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August 21, 2020

Orange County Water District  
18700 Ward Street  
Fountain Valley, CA 92708

Attention: Mr. Roy Herndon  
Chief Hydrogeologist

**Technical Comments from Bell on the July 1, 2020 Supplemental Remedial Investigation Report, Orange County Water District, South Basin Groundwater Protection Project, Operable Unit 2 (Supplemental RI Report) prepared by Hargis + Associates, Inc. (Hargis) for the Orange County Water District (OCWD).**

Dear Mr. Herndon:

The following technical comments on the Supplemental RI Report have been prepared on behalf of Bell Industries, Inc. (Bell).

The Supplemental RI Report essentially ignores the overwhelming majority of the extensive data that has been acquired at the Bell site and the nearby UCI and Steelcase sites. As a result, the interpretations in the Supplemental RI Report regarding groundwater flow, plume extent, and sources is substantially inconsistent with the data obtained from dozens of wells over several decades within Operable Unit 2<sup>1</sup> in the Northeast Area.

- A. Cross sections A-A' through N-N', presented on Figures 5-17A through 5-17N of the Supplemental RI Report, depict an "Upper Sand" and a "Basal Sand" within the Shallow Aquifer System as being consistently present throughout the South Basin Area. However, at the Bell site, three distinct hydrostratigraphic layers have been identified in the Shallow Aquifer System, referred to as the Local Shallow Zone, the Local Intermediate Zone, and the Local Deep Zone. These three layers, or zones, have been demonstrated to be separate and distinct units with respect to groundwater flow and plume migration, as shown on the groundwater contour maps and plume maps that have been presented in more than 50 quarterly or semiannual monitoring reports that have been prepared for the Bell site dating back at least 20 years.

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<sup>1</sup> As defined by Hargis, Operable Unit 2 is groundwater contamination in the Shallow Aquifer System off-property of numerous groundwater contamination source sites located within the SBGPP Study Area

The three hydrostratigraphic layers in the vicinity of the Bell site are also clearly identifiable on Figure 4.3.4 of the April 23, 2020 Expert Report of OCWD Expert Graham Fogg, Ph.D. As noted by Dr. Fogg, his staff compiled a total of 22,369 feet of logs from 171 CPTS within the South Basin. The figure below, which is Figure 5 of the June 26, 2020 Expert Report of Bell Expert Dr. Andrew A. Kopania, PG, CH, depicts the Bell hydrostratigraphic layers relative to those previously defined by OCWD (A1/A2, B1, B2, C, and D) on Figure 4.3.4 from Dr. Fogg’s Expert Report. It is clear on Dr. Kopania’s Figure 5 that the shallowest interval at Bell (referred to as the Local Shallow Zone) projects above the ground surface toward the south and does not exist in much of the south part of the South Basin study area. Thus, the hydrostratigraphic zones are not necessarily continuous throughout the South Basin. Hargis appears to have abandoned the A through D aquifer zone designations used by other consultants and experts for OCWD and, in the process, over-simplified the subsurface conditions in a manner that results in incorrect correlations between units and misrepresents the continuity of those units across the South Basin.

Due to the miscorrelations in the Supplemental RI Report, plume map figures such as Figures 5-6 and 5-8 combine data from different stratigraphic intervals. The resulting continuous plumes depicted on these figures are incorrect and are not representative of actual conditions as defined by the many site-specific monitoring reports produced for the individual source sites.

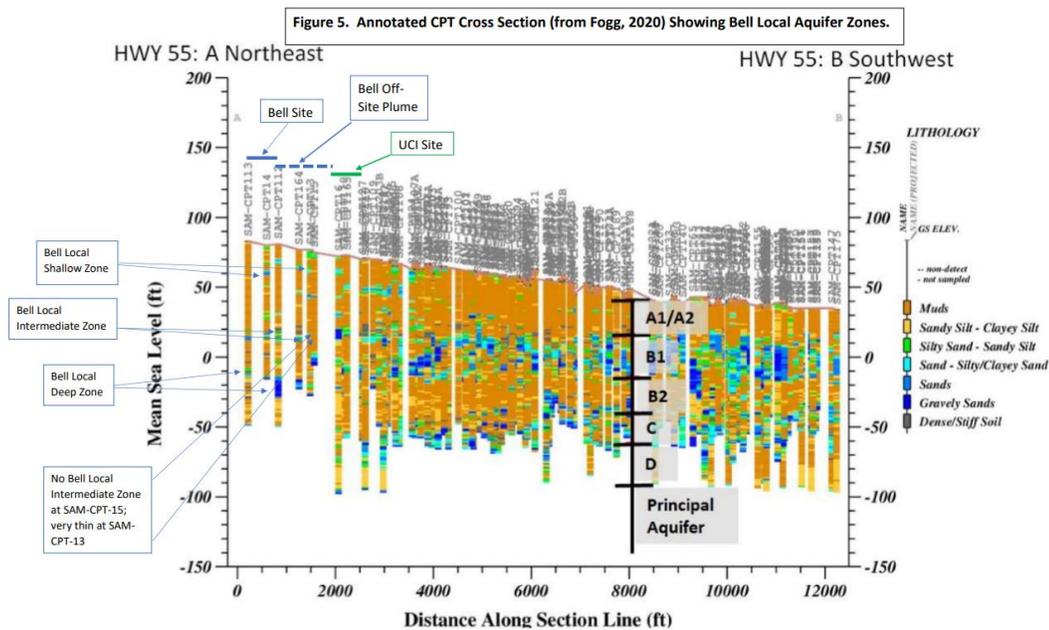


Figure 4.3.4. A cross-section along Highway 55 through the study area with location shown in Fig. 4.3.3. The approximate elevation intervals of the six aquifer zones, and principal aquifer, are also shown. All CPT logs made available in 2012 were projected perpendicularly onto this one cross section. From April 23, 2020 Expert Report of Graham E. Fogg, Ph.D.

