the contaminated zone assumed in the RESRAD model is based on the 75% a site specific distribution (2.67 m) that ranges from the depth of the soil mixing layer (0.15 m) to the maximum depth of a sample that had plant related radioactivity (3.51 m).

RAI

If residual radioactivity is found at a greater depth than the 2.67 m assumed in the model, what method will be used to evaluate if the dose results are still applicable?

RAI 36

Basis for Request:

Chapter 6, Appendix I. There are some aspects of the RESRAD modeling that may be resulting in an underestimation of the water dependent doses. For example, parameters that are

expected to be correlated are not (such as the Kd values in the contaminated, unsaturated and saturated ones). Additionally, because parameters were not correlated, some realizations of the probabilistic analysis had combinations of parameters that are physically impossible (e.g., an effective porosity that is higher than the total porosity).

RAI

Provide an assessment to determine whether these modeling artifacts are resulting in an underestimation of the water dependent doses.

RAI 37

Basis for Request:

"Gross Activity DCGL in Support of the Final Status Survey at HBPP," Section 3.0. The beta/gamma gross activity DCGL is based on Cs-137 and Co-60 because these were the only radionuclides identified as being significant for building surfaces. The elimination of insignificant radionuclides from further consideration is consistent with NRC guidance; however, the dose impact of the insignificant radionuclides still needs to be considered.

RAI

Provide an explanation of how the dose from the insignificant radionuclides is going to be accounted for in the use of the gross activity beta/gamma DCGL.

RAI 38

Basis for Request:

"Gross Activity DCGL in Support of the Final Status Survey at HBPP," Section 3.0, Table 3-1. Table 3-1 presents information on the measured activities of Cs-137 and Co-60 inside buildings and on their roofs.

RAI

Provide a description of analytical information available for other radionuclides. Also describe any plans to reconfirm the relative fractions of Cs-137 and Co-60 during the Final Status Survey.

RAI 39

Basis for Request:

"Gross Activity DCGL in Support of the Final Status Survey at HBPP," Section 4.0. This section states that because there is limited information on the fractional composition of alpha emitters at HBPP, the DCGL for the most limiting alpha emitter will be used.

RAI

Are there plans to obtain fractional compositions of the alpha emitters at a later time?

RAI 40

Basis for Request:

"Radionuclide Selection for DCGL Development," Section 5.0. Radionuclides that were potentially present were evaluated from NUREG/CR-3474, "Long-Lived Activation Products in Reactor Materials" and NUREG/CR-4289' "Residual Radionuclide Contamination Within and Around Commercial Nuclear Power Plants", and the Humboldt Bay Historical Site Assessment. Because of failed fuel at Humboldt Bay, there may be differences between the radionuclides at that power plant and the radionuclides commonly observed elsewhere. The Historical Site Assessment focuses primarily on Cs-137 and Co-60.

RAI

Provide an explanation of how the approach used captured all radionuclides potentially present, including those that may be present due to fuel failure (and associated ingrowth). Also, provide a description of characterization performed for radionuclides other than Cs-137 and Co-60.

RAI 41

Basis for Request:

"Radionuclide Selection for DCGL Development," Section 5.2.2. Based on the description in Section 5.2.2 of "Radionuclide Selection for DCGL Development", it is not clear to the NRC staff how the input concentrations were developed for the DandD code.

RAI

Provide an explanation of the methodology used to develop these concentrations, including how the radionuclides present from failed fuel were accounted for in the development of these concentrations.

RAI 42

Basis for Request:

"Radionuclide Selection for DCGL Development," Section 5.2.2. The dose from the radionuclides that could not be evaluated using DandD should be included as part of this dose.

RAI

Provide information on the method that will be used to account for the dose from the discounted radionuclides.

RAI 43

Basis for Request:

"Radionuclide Selection for DCGL Development," Table 5-5 and Table 6-1. Fe-55 was listed as not being discounted in Table 5-5, but it was not included in Table 6-1 "HBPP Site-Specific Suite of Radionuclides."

RAI

What was the basis for eliminating Fe-55 from the site-specific suite of radionuclides?

RAI 44

Basis for Request:

"Derived Concentration Guideline Levels for Embedded and Buried Piping in Support of the Final Status Survey at HBPP." The conceptual model assumed for the pipes does not correspond to the actual configuration of the system.

