

SAFETY EVALUATION BY OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
RELATED TO THE RELEASE OF LAND FROM FACILITY OPERATING LICENSE NO. DPR-7

PACIFIC GAS AND ELECTRIC COMPANY

HUMBOLDT BAY POWER PLANT UNIT 3

DOCKET NO. 50-133

1.0 INTRODUCTION

The Humboldt Bay Power Plant (HBPP) Unit 3 reactor was permanently defueled in 1984 and on July 30, 1984, Pacific Gas and Electric (PG&E, the licensee) submitted a license amendment request to possess fuel for up to 30 years, but no longer operate, and to decommission HBPP Unit 3 using the SAFSTOR method. On July 16, 1985, the U.S. Nuclear Regulatory Commission (NRC) issued a license amendment to place Unit 3 in a possess-but-not-operate status, and on July 19, 1988, the NRC issued a license amendment approving the Decommissioning Plan and authorizing the decommissioning of Unit 3. PG&E submitted the HBPP Unit 3 Post-Shutdown Decommissioning Activities Report (PSDAR) to the NRC pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50.82(a)(4)(i) on February 27, 1998. The PSDAR and the Defueled Safety Analysis Report (DSAR) superseded the original Decommissioning Plan and provided the information required by 10 CFR 50.82(a)(4). By December 2008, all spent fuel had been removed from the HBPP Unit 3 spent fuel pool and transferred to the 10 CFR Part 72-licensed Humboldt Bay Independent Spent Fuel Storage Installation (HB ISFSI).

On May 3, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML131300009), PG&E submitted the HBPP Unit 3 License Termination Plan (LTP). In response to the NRC's Requests for Additional Information, PG&E submitted Revision 1 to the HBPP Unit 3 LTP on August 13, 2014 (ML14246A164). The NRC approved the HBPP Unit 3 LTP on May 4, 2016 (ML15090A339). PG&E submitted Revision 2 to the LTP on September 18, 2017 (ML17261B264).

By letter dated November 9, 2016, (ML16326A004) PG&E requested NRC approval of the acceptability of the release of a portion of the HBPP Unit 3 site from the 10 CFR Part 50 license (DPR-7). The area to be released ("Release Area") consists of approximately 30.4 acres, known as the Fisherman's Channel (Release Area). No dismantlement activities are required, or were performed, in the "Release Area." Since the subject area is impacted, a Final Status Survey (FSS) was performed. PG&E indicated that they have surveyed the subject areas in accordance with Section 5 of the HBPP Unit 3 LTP and that the 10 CFR 20, Subpart E, criteria for unrestricted release was met. The licensee also evaluated the impact of the release on the HBPP Unit 3 licensing programs. Both the radiological survey and the impact on the licensing programs are evaluated below.

Because the partial site release has been proposed in accordance with the approved LTP, the 10 CFR § 50.83 partial site release requirements are not applicable.

2.0 EVALUATION

2.1 Impact of Releasing the Specific Area on Part 50 Licensing Basis

The licensing basis for HBPP Unit 3 includes the maintenance of certain programs to fulfill regulatory requirements and functional responsibilities. Throughout decommissioning, these programs are modified as necessary and terminated when the applicable concern is no longer relevant. These program changes are implemented using the change processes specified for each type of program. The methodology for releasing land requires a review and assessment of the impact on licensing programs for the site lands remaining within the domain of the Part 50 License. The impact of releasing the "Release Area" on each of the HBPP Unit 3 licensing programs is evaluated below.

2.1.1 License and Technical Specifications

The HBPP Unit 3 license does not specify the specific property included in the licensed area so no changes are required to the HBPP Unit 3 license for the proposed partial site release. The HBPP Unit 3 Technical Specifications (TS), in particular the Design Features and Administrative Controls sections, make no mention of the "Release Area" and are not impacted by the proposed partial site release. Because the proposed partial site release does not necessitate a change to either the license or TS, no amendment is required for approval.

2.1.2 Defueled Safety Analysis Report (DSAR)

The licensee committed to make a change to the HBPP Unit 3 Defueled Safety Analysis Report (DSAR), Figure 2-1, to identify the new site boundary reflecting the reduced site area resulting from the release of the "Release Area." The licensee's proposed DSAR change appropriately reflects the proposed partial site release and is therefore acceptable.