- B. Figures 4-2 through 4-7 of the Supplemental RI Report present groundwater contour maps for the “Upper Portion of Shallow Aquifer System” and for the “Lower Portion of Shallow Aquifer System”. The Supplemental RI Report does not explain how the intervals described for the groundwater contour maps on Figures 4-2 through 4-7 relate to the “Upper Sand” and the “Lower Sand” depicted on the cross sections on Figures 5-17A through 5-17N.

In addition, Figures 4-2 through 4-7 do not show the actual data points used to generate the groundwater contours.

In any case, it is clear that Hargis did not use any of the voluminous data available from the individual source sites because the contours depicted by Hargis are dramatically inconsistent with the actual data from those sites. For example, the second figure below, which is modified from Figure 7 of the June 26, 2020 Expert Report of Bell Expert Dr. Andrew A. Kopania, PG, CH, shows the groundwater contours from Figure 4-2 of the Supplemental RI Report, for the Upper Portion of the Shallow Aquifer System for early 2012, superimposed on the groundwater contours from the same aquifer interval for the same time period based on local data from the Bell, UCI, and Steelcase sites<sup>2</sup>. It is clear from the depiction on the modified Figure 7 that the contours produced in the Supplemental RI Report are completely inconsistent with the actual water level data in the northeast part of the South Basin.

Furthermore, Figures 4-3, 4-5, and 4-7 of the Supplemental RI Report, which show groundwater contours for the Lower Portion of the Shallow Aquifer System, do not show any data or contours within several thousand feet of the Bell, UCI, or Steelcase sites. However, as noted above, there is voluminous data available from the lower part of the shallow aquifer system obtained over several decades from the northeast part of the South Basin.

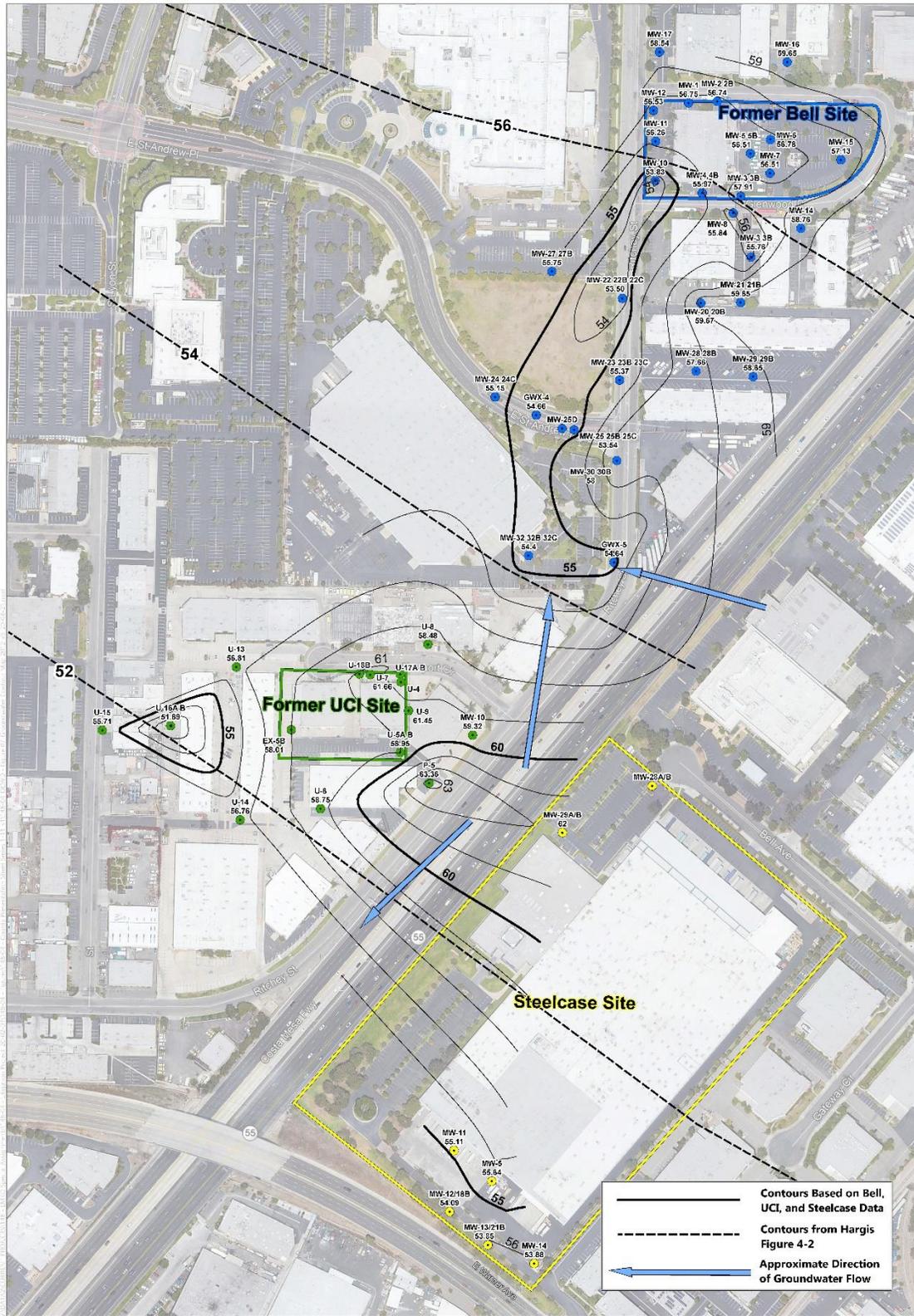
Thus, it can be concluded that the groundwater contours presented in the Supplemental RI Report are based on a selective and dramatically incomplete set of data, which results in faulty depictions of groundwater flow and incorrect interpretations regarding groundwater flow and plume movement.

