Water Board Staff Responses to Comments on
Proposed Waste Discharge Requirements (WDRs) for Pacific Gas and Electric Company Agricultural Treatment Units, Hinkley, San Bernardino County

March 6, 2014

	Comment Letter 1: IRP Manager, Project Navigator	
#	Comment	Response
1.1.	The CAC [Community Advisory Committee] and the IRP [Independent Review Panel] Manager thanks the Water Board for clarifying and addressing all the comments submitted regarding the Tentative WDRs, and incorporating, as appropriate, the comments into the proposed WDRs.	No response needed.
1.2.	Can the current MODFLOW model be revised to estimate groundwater levels for domestic wells in the Project Area pre-remedial activities? Can the model be used to estimate water levels in 2005 (using a similar baseline date as total dissolved solids and nitrates as outlined in the Proposed WDRs?	It may be feasible to revise the MODFLOW model to estimate water levels in 2005, but those levels would be due to actions which are not subject to Environmental Impact Report (EIR) mitigation measures. The EIR and its mitigation measures only apply to remedial activities that are authorized by permits issued after certification of the EIR; in other words, there is no legal authority for the Water Board to apply EIR significance criteria and associated mitigation measures to activities that were conducted **prior** to EIR certification and adoption of the current WDRs; for example, going back to 2005. To clarify, the proposed WDRs do not contain a baseline date for total dissolved solids and nitrate, but require that pre-remedial reference levels (or baseline)

	Comment Letter 1: IRP Manager, Project Navigator	
#	Comment	Response
		be established prior to or concurrent with new ATUs. That data will be established in 2014.
1.3.	The CAC seeks feedback on how the WDRs will be applied to manage the threat of airborne Cr6 and other constituents as a result of applying Cr6 impacted groundwaters to the agricultural treatment units (ATUs). If possible, please reference any study conducted which shows that using a drip-drag system does not contribute to airborne Cr6 or other constituents.	The WDRs authorize land application of groundwater using "non-spray irrigation techniques (drag-drip lines or equivalent methods to prevent aerial spraying of groundwater)". See Finding 16 of the proposed WDRs. Water Board staff are not aware of any studies specific to chromium and drag-drip irrigation. However, the exposure route for Cr6 from irrigation is through inhalation of aerosols (very fine mists) or particulates (water droplets). Use of drip irrigation instead of spray suppresses the formation of aerosols or particulates that might pose an inhalation risk by applying the water directly to the ground surface. Therefore, aerosols and particulates do not have a chance to form. The WDRs will be revised to include the requirement in the Orders section that irrigation techniques must be used that do not result in aerial spraying of groundwater. See late revision #1.

1.4.	What is the estimated average increase of chromium (as either Cr6 or Cr3) concentrations in the ATU soils as a result of applying groundwater to the ATUs?	There are several different estimates for potential increases of chromium in soils from ATU operations, discussed below. As discussed in the EIR (see EIR pages 3.3-20 - 21), ATU soils monitoring data have not indicated a pattern of accumulating chromium to date. At the Desert View Dairy (DVD), which is the longest running agricultural treatment unit, background total chromium soil levels ranged from 5.7 to 19 ppm in 2004, were measured at 3 to 10 ppm in the first year of operation in 2005, and were measured at 3 to 13 ppm after 7+ years operation, with no pattern of increase. A similar result occurred at other prior land treatment units. For the EIR analysis, an estimate of potential chromium accumulation was performed for the fastest and slowest EIR alternatives (4C-4 and 4C-5, respectively). As noted in the EIR, the estimates do not take into account any soil leaching to groundwater, uptake by vegetation, or soil loss. For 4C-5, the assumption was that groundwater with 500 parts per billion (ppb) hexavalent chromium would be applied for 20 years, then 27 ppb for the next 30 years, and 2.2 ppb for the next 45

		years (for a total of 95 years of ATU operations, the longest ATU operational period). The potential accumulation in soil for 4C-5 (which is worst-case rather than an average value) is up to 65 parts per million (ppm) Cr3. Note that the assumptions used for this calculation are very conservative in terms of chromium concentration and duration of ATU operation. For 4C-4 (the fastest alternative, so irrigation water is applied for a shorter time period) the potential accumulation is 22 ppm Cr3. These values were compared to US EPA regional screening levels of 120,000 ppm Cr3, to conclude that under the worst-case scenario, Cr3 accumulation in soils is far below the screening level, and within the range of background levels of chromium in western United States soils of about 40 to 60 ppm (25^{th} to 75^{th} percentiles), based on US EPA data on background metals concentrations. According to the Kearney Report (UC Riverside, 1996), the mean total chromium concentration in California background soils is 76 ppm with a 75^{th} percentile concentration of 114 ppm. PG&E estimated the potential Cr3 soil chromium