2.1.3 Environmental Report for HBPP Unit 3 Decommissioning

LTP Chapter 8 contains the Supplement to the Environmental Report for HBPP Unit 3 decommissioning, dated July 1984. The Supplement does not specifically address the "Release Area" and is not impacted by the proposed release. Because the Supplement is not impacted by the proposed partial site release, no changes to it are required.

2.1.4 Humboldt Bay Site Emergency Plan

The Emergency Plan is not affected by the proposed partial site release and no changes to it are required for the proposed partial site release.

2.1.5 Humboldt Bay Quality Assurance Plan

The Quality Assurance Plan is not affected by the proposed partial site release and no changes to it are required for the proposed partial site release.

2.1.6 Offsite Dose Calculation Manual (ODCM)

The ODCM is not affected by the proposed release and no changes to it are required for the proposed partial site release.

2.1.7 Environmental Monitoring Program

The Environmental Monitoring Program is not affected by the proposed partial site release and no changes to it are required for the proposed partial site release.

2.1.8 Ground Water Monitoring Program

There are no active ground water monitoring wells in the "Release Area." The "Release Area" comprises Humboldt Bay area and tidal influenced marsh land. Since the area is a considerable distance from areas of potential ground water contamination, there was no need to place ground water wells in the "Release Area." Therefore, there was no need to perform a capture zone analysis and there was no need to add a ground water contribution in the "Release Area." As a result the Ground Water Monitoring Program will not be affected by the proposed partial site release and no changes to it are required for the proposed partial site release.

2.1.9 Fire Protection Program

The "Release Area" is open land area and has no effect on the Fire Program. Therefore no changes to it are required for the proposed partial site release.

2.1.10 Training Program

The "Release Area" is open land area and has no effect on the Training Program. Therefore no changes to it are required for the proposed partial site release.

2.1.11 Post-Shutdown Decommissioning Activities Report (PSDAR)

The PSDAR will not be affected by the proposed release and no changes to it are required for the proposed partial site release.

2.1.12 License Termination Plan (LTP)

The licensee has stated that changes will be made to the HBPP Unit 3 LTP in Sections 2.1.8.11 and 8.1.2; Figures 1-2, 2-2, 6-2, and 8-1; and Table 2-3, to reflect the new site boundary and reduced site acreage resulting from the release of the "Release Area." These proposed changes appropriately reflect the proposed partial site release and are therefore acceptable.

2.1.13 Independent Spent Fuel Storage Installation

The licensee has stated that PG&E will continue to maintain authority over all activities conducted within the HB ISFSI 10 CFR Part 72 license until such time as the spent fuel is removed from the site and the NRC terminates the 10 CFR Part 72 license. The proposed partial site release has no impact on the HB ISFSI so no changes to any HB ISFSI programs are required for the proposed partial site release.

2.1.14 Record Retention Requirements

The licensee has stated that PG&E will maintain the following records through license termination: (1) a map of the site identifying the facility and site as defined in the original license; (2) a record of the "Release Area" released under this action; and (3) documentation of the

radiological conditions of the lands released under this action. The records to be retained reflect the information necessary for eventual termination of the license. Therefore, the licensee's commitment is acceptable for compliance with the NRC's record retention requirements.

2.2 Radiological Site Release Criteria

The site radiological release criteria for the HBPP Unit 3 site correspond to the 10 CFR 20.1402 criteria for unrestricted use. The residual radioactivity, including that from ground water sources that is distinguishable from background, must not cause the total effective dose equivalent to an average member of the critical group to exceed 25 mrem/yr. The residual radioactivity must also be reduced to levels that are as low as reasonably achievable (ALARA).

HBPP Unit 3 L TP, Section 5, describes the FSS Plan that encompasses the radiological assessment of all affected structures, systems, and land areas for the purpose of quantifying the concentrations of any residual activity that exists following all decontamination activities. The licensee performed a FSS of the "Release Area" and provided a copy of the FSS report with this request. The FSS Report concluded that the site release criteria was met.