- C. The lack of attention to site specific data also results in the Supplemental RI Report completely ignoring known VOC contamination in Operable Unit 2 for which no sources have yet been identified. As previously noted by the Santa Ana Regional Water Quality Control Board, the presence of 1,1-DCE and 1,4-dioxane at concentrations exceeding five times the MCL or action level in Bell Local Shallow Zone well MW-16, located at least 200 feet upgradient of the most upgradient well on the Bell site (MW-2), has been known for decades. Yet the Supplemental RI Report ignores that comment from the Regional Board and did not investigate the source and extent of the upgradient Operable Unit 2 contamination in the Shallow Aquifer System.

In addition, during offsite investigations conducted by Bell in 2007, a significant PCE plume was discovered when Well MW-29B was installed by Bell. The PCE concentration in MW-29B has been as high as 530 micrograms per liter (or parts per billion). This PCE plume is separate from and unrelated to the Bell site. Because the Supplemental RI Report ignores any site specific data in the northeast area, the extent and source of this PCE plume has not been identified by Hargis.

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<sup>2</sup> Unlike data presented in the Supplemental RI Report and its appendices, the groundwater elevations on Figure 7 of the June 26, 2020 Expert Report of Bell Expert Dr. Andrew A. Kopania, PG, CH have been corrected for the use of different vertical survey datums (e.g. NGVD29 vs NAVD88) in the different source site investigations. The Supplemental RI Report does not define the vertical datum used for maps, cross sections, and data tables presented.



SOURCE: Base Map: F201 Street Map, accessed Feb. 2016, ArcGIS, Google Earth Imagery Data: 4/2/2016.  
Well Locations: Ekro Environmental, Inc. (previous Feb 2020)

- NOTES
1. All elevations are in feet, NAVD 83
  2. All data properties: NAD 83, California State Plane Zone NAD 83, Unit: Feet, Contour Interval: 0.50, Green: Minimum
  3. Contour lines interpolated from a Cell 3D surface model created using the elevations just shown, with additional grid based natural relief; interpolation at a grid spacing factor of 10 in the X and Y directions.



Groundwater Contour Map-2012  
OCWD v. SABIC, et al.  
Figure 7

Based on the technical comments discussed above, it is readily apparent that the interpretations presented in the Supplemental RI Report for the Bell site and other contaminant plumes in the Northeast Area are not based on any actual site data from that part of the South Basin. As such, the Supplemental RI Report is not consistent with current standards of practice for groundwater contamination and plume investigation and is not consistent with the NCP.

Sincerely,

***EMKO Environmental, Inc.***

A handwritten signature in black ink, appearing to read "A. Kopania". The signature is fluid and cursive, with a large initial "A" and a long, sweeping tail.

Dr. Andrew A. Kopania, R.G., C.H.  
President and Principal Hydrogeologist  
California Professional Geologist #4711  
California Certified Hydrogeologist #HG31

August 21, 2020

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**VIA E-MAIL AND U.S. MAIL**

RE: Comments of Accurate Circuit Engineering, Inc., Bell Industries, Inc., Brenntag Pacific, Inc., DRSS-I, LLC, Dyer Business Associates, a California Limited Partnership, Gallade Chemical, Inc., Sanmina Corporation, Soco West, Inc. on the Orange County Water District's July 1, 2020 *Supplemental Remedial Investigation Report, Orange County Water District, South Basin Groundwater Protection Project, Operable Unit 2*

Dear Mr. Herndon,

This letter provides the comments of Accurate Circuit Engineering, Inc., Bell Industries, Inc., Brenntag Pacific, Inc., DRSS-I, LLC, Dyer Business Associates, a California Limited Partnership, Gallade Chemical, Inc., Sanmina Corporation, Soco West, Inc., on the July 1, 2020 *Supplemental Remedial Investigation Report, Orange County Water District, South Basin Groundwater Protection Project, Operable Unit 2* (Supplemental RI Report) prepared by Hargis + Associates, Inc. (Hargis) for the Orange County Water District (District).

These comments are provided in response to your submission of the Supplemental RI Report to the South Basin Stakeholder Advisory Group (SAG) on July 8, 2020 requesting our review and comments. By subsequent email dated August 4, 2020 you stated that the District was extending the comment period to August 21, 2020. These comments are intended as public comments by the companies listed above, each of which had or have operations or property in the area of Orange County discussed in the Supplemental RI Report. These comments are not intended as made by any litigation-related expert or as an admission of any kind.

While we appreciate the opportunity to make comments, we note that it is very late in the District's remedial investigation (RI) process to only now be affording stakeholders the opportunity to comment. It is our understanding that the District started its remedial investigation / feasibility study (RI/FS) process in 2015, but is only now beginning to seek input from stakeholders who have been actively investigating and remediating sites throughout the South Basin for years, some for decades. We are concerned that, until now, the District has largely ignored the expertise and experience built up over years of these stakeholders. Still, we provide the District with these comments as they reflect the broad and deep experience of the stakeholders at investigating and remediating contaminants in soil and groundwater throughout the South Basin.

As the Supplemental RI Report notes on page 1, the Santa Ana Regional Water Quality Control Board (Regional Board) and California Department of Toxic Substances Control (DTSC) are presently overseeing the ongoing remediation of many sites in the South Basin (and have overseen the closure of sites that were previously cleaned up). These sites include areas both on and off of the properties of those conducting the cleanups. Because these agencies are designated as the primary oversight agencies for these cleanups, these agencies should continue to take the lead in evaluating these cleanups to determine whether any additional efforts are necessary. The District should avoid duplicative efforts and potentially interfering with those ongoing cleanups as that will, at the least, only add to the costs and process of those cleanups, slowing them and making them more difficult.

The Supplemental RI Report fails to adequately describe how the District has taken all of these past and ongoing efforts into account in evaluating the current and likely future extent of any areas requiring any additional cleanup activities. It also fails to adequately describe how its efforts relate to and avoid duplicating and interfering with the Regional Board's and DTSC's ongoing efforts.

## I. GENERAL COMMENTS

### A. The Supplemental RI Report fails to explain how it "supplements" the District's 2015 Preliminary Remedial Investigation Report or what remains from that earlier Report and what has been rejected, revised or utilized.

The Supplemental RI Report states that, it is "a supplement to the October 2015 Preliminary RI Report, Operable Unit 2, prepared by Aquilologic, Inc." But, no stakeholders were ever provided the opportunity to comment on the 2015 Preliminary RI Report. It also appears clear from the public record that neither the Regional Board nor DTSC were provided the opportunity to comment on the 2015

Preliminary RI Report. Because the 2015 Preliminary RI Report is a component of the present Supplemental RI Report, the District must provide an opportunity to comment upon it in a meaningful way.

There is no indication in the Supplemental RI Report of how it relates to or “supplements” the 2015 Preliminary RI Report. While a cursory comparison of the two Reports indicates that they diverge substantially in approach, methodology, conclusions and data cited, it is impossible to undertake a full review of both the Preliminary and Supplemental RI Reports within the time period allotted for comments. We further note that the author of the Preliminary RI Report, Aquilogic and its principal, Anthony Brown, had already come to a conclusion about the final remedy (or at least an interim remedy) in 2012. Mr. Brown testified that a pump-and-treat remedy is the appropriate remedy for the South Basin and even provided cost estimates for implementing that remedy in various “Study Areas” within the South Basin. Thus, this entire exercise of preparing a “supplemental” RI after the District’s own expert witness and prior report preparer has already selected a remedy is an example of closing the barn door after the horse has already left.

The District has already selected a remedy for each of the five study areas initially designated by Mr. Brown. Because the Supplemental RI Report supplements Mr. Brown’s prior 2015 Preliminary RI Report, there is nothing to indicate that the District has now rejected that prior remedy. To now publish a Supplemental RI Report with a remedy already selected violates the National Contingency Plan (NCP) process formally adopted by the District’s Board in 2014. If the Board’s directive that the District must comply with the NCP process is to be followed, the District must reject the complete Preliminary RI Report and the Supplemental RI Report cannot merely supplement that Preliminary RI Report.

Moreover, without explaining exactly what of the Preliminary RI Report is being “supplemented”, what of that Report remains, and what of that Report is now being rejected or modified makes it impossible to comment fully upon the Supplemental RI Report or to even understand its analyses and conclusions.

There are numerous contradictions and fundamental disagreements between the 2015 Preliminary RI Report and the present Supplemental RI Report. These contradictions and disagreements make it impossible to identify the final analyses and conclusions of the District’s RI. For example, Appendix J of the Supplemental RI Report presents Hargis’ interpretations of contaminants of concern (COC) concentration and location data in the form of plume contour maps. The maps depict notably different plume contours than both earlier District plume contour maps (of which the District has publicly released multiple different versions over the years) and the plume contour maps in the 2015 Preliminary RI Report. Which of

these many maps are accurate? Which of these maps does the District now consider as presenting the current state of COC concentrations and locations in 2020? Do any of these maps depict the current state of COC concentrations and location in 2020? It is impossible to discern from the Supplemental RI Report (incorporating the Preliminary RI Report) which maps represent the District's current interpretation of the current state of COCs in the South Basin. Without this simple and fundamental component of any RI, it is impossible to move on to an FS, impossible to identify any areas which may require further data collection, and impossible to identify any areas which may require any remedial action. This is merely one example of many contradictions and disagreements between the two documents, but all of them must be explained or reconciled before the process continues.

In addition, the plume contour maps in the Supplemental RI Report improperly combine the subsurface lithologies into two groups (0'-60' bgs; 60'-the basal sand). This oversimplification produces an overestimation and a misrepresentative interpretation of the COC impacts, particularly in areas where COCs are concentrated in the uppermost clayey layer and the area above the vadose zone. Such a misinterpretation will lead to overestimation of the need for remedial actions. Moreover, the maps for the upper 60' zone improperly suggest that COC concentrations depicted occur down to 60' bgs when, in many cases, the data point used to produce the map is for a much shallower depth.

In addition, the different subsurface lithologies produce entirely different fate and transport rates and processes. For example, the shallowest clay layer that exists throughout the Study Area produces much slower migration than the first sandy layer, which in many places resides more than 35' bgs. Mapping these layers as one misrepresents the fate and transport processes, rates and outcomes for the COCs depicted.

As the Regional Board has commented, a much more refined vertical definition of the various layers is required if the Supplemental RI Report is to be useful and NCP compliant. It must evaluate and depict all of the hydrostratigraphic layers. It must also account for their variability across different parts of the Study Area; the layering in the Central area is likely to differ significantly from the layering in the Southern area, yet the Supplemental RI Report fails to analyze the import of these differences for fate and transport or future remedial activities.

In addition, as the Regional Board requested, the Supplemental RI Report must include updated figures for each portion of the Study Area (Western, Central, Northeastern, Eastern and Southern), including contour maps for each HSU and detailed cross-sections downgradient of all "source sites".

**B. The Supplemental RI Report fails to adequately define the geographic scope of its assessment and to distinguish the area it is concerned with from the area it is leaving to others to remediate.**

The Supplemental RI Report does not adequately evaluate the current and planned remedies at the many sites currently overseen by DTSC and the Regional Board, especially the past, current and potential future positive effects of remedial activities on areas which are off the properties of those conducting those activities. The District must specifically evaluate the past, current and potential future positive effects of remedial activities for each cleanup site to determine what those effects will be on the extent and nature of COCs associated with each cleanup site. The Supplemental RI Report fails to do this. It merely lists cleanup sites and notes the remedial activities of each site in Appendix M, but it entirely fails to analyze, assess, evaluate or otherwise determine any of the outcomes of those remedial activities. A properly conducted RI must include such an evaluation in order to ensure that a clear and accurate picture of the actual extent and real impact of COCs is developed. We note a series of major problems with the overall approach and lack of geographic definition or consistency.

First, major departures between the methodology and approach of the Preliminary RI and the Supplemental RI Report exist with regard to the division of the so-called “Study Area” into five separate geographic regions. Although this five “study area” approach and methodology was used extensively in the Preliminary RI and various figures attached thereto, it appears to be tacitly abandoned in the Supplemental RI Report. This new approach, made without formal explanation to the stakeholders, limits our ability to comment—Is this indeed a new approach, or are the commenting stakeholders to assume that the five study areas (Central, Eastern, Southern, Western, and Northern) are still viable in the overall approach? This is a fundamental question.

Second, the Supplemental RI Report does not address another major scope question—the issue of the “excluded” area that was previously prepared by the Regional Water Board in the form of a map adapted from Hargis Fig. 3-2. The Regional Board modified Figure 3-2 and entitled it “Summary of Source Site Groundwater Remediation and Carve-Out Areas to Be Excluded”. But, in the Supplemental RI Report, Figure 3-2 is abbreviated and simply entitled “Summary of Source Site Groundwater Remediation”. Thus, the scope of the Supplemental RI Report is unclear—does it now include areas that were previously designated by the District as “to be excluded”? If it does not include those areas, then how can the District explain that this is consistent with its prior discussions with the Regional Board?

Third, the Supplemental RI Report incorrectly conflates “off-property” with “off-site.” At many of the cleanup sites currently overseen by DTSC and the Regional Board, the “sites” includes areas both on and off of those properties. This approach is consistent with the definition contained in the NCP, which provides: “On-site means the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action.” (NCP, 300 C.F.R. section 300.5). The District appears, however, to consider any “off-property” area to be “off-site.” This is inaccurate and produces an incorrect picture of the nature and extent of COCs requiring action. The Supplemental RI Report must first define the precise scope of the “problem” it is attempting to address. Defining that problem as “off-site” areas which have COCs in them creates a problematic overlap between the DTSC / Regional Board sites currently or historically under remediation and the areas beyond those sites which the District apparently wants to evaluate. As the State Water Board noted in a February 2020 meeting with the District: “SWRCB noted the importance of considering on-site monitoring well network and referenced incorporating performance monitoring wells on-site. Knowing the source site water quality will provide insight into what will eventually be seen downgradient.” (There is also the question of whether the District’s identification of the “problem” is accurate, which leads to the question of whether there is a problem requiring any action by the District in the first place.)

Fourth, the Supplemental RI Report does not address the detailed comments of the Regional Water Board issued on November 21, 2019 related to data gaps in the RI. Instead, the District urged that the Regional Board defer its requests for further data in the RI on the grounds that “that level of granularity” was not necessary for the District. (District letter dated Dec. 9, 2019). Whatever that phrase means, the undersigned commentators note that until the District seriously addresses the observed data gaps in various areas in the South Basin that the Supplement RI is substantially incomplete. This observation is consistent with the concern raised by the Regional Board in its memorandum summarizing a February 2020 meeting with District staff and consultants in which the Regional Board noted in part: “Hargis mentioned that the remedial design will identify additional data gaps that will be filled prior to design of an interim remedy. The Regional Board raised a concern that since the grant is for an RI/FS only, a remedial design and subsequent documents will not be submitted for comment and review.”

Thus, there is considerable, indeed extreme, uncertainty, for any commentator as to the exact scope and proposed extent of the Supplemental RI Report. Does it really include what the Regional Board previously designated as the “to be excluded” area? Does it really attempt to include what the Preliminary RI defined as separate “study areas?” Does the commentator need to address the contradiction in the

Supplemental RI Report between its treatment of “off-site” versus the broader definition of “on-site” as contained in the NCP?

**C. The Supplemental RI Report’s fails to adequately review, analyze and discuss the purported “source sites” remediation activities.**

“The Supplemental Remedial Investigation Report, after repeated conversations between OCWD and our [Regional Board] staff and more than four years since the previous 2015 Preliminary Remedial Investigation Report was prepared, still has not incorporated all ongoing Source Site remediation. This must be completed before the FS is undertaken.” (Regional Bd. letter of July 11, 2019 at p.2). The commentators agree with this observation made by the Regional Board and add the following additional points.

The Supplemental RI Report barely acknowledges or addresses past and ongoing remediation at individual “source sites.” This information is essential for understanding whether COPCs are likely to migrate downgradient from individual “source sites.” For example, the Gallade remediation system is not acknowledged in the Supplemental RI Report, even where groundwater plumes are described in the northern portion of the SBGPP. In this specific case, without an understanding of the Gallade remediation system, the Supplemental RI Report may come to erroneous conclusions about hydraulic gradients and transport pathways in the vicinity of the Gallade “source site,” and the need for groundwater remediation immediately downgradient of that area.

Similar to the above is the extensive 20-plus years of on and off-site remedial efforts related to DRSS’s 2040 East Dyer site (2040 Site). COPC mass reduction has been substantial, well over 90 percent. Because of this, in various ways the Regional Board has validated DRSS’s approach and results, including asking the District to remove the 2040 Site’s remedial areas from the RI and or the upcoming FS. This fact should be highlighted specifically in the Supplement RI.

The Supplemental RI Report’s Appendix M does not adequately summarize the groundwater source remediation. Instead, it merely lists some activities at some remediation sites. It provides no qualitative or quantitative assessment of the effects, influence, scope or effectiveness of those activities and thus the necessity of any additional activities.

The Supplemental RI Report fails to assess the effects, influence, scope or effectiveness of past and ongoing remedial activities at many sites in the South Basin. Without such an assessment, it is impossible to conclude that any additional activities by the District are even necessary.

The Supplemental RI Report fails to adequately acknowledge, let alone evaluate, past and ongoing remediation at individual “source sites.” Such evaluations are crucial to understanding whether COCs are likely to migrate downgradient from individual “source sites” at volumes and concentrations which may require further action. They are also necessary to determine whether the entities cleaning up their sites have obligations to address such future migration as part of their remedial plans or orders. In addition, these evaluations are also necessary to determine what the Regional Board and DTSC are likely to require of the responsible parties if such migration occurs and if migrating COCs require further remedial actions. The Supplemental RI Report fails to adequately describe what specific COC migration would trigger what specific response by the responsible parties, the Regional Board and/or DTSC. The Supplemental RI Report appears to mistakenly assume that any COCs present off the properties of entities conducting cleanups require action by the District and that such COCs are not being addressed by those entities, the Regional Board and/or DTSC. Without careful evaluation of each ongoing and planned cleanup, the District simply cannot reasonably make such an assumption.

As an example of the Supplemental RI Report’s failure to evaluate ongoing remediations, the Supplemental RI Report fails to acknowledge, let alone evaluate, existing groundwater remediation activities, including those with significant capture zones, effects on hydraulic gradients and limitations on transport pathways; the Sabic, Gallade, Embee, Campbell Trust, Textron and ITT sites come to mind. Similarly, the Supplemental RI Report fails to evaluate the effectiveness of Regional Board-approved *in situ* remedies, such as those being implemented by DRSS for the 2040 Site.

Despite repeated comments by the Regional Board (7-25-2018; 7-11-2019; 3-26-2020), the Supplemental RI Report still has not incorporated, assessed, analyzed, described or evaluated ongoing Source Site remediation plans, activities, effects and histories. These must be completed before any feasibility study is undertaken to ensure that an accurate and complete understanding of the nature, extent and likely future movement of COCs is developed.

The Supplemental RI Report failed to consider all available and relevant data for the Study Area. It did not adequately consider data from “source sites”, despite significant investigative work at these sites over decades. Furthermore, the vast majority of investigative work at these sites were completed under Regional Board or DTSC oversight over both. Incorporating these data would result in a more accurate and representative conceptual site model (CSM) for the South Basin. The Supplemental RI Report’s failure to incorporate these data into the CSM has produced a flawed and unrepresentative CSM.

The CSM as presented is largely based on qualitative observations and does not analyze, assess, or evaluate the outcomes of remedial activities performed at many sites and the effect on the extent and nature of the identified COCs. Supporting figures (e.g., Figure ES-6) do not present quantitative hydraulic gradient values, but rather an oversimplified conceptual model of hydrogeologic conditions under static non-pumping conditions. As a result, these figures and the CSM do not reflect influence on gradients as a result of the groundwater extraction systems for sites actively remediating. More significantly, the CSM is fundamentally based on overgeneralized conclusions which flow from hypotheses and assumptions not supported by any data or analyses.

The Supplemental RI Report does not incorporate the most current data. As a consequence, potentially relevant changes in current conditions may be missed in the various analyses performed as part of the RI. Multiple source sites are actively implementing remedial actions, and these actions, coupled with natural attenuation, affect the occurrence of contaminants in groundwater. This means that the Supplemental RI Report fails to reflect current conditions. As an example, the Supplemental RI Report does not include or consider a significant soil removal action at the Gallade property. That action removed more than 1,000 cubic yards of contaminated soil, yet the Supplemental RI Report failed to consider the affects this removal action will have on the risk of any migration of COCs on the Gallade site. The Regional Board previously provided the District with a similar comment on the inadequacy of the Supplemental RI Report’s use of current data.

The Supplemental RI Report failed to include data from all potential “source sites”. For example, the Supplemental RI Report did not include data from the 2215 S. Standard Avenue, Santa Ana site (“Standard Site”). That data includes multiple investigations completed to date, such as monitoring well installations, membrane interface probes and cone penetrometer testing (MIPs/CPTs), and ongoing groundwater quality monitoring. Similarly, the Supplement RI Report fails to include data related to the former Kaiser Electroprecision site at 17000 Red Hill Ave., Irvine (“Kaiser Site”), e.g., while identifying the Kaiser Site in Table 3-2, there are no maximum concentrations listed in Table 3-3. For these and other reasons, the Supplemental RI Report’s failure to include such data produces an incomplete and inaccurate picture of the Study Area, the extent and nature of COCs and a flawed CSM.

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**D. The Supplemental RI Report lacks sufficient data quality assessment, data quality control and analysis of the comparability of data from multiple sources, time periods and sample collection methods.**

The Regional Board has commented, “The preparation of the FS should follow U.S. Environmental Protection Agency's (U.S. EPA's) “Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA.” (Regional Bd. letter July 11, 2019). The referenced EPA guidance document (1995) specifically recommends that for both the RI and FS the initial scoping work should focus on Data Quality Objectives (DQOs). (EPA Guidance at Chap. 2, p.1.) It appears that the RI process did not include DQOs or any other quality assessment and quality control (QA/QC) process intended to ensure that the dataset used for Hargis’ analysis actually included comparable data.

The Supplemental RI Report relied on data from multiple and vastly differing sources to build its dataset. However, that dataset includes data from multiple types of sampling methods which are not equivalent (e.g., groundwater monitoring vs. cone penetration testing; grab samples vs. composite samples).

The Supplemental RI Report defines Operable Unit 2 (OU2) as, “groundwater contamination in the Shallow Aquifer System off-property of numerous groundwater contamination source sites located within the SBGPP Study Area where groundwater contaminant plumes emanating from individual source sites have migrated and commingled.” The so-called OU2 dataset, however, includes on-property soil and groundwater data, which it uses to define off-property contamination.

**E. The Supplemental RI Report fails to analyze, identify and follow up on data gaps.**

The Regional Board previously identified multiple data gaps in Hargis’ dataset and analyses. (Regional Bd. Letter dated Nov. 21, 2019). The Supplemental RI Report does not address these data gaps. In addition, the Supplemental RI Report identifies a long list of “source sites” spread throughout the South Basin but does not identify the obvious data gaps downgradient of many of these sites. For example, Appendix J depicts a number of sites which appear contained but the Supplemental RI Report fails to identify the areas downgradient of them as data gaps which must be filled in order to determine whether COCs from these “source sites” are migrating downgradient: LNN Costume Shop site; Rheem Metals;

Engineering Plating; Griswold Controls; Gallade Chemical, Inc.; Arco Welding Manufacturing; Micromotors (Prodex); and others.

The Regional Board has previously identified data gaps that include data for the L&N Costume Services site (1602 East Edinger Blvd) and the Barlen Enterprises site. The Supplemental RI Report must evaluate these sites and identify all data gaps associated with potential downgradient contaminants. The Regional Board has suggested that these sites are sources of COCs that have migrated and commingled with downgradient plumes, but the Supplemental RI Report fails to evaluate this possibility.

**F. The Supplemental RI Report fails to adequately consider and discuss natural attenuation and other fate and transport processes.**

The Supplemental RI Report describes some ways in which COCs might hypothetically move out of the groundwater confined in the Shallow Aquifer in the South Basin. These include extraction wells at site cleanups, potential flow of shallow groundwater into storm channels in the southern area of the Study Area, and potential flow of shallow groundwater beyond the Study Area to the south.

But, the Supplemental RI Report fails to address other data and information show that there is no threat that material amounts of shallow zone contamination will move downward to the principal zone. These include the following.

- According to Figure 5-12 in the Supplemental RI Report, no VOCs in the 100-foot bgs or below area near the basal sand layer were detected at the MCL level or above.
- There is an upward vertical gradient within much of the shallow zone in the Study Area that constitutes a hydraulic barrier to the downward migration of dissolved COCs from the Shallow Aquifer System. Specifically, this reality exists downgradient of the 2040 Site, as depicted by the District here in Figures 7-1 and 4-9K (and acknowledged in many OCWD-related witness depositions well-known to the District).
- Releases of chlorinated VOCs into South Basin groundwater began 60 years ago, tapered off during the 1990s, and ended in the 2000s. Over those six decades, detections of VOCs in the Principal Aquifer are limited to a single detection above MCLs once at a single production well, a well which had construction or maintenance defects that permitted the flow of groundwater through a particular monitoring or video tube that has since been corrected.

Therefore: 1) there is time for the current and planned site remedies to contain and eliminate VOC mass in the shallow zone to further reduce any remote threat to the

principal; and 2) natural attenuation is a reasonably protective remedy for large parts of the South Basin “study area”. The District itself has settled several lawsuits providing for a cessation of groundwater remediation when it has achieved levels 4 times the pertinent MCLs and Anthony Brown’s “5 times MCL” benchmark<sup>1</sup> for areas to leave to monitored natural attenuation (MNA) is realistic.

**G. The Supplemental RI Report’s lack of a fate and transport analysis and discussion is fatal.**

The future masses and concentrations of COC plumes anywhere in the South Basin depend on the ongoing and future remedial actions at “source sites” (including both on- and off-property remedial activities). The Supplemental RI Report, however, entirely fails to analyze the fate and transport of these COCs. While the Supplemental RI Report includes an overly generalized textbook description of chemical fate and transport mechanisms, it entirely fails to include any analysis of any of the specific “source sites” listed in Appendix M, the expected ongoing contribution of COCs from each of these sites to the areas of concern to the District, the resulting masses and concentrations of COCs in those areas, the data gaps in those areas, the standards for determining whether such areas require further assessment or action, and the effects of natural attenuation and other processes on such areas. Without a fate and transport analysis, there is no basis to evaluate the effectiveness of past, current, and future remedial actions at all of the “source sites,” the COC concentrations in the areas of concern to the District, or to establish the necessity and locations of potential remediation areas in any future FS.

The obvious way to address the lack of a fate and transport analysis is to develop a fate and transport model. While it appears from the District’s and Hargis’ past statements that Hargis was planning to develop such a model, none is included in the Supplemental RI Report. If the District truly wants to conduct a useful RI, it must construct an adequate fate and transport model.

**H. The Supplemental RI Report contains numerous technical problems, such as incorrect data in tables, improper combinations of data and other issues.**

We leave it to those with expertise to identify specific technical problems with the Supplemental RI Report. However, even lacking such expertise, we have identified

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<sup>1</sup> The District’s expert and RI consultant Anthony Brown has previously opined that it is appropriate to leave contamination in place at concentrations of VOCs five (5) times the relevant MCL as those can be successfully by MNA as a remedial action.

several obvious technical problems with the Supplemental RI Report's methods and conclusions.

The Supplemental RI Report improperly combines distinct portions of the Shallow Aquifer in its evaluation of groundwater surface and resulting groundwater flow directions and paths. The Supplemental RI Report's examines layers that it labels the "upper portion" and "middle portion" of the "Shallow Aquifer System", but its dataset combines high permeability layers with lower permeability sand horizons at depth to construct a groundwater surface map. This produces an incorrect result. For example, where wells from which samples are taken are screened in different portions of the Shallow Aquifer System that have separate groundwater flow characteristics. Thus, the Supplemental RI Report improperly mixes data from distinct groundwater flow systems and thereby misrepresents groundwater levels and flow directions.

**I. The District's RI process lacks any guiding regulations promulgated by the District, any guiding orders from DTSC or the Regional Board and any oversight by any experienced environmental remediation agency.**

We are concerned that whatever Hargis or the District may say in the Supplemental RI Report about the District's ongoing investigation and apparently planned remediation in the South Basin, there is no enforceable oversight of the District. The undersigned commentators are all currently subject to oversight by DTSC, but that agency has not been involved in the current Supplemental RI Report or any prior draft. There is no order in place requiring the District to conduct this investigation or, indeed, to do anything. Instead, the District created a "project" named the "South Basin Groundwater Protection Project" to pursue an effort that was originally started as and continues to be directly tied to ongoing litigation the District filed against many South Basin companies and property owners. The District has promulgated no administrative rules or processes for pursuing this Project or investigations generally.

The District's creation and use of the South Basin SAG is one example of how the District appears to be inventing this process as it goes along. Only now, years after it began its process of planning for and then conducting its RI process, is it seeking input from the South Basin SAG. There are no standards, regulations, policies or guidelines, however, that identify the process the District intends to use to consider these comments and others being submitted by interested parties. The District is putting the cart before the horse by proceeding with an RI without having developed, promulgated or distributed information about the process it intends to use to conduct such RIs. This means that stakeholders like us have no idea what to

expect when, how to participate effectively or how the result will be produced or enforced. Such uncertainty inevitably creates suspicion, concern and disputes.

## **II. SPECIFIC COMMENTS ABOUT LANGUAGE OR SECTIONS OF THE SUPPLEMENTAL RI REPORT**

### **A. The Supplemental RI Report fails to explain or identify specific “source sites” which have purportedly had plumes of COCs “migrate away” and “commingle” with other “source sites” plumes.**

The Supplemental RI Report, Executive Summary at page ES-3 states, “Plumes of groundwater contamination emanating from chemical releases at individual source sites within the Study Area have migrated away from their source areas and in many cases have commingled to form a broad expanse of groundwater contamination in the Shallow Aquifer System....” This statement is not supported by any analysis or discussion. It is overly general and fails to address, identify or assess the “source areas.” It asserts that commingling of plumes has occurred but fails to connect specific “source areas” to specific “source sites” or other unidentified sources. It also appears to ignore those areas where remediation activities are planned, ongoing or have been completed. The statement is qualitative in nature and does not appear to be supported by any analysis or discussion. It asserts that commingling of plumes has occurred, but fails to connect specific “source areas” to specific “source sites” or other unidentified sources.

Given the above, the Supplemental RI Report is inadequate and does not accurately represent actual, current conditions in the South Basin. As such, the CSM is inaccurate and incomplete. In addition to the exclusion of a large volume of data that are readily available, the Supplemental RI Report’s assertion that plumes from “source sites” are commingling is fatally flawed because it is so general as to be useless in actually identifying which “source sites” are purportedly contributing to these “commingled” plumes.

This statement should be deleted.

### **B. Supplemental RI Report Figure ES-6 fails to distinguish “source sites” from “off-site areas” and OU2 COCs.**

Supplemental RI Report Figure ES-6 illustrates the Supplemental RI Report’s and the District’s failure to distinguish “source sites” from “off-site” areas. The District has consistently failed to distinguish between those ongoing remediation “sites”, which specifically include both on- and off-property areas, and its stated concern with “off-site” COCs only. This figure does not distinguish sites from “off-site” areas,

let alone clearly and specifically delineate the precise geographic extent of the District's "OU2." Without a clear distinction between "source sites" and their overall remediation areas, it is impossible for Hargis, the District, the Regional Board, DTSC or anyone to understand the nature and extent of OU2 COCs, any necessity for any remedial activities to address such OU2 COCs or the appropriate process or jurisdiction to examine or address such COCs.

Figure ES-6 should include sites with ongoing remediation, sites with containment COCs within their site boundaries (whether on- or off-property) to adequately depict the full range of actual site conditions within this conceptual site model of groundwater. Finally, the production well depicted in Figure ES-6 should be shown as a potential conduit for vertical short-circuiting based on reported conditions within IRWD-3 in the past.

Figure ES-6 should be corrected.

**C. The Supplemental RI Report improperly assumes an "interim remedy" is required and fails to include the analyses necessary to assure that any such remedy will "not compete with" ongoing groundwater source remediation.**

The Supplemental RI Report, Sec. 1.1 at page 2, states, "The Interim Remedy is meant to complement, not compete with, on-going groundwater source remediation being implemented under the oversight of RWQCB and ... DTSC..." Given that the Supplemental RI Report fails to analyze any of the source site remedies, as described above, and fails to include a fate and transport analysis, this statement is unsupported. Hargis and the District cannot know or determine that any "Interim Remedy" is even necessary, let alone will "not compete with" ongoing cleanups at many sites throughout the South Basin. In addition, this statement indicates that the District is violating the NCP by presuming that an "Interim Remedy" is actually necessary in the Study Area. The District cannot presume a remedy is even necessary before it completes the RI portion of the process; indeed, it may identify many areas where no remedial activity is necessary.

In addition, the Supplemental RI Report fails to adequately describe what is meant by the phrase "not compete with" or to identify any areas where this might potentially occur. Because the Supplemental RI Report fails to analyze ongoing or past "source site" remedial activities, capture zones, containment areas, remaining on-site COCs post-remediation or any other components of past, planned or ongoing