		accumulation for agricultural treatment unit surface soils to be much less, on the order of 0.4 to 1.2 ppm (PG&E Feasibility Study Addendum #1). The Water Board in 2004 (Order R6V-2004-0034) estimated potential future soil total Cr accumulation over 8 years at the DVD to be perhaps 0.5 ppm, which if extrapolated to 95 years would be about 6 ppm. The assumptions about applied water volumes, Cr concentrations in applied water, duration of treatment, and potential fate and transport of deposited chromium likely vary between these different estimates by PG&E, the Water Board and the conservative "worst-case" estimate in the EIR.
	Comment Letter 2: Water Board Advisory Team	
2.1.	On page 26, D.4 (receiving water limitations) – The requirement states that "if the discharge of irrigation water containing greater than 10 mg/L nitrate" causes nitrate levels to exceed or increase, then the discharger must provide a contingency plan. Do we intend to only have the requirement for a contingency plan apply when the irrigation water contains nitrate above 10 mg/L – or do we intend to require the contingency plan anytime the nitrate in the groundwater exceeds 10 or increases above 10 or 20% (depending on the background). I think the latter – and recommend removing "containing greater than 10 mg/L nitrate as N." That way if the discharge of the irrigation water causes an increase – there must be a contingency plan – regardless of whether the irrigation water was above or below 10 mg/L nitrate.	The intention was to require a contingency plan when the discharge of irrigation water causes an increase in nitrate in the receiving groundwaters. The change will be made as suggested. See late revisions #2 and #8.

	Comment Letter 2: Water Board Advisory Team	
2.2.	On p. 26, D.5 – I think we should change "If the discharge of waste" to "If the discharge of irrigation water" – consistent with D.4, above	The change will be made to the proposed WDRs as suggested. See late revision #3.
2.3.	Page 27 – first line, carried over from the sentence on p. 26 (re Conditions Triggering Environmental Impact Report Mitigation Measures) – after "are described" in first line, I suggest adding "in I.E.1, below"	The change will be made to the proposed WDRs as suggested. See late revision #4.
2.4.	On page 29 – I.E.1.a.iii – should read "will be defined ***as*** any domestic water supply"	The change will be made to the proposed WDRs as suggested. See late revision #5.
2.5.	On page 29, f.n. 7 – after "those" add "agricultural supply wells that are not owned"	The change will be made to the proposed WDRs as suggested. See late revision #6.
2.6.	On page 34 – III. (Action Plan for Uranium in Soils) – it appears the numbering is off. Under current "2" (which should be 3), in first line – should read "shall submit an action plan" – removing "propose" from line.	The numbering appears correct as there are only two paragraphs in the section. (see Bates page 4-41 in the final agenda item). The word "proposed" will be removed as suggested. See late revision #7.
	Comments on Responses to Comments	
2.7.	In Comment #B16, PG&E submitted its proposed revisions to groundwater monitoring for existing ATUs (and this was provided in Attachment A to the Response to Comments). On Attachment A, PG&E listed specific wells for which it requested certain revisions in monitoring, including either removing it from the sampling, changing the sampling frequency, or using the well as an alternative. For each request, PG&E provided its rationale. For eight specific requests, the written response does not provided an explanation or rationale as to why the proposal is rejected, and those responses were not responsive to the specific request and rationale provided. Please provide additional explanation why PG&E's rationale is not acceptable for the specific requested changes to the following	Additional explanation is provided below. **MW-14A** - Agree. Both 14A and 14S are screened in upper aquifer but 14S has higher Cr concentrations making it better to monitor before treatment downgradient. **MW-27A/B** – While both MW-27 A/B and MW-9 are close to each other and upgradient of all ATUs on east side, MW-27 A/B shows Cr at higher concentrations than MW-9.

	Comment Letter 2: Water Board Advisory Team	
	Monitoring Wells: MW-127S1, MW-127S2, MW-14A, MW-27A, MW-27B, MW-32S, MW-42B1, MW-56.	**MW-32S**- Frequent monitoring needed with MW-32B1 to characterize effectiveness of chromium remediation and byproducts generation over vertical extent in upper aquifer from Yang ATU, whereas MW-32B2 would provide redundant results. **MW-42B1**- Disagree. Well needed with MW-42B2 to show upgradient Cr concentrations over 30 feet of vertical groundwater in upper aquifer prior to treatment in ATU. **MW-56** - Location and monitoring frequency needed to characterize effective of chromium remediation and byproducts generation when Ranch ATU pumping is reduced from maximum, whereas MW-22B is located too far west of Ranch ATU to make this determination. **MW-127S1/S2** - Monitoring location is a compliance point downgradient of DVD ATUs and upgradient of domestic wells. Wells needed to evaluate effectiveness of chromium remediation and byproduct generation vertically in upper aquifer before reaching domestic wells.
	Comments on Findings and Statement of Overriding Considerations	
2.8.	For Impact WTR-2d, in second to last sentence of the first paragraph for the Findings, please change the sentence to read, "…and the	The change will be made to the proposed WDRs as suggested.