2.2.1 Radiological Site Release Evaluation

NRC staff reviewed the Final Status Survey Report for Survey Units HBPP-FSSP-OOL 10-11 and HBPP-FSSP-OOL 10-12, dated November 2, 2016 (RCP FSS-17, Revision 1). The licensee's FSS design criteria, implementation of the data quality objectives (DQO) process, and survey approach/methods were reviewed, and final results were assessed against the licensee's approved release criteria. The staff's analysis is provided below.

HBPP-FSSP-OOL 10-11

The survey unit described as HBPP-FSSP-OOL 10-11 was designated by the licensee as a Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) Class 3 unit, and is described as the water covered portion of the area that includes Fisherman's Channel, a navigable waterway, and tidal mud flats to the east. The survey unit's boundary abuts both Survey Area HBPP-FSSP-OOL 10-12 and off-site locations, including residences associated with the King Salmon community. The survey unit is approximately 76,520 square meters of surface area, which is consistent with MARSSIM guidance on Class 3 survey areas (i.e., no size limit). The licensee also notes that the area is completely covered by seawater at high tide, requiring a boat and sample dredge to collect sediment samples for FSS. The licensee's LTP requires 1-10% of Class 3 areas to receive scan coverage during FSS, but a variance to this requirement was taken due to routine tidal flooding of the inlet. Twenty (20) sediment samples were taken within the survey unit using a random start systematic triangular grid. The licensee determined the required number of samples using an adjusted operational derived concentration guideline level (DCGL) of 7.58 pCi/g Cs-137, which resulted in 15 samples being required. The operational DCGL was utilized in order to account for potential dose from Hard-to-Detect (HTD) radionuclides. A soil (sediment) investigation level was also established at 25% of the operational DCGL, or 1.90 pCi/g Cs-137.

NRC staff finds the overall sampling approach to be reasonable because it takes into account the unique tidal flooding situation and the increase in the required number of samples combined with a triangular grid survey provided systematic coverage. Designing the survey using the lower operational DCGL is also appropriate because the investigation level is a fraction of the

operational DCGL, which is consistent with MARSSIM, and 25% is more conservative than the requirements of the licensee's LTP. Additionally, MARSSIM 4.3.2, recommends that 10% of samples include analyses for all radionuclides of concern. The licensee performed analyses for HTD radionuclides on 2 samples from the survey unit, which included alpha spectroscopy, gas proportional counting, and liquid scintillation depending on the radionuclide and the measurement method. This frequency of HTD analyses is consistent with guidance from MARSSIM and is reasonable.

The licensee's survey results indicated that Cs-137 was not identified in any of the 20 samples collected for non-parametric statistical testing, and neither of the 2 HTD samples tested positive for Cs-137 or other plant derived radionuclides. No samples triggered an investigation. Since no sample exceeded the DCGL, the statistical test (i.e., Sign Test) was not required. As such, the licensee acknowledged that "the Sign Test was performed (by inspection) on the data and compared to the original assumptions of the DQOs," and that "the evaluation of the Sign Test results demonstrates that the survey unit passes the unrestricted release criteria, thus, the null hypothesis is rejected." NRC staff concludes that the licensee's survey and analyses for this survey unit were adequate to ensure that the unrestricted release criteria of 10 CFR 20.1402 are met.

HBPP-FSSP-OOL 10-12

The survey unit described as HBPP-FSSP-OOL 10-12 was designated by the licensee as a MARSSIM Class 3 unit, and is described as coastal marshland that is devoid of plant related structures. It is bordered by Survey Unit OOL10-11 over most of its boundary, in addition to off-site locations to plant south and King Salmon Avenue to plant east. The survey unit is approximately 46,364 square meters of surface area, which is consistent with MARSSIM guidance on Class 3 survey areas (i.e., no size limit). The licensee's LTP requires 1-10% of Class 3 areas to receive scan coverage, and walkover scans were performed over approximately 10% of the survey unit. Twenty (20) sediment samples were taken within the survey unit via random selection. The licensee determined the required number of samples using an adjusted operational DCGL of 7.58 pCi/g Cs-137, which resulted in a required number of 15 samples. The operational DCGL was utilized in order to account for potential dose from HTD radionuclides. A soil (sediment) investigation level was also established at 50% of the operational DCGL, or 3.79 pCi/g Cs-137. The NRC staff finds this sampling approach to be reasonable and consistent with MARSSIM and the licensee's LTP. Designing the survey using the lower operational DCGL is also conservative and appropriate. The investigation level is a fraction of the operational DCGL, which is consistent with MARSSIM, and the 50% level meets the requirements of the licensee's LTP. The licensee performed analyses for HTD radionuclides on 2 samples from the survey unit, which included alpha spectroscopy, gas proportional counting, and liquid scintillation depending on the radionuclide and the measurement method. This frequency of HTD analyses is consistent with guidance from MARSSIM 4.3.2, and is appropriate.

The licensee's survey results indicated that the background for walkover scans ranged from approximately 3-4.7 kcpm, which compares well with the anticipated range of 3.2 to 5.4 kcpm predicted in the plan, and no indications above background were encountered. The licensee further notes that Cs-137 was identified in 9 of the 20 samples collected for non-parametric statistical testing, but no sample exceeded a DCGL. No samples triggered an investigation, as the maximum Cs-137 result was 1.19 pCi/g (compared to an investigation level of 3.79 pCi/g). Additionally, neither of the 2 HTD samples tested positive for Cs-137 or other plant derived nuclides. Since no sample exceeded the DCGL, the statistical test (i.e., Sign Test) was not

required. As such, the licensee acknowledged that “the Sign Test was performed (by inspection) on the data and compared to the original assumptions of the DQOs,” and that “the evaluation of the Sign Test results demonstrates that the survey unit passes the unrestricted release criteria, thus, the null hypothesis is rejected.” NRC staff concludes that the licensee’s survey and analyses for this survey unit were adequate to ensure that the unrestricted release criteria of 10 CFR 20.1402 are met.

2.2.2 Confirmatory Survey

Under contract to the NRC, the Oak Ridge Institute for Science and Education (ORISE) conducted a confirmatory radiological survey of the area to be released on September 30 through October 1, 2015. A report on that survey was provided on October 24, 2016 (ADAMS Accession number ML16300A275). The survey included gamma, alpha, and beta radiation surveys and soil sampling. The results of the ORISE gamma, alpha, and beta radiation surveys, combined with the ORISE laboratory analytical results of the soil samples, satisfies the NRC-approved soil and surface activity DCGLs described in PG&E’s LTP.

2.3 Potential for Cross-Contamination from Subsequent Activities

The "Release Area" is bounded on the east by King Salmon Avenue and by off-site locations on the north, west and south. When active decommissioning began, the licensee established restrictive controls on the release of material from radiological controlled areas, to prevent the cross-contamination of areas which had been decontaminated by areas under decommissioning. These controls include contamination containment, dust control measures, storm water runoff control measures, building demolition controls, and additional evaluations and surveys of material leaving the site. These radiation protection program requirements for decommissioning activities, as well as the additional protections afforded from FSS isolation and control measures of adjacent site areas, provide strong assurance that the potential for cross-contamination of the "Release Area" is negligible.

3.0 Conclusion

The release of the "Release Area" is part of PG&E's overall effort to terminate License DPR-7 and to achieve unrestricted release of the entire site, with the exception of the 10 CFR Part 72 portion, in accordance with the criteria in Subpart E of 10 CFR Part 20. This action is also consistent with the phased approach described in Section 1.2 of the HBPP Unit 3 LTP.

10 CFR 50.82(a)(11) establishes the following criteria to be used by the NRC for terminating the license of a power reactor facility: (1) dismantlement has been performed in accordance with the approved LTP; and (2) the final radiation survey and associated documentation demonstrate that the facility and site have met the criteria for decommissioning in 10 CFR Part 20, Subpart E. Although no dismantling activities were required for the "Release Area," the information provided in the licensee’s submittal supports the release of the "Release Area" by demonstrating that this portion of the site land can be released from the HBPP Unit 3 site.

The licensee's FSS Report, along the confirmatory report by ORISE, provides documentation that decommissioning activities have been performed in accordance with the LTP, and each FSS confirms that the residual radioactivity in each associated survey unit meets the criteria established in the HBPP Unit 3 LTP. Thus, the release of the "Release Area" is consistent with, and in compliance with, the license termination process in accordance with the approved LTP and NRC regulations.

Principal Contributor: John Hickman, NMSS