RAI

Provide an assessment of the dose from the residual radioactivity in the pipes that is consistent with the actual expected configuration or provide additional justification for the conceptual model assumed.

RAI 45

Basis for Request:

"Derived Concentration Guideline Levels for Embedded and Buried Piping in Support of the Final Status Survey at HBPP."

RAI

Provide information on how the dose contribution from residual radioactivity in the pipes is going to be considered when evaluating the other DCGLs in the same area.

RAI 46

Basis for Request:

"Derived Concentration Guideline Levels for Embedded and Buried Piping in Support of the Final Status Survey at HBPP." The activities of radionuclides used in the calculation of dose from the residual radioactivity in pipes were based on an analysis of one sample.

RAI

Provide more information on the representativeness of this sample for the material in the pipe and a description of what analyses will be performed in the future to verify the relative ratios of the radionuclides in the pipes.

RAI 47

Basis for Request:

"Derived Concentration Guideline Levels for Embedded and Buried Piping in Support of the Final Status Survey at HBPP." The dose from the residual radioactivity in the pipes was evaluated deterministically, while similar RESARAD calculations for the soil DCGLS were performed probabilistically.

RAI

What is the reason for the use of a different approach for the pipe DCGLs? Also, provide information on whether the use of mean values from the probabilistic distributions in a deterministic assessment may be non-conservative.

Environmental

Basis for Requests:

Approval of the license amendment associated with the LTP requires development of an Environmental Assessment. The following information is necessary to adequately prepare that document

RAI 48

Section 1.4 "Plans for Site Remediation." In addition to the proposed plan and the no action alternative, did PG&E consider any other means of decommissioning and remediating the site?

RAI 49

Section 3.3.1, Table 3-1 "Major Remaining Activities and Completion Dates." Please update this table. Also, what other activities will take place once decommissioning is complete?

RAI 50

Section 8.5.1.3 "Storage and Disposal of Low-Level Radioactive Waste" – Where will this waste (solid and liquid) be taken to be disposed of? How many, and what types of trucks will be used?

RAI 51

Section 8.5.2.10 “Socioeconomics.” A comparison of the number of workers employed at the height of Unit 3’s operation to the number of workers to be employed during decommissioning should be made. The time periods for each activity should also be made.

RAI 52

Section 8.5.2.12 “Cultural, Historical and Archaeological Resources.” Are there any State-identified historic places along the proposed truck routes?

RAI 53

Section 8.5.2.14 “Noise.” What activity will generate the loudest noise? How loud? Will it be continuous or intermittent? What are the nearest sensitive receptors? At what times during the day will the noise be most noticeable? Will the noise be louder than the traffic from Route 101?

RAI 54

Section 8.5.2.15 “Irretrievable Resources.” What resources are irreversible (never recovered)? What resources are irretrievable (lost only for a period of time)?

RAI 55

Section 8.5.2.16 “Traffic Transportation.” Will ingress and egress interfere with Humboldt Bay Generating Station (HBGS)? Will any of the proposed truck routes pass through populated areas? Will any of the truck routes overlap, spatially and temporally, with school bus routes? Is there a traffic control plan?

RAI 56

Cumulative Effects. Will the proposed action have an effect on any concurrent actions in the same vicinity (e.g., HBGS)? Will the proposed action have any long-lasting effects on the surrounding natural and human environment?

RAI 57

For the soil that is to be excavated please provided estimated quantities for: (1) soil will be re-used on-site; (2) soil that will be disposed off-site; and (3) soil that will be stockpiled off-site?

Additional Documents Request

Please provide copies of:

Bechtel Civil & Minerals, Inc.: "Interoffice Memorandum, Humboldt Bay Power Plant Unit #3 Report of 1984 Geologic Activities." August 1984.

PG&E Department of Engineering Research: "Effects of Tides on Groundwater Flow at Humboldt Bay Power Plant," January 1987

PG&E Technical and Ecological Services, Water Resources Unit: "Humboldt Bay Power Plant Wastewater Treatment Impoundments Hydrogeologic Characterization Study," November 1988

PG&E Geosciences: "Technical Report TR-HBIP-2002-01, Seismic Hazard Assessment for the Humboldt Bay ISFSI Project, Revision 0." December 27, 2002

ENERCON Services, Inc.: "Humboldt Bay Power Plant Tritium Evaluation," December 2006

PG&E: "DECON-POS-H011: Groundwater Investigation History, Control, and Management, Revision B." May 2009