	Comment Letter 2: Water Board Advisory Team	
	importance of addressing the high-level plume concentrations for RETURNING beneficial uses OF THE AQUIFER, …" Similarly for the finding for WTR 2g on p. 12.	See late revisions #11 and #13.
2.9.	For Impact WTR 2f, the findings note that WTR MM-6 requires monitoring of nitrate levels for one year before creating new agricultural treatment units; however, the responses to comment A7 states that monitoring can be done concurrently with establishment of the new ATUs. Please explain. How much monitoring will PG&E have to do to establish baseline limits before it is able to bring on new ATU units authorized under this Order?	PG&E may conduct monitoring for WTR-MM-6 concurrent with the start of agricultural treatment. This is stated in the language for WTR-MM-6 in Attachment F of the proposed WDRs and is consistent with the language and intent of the EIR mitigation measure. This language should be included in Attachment H but was omitted and will be corrected. See late revision #12. PGE can conduct monitoring to establish baseline one year prior to or **concurrent with** the start of ATUs.
	Comment Letter 3: US Fish and Wildlife Service	
3.1.	The US Fish and Wildlife Service (Service) is concerned that the range of screening levels for trivalent chromium, which are based on risks to human health, are not adequate protective of wildlife. The US EPA (2008) issues ecological soil screening levels (Eco-SSLs) which are generally used in the development of screening-level ecological risk assessments (Eco-SSLs range from 26 ppm Cr3 (for avian species) to 34 ppm (for mammals), and 130 ppm Cr6 (for mammals). We recommend that the Lahontan Water Board consider the potential risks to ecological receptors when developing the monitoring requirements associated with the proposed Order.	The Eco-SSLs for trivalent chromium are at levels that are well within the background range of chromium in soils noted above for California – see response to comment 1.4, above. The USEPA document (2008) that published the interim final chromium Eco-SSLs acknowledges that the values are lower than the 50th percentile of reported background concentrations for both eastern and western U.S. soils. This suggests that if there are measurable adverse effects to wildlife from such low levels of trivalent chromium, then

	Comment Letter 3: US Fish and Wildlife Service	
		wildlife is routinely exposed to such adverse effects under natural background conditions. As the EPA acknowledges, the Eco-SSLs are not regulatory levels and should not be used to set cleanup levels. Since the evidence to date supports a hypothesis of limited chromium accumulation at agricultural treatment units and the rough estimate of potential soil chromium accumulation indicates levels within broad background soil ranges, it would be difficult to identify potential significant harm to wildlife related to this project effect based on the information reviewed. As acknowledged in the Environmental Impact Report for the chromium groundwater cleanup (certified in July 2013 by the Lahontan Water Board), creation of new agricultural treatment units would result in permanent conversion of land that may be suitable habitat for the listed desert tortoise and the Mojave ground squirrel to agricultural use. Once converted, such areas will no longer provide suitable habitat for these listed species. The agricultural treatment units are operated as agricultural fields with regular discing and mowing that maintains them in a disturbed state that limits the ability of wildlife to be resident

	Comment Letter 3: US Fish and Wildlife Service	
		in the fields for extended durations. While some mammal species, such as rodents, may forage in the fields, discing would reduce the potential suitability of such areas for longer-term occupancy. While migratory birds can also forage in agricultural fields for insects and other prey (as well as seed), given the state of disturbance and lack of suitable nesting areas they are unlikely to nest or be permanently residents in the fields themselves. Soil exposure durations for wildlife are limited by these factors. Regarding the Migratory Bird Treaty Act, once converted to agriculture, the agricultural fields will not provide suitable nesting habitat for migratory birds although birds may forage within the fields. Mandating specific soil quality conditions for the potential protection of such species on land that has been converted from suitable habitat seems counterintuitive. It is common practice in working with desert habitats to consider all disturbances as a permanent conversion of habitat. The EIR follows this convention and requires PG&E to compensate for losses of habitat through compensation. Even if there were some residual risk associated with soil chromium

	Comment Letter 3: US Fish and Wildlife Service	
		accumulation to wildlife species, PG&E will already be compensating for the loss of habitat in any case.
3.2.	Because trivalent chromium is less soluble than hexavalent chromium, increasing accumulation of trivalent chromium would be expected as the agricultural units continue to operate.	See response to comment 1.4 regarding data and estimates of increases of chromium in soil due to ATUs. In summary, the worse-case estimates of potential accumulation of chromium due to ATUs do not result in concentrations greater than background ranges reported in California.
3.3.	The most recent ecological risk assessment (ERA) for the Hinkley site is from 1988 and does not comport with current practices or EPA guidelines for conducting ERAs. We recommend that the Lahontan Water Board conduct an updated ERA for the site in order to provide a basis for establishing site-specific screening levels and cleanup goals that are protective of wildlife.	Based on the evidence gathered to date (including that in the EIR), remediation using agricultural treatment units does not appear likely to result in significant impacts to wildlife due to potential Cr3 accumulation in surface soils. As such, the Water Board did not require an updated ecological risk assessment to inform its EIR conclusions. If the US Fish and Wildlife Service determine that it needs an updated ERA to supports its development of federal endangered species permits, it has the legal authority to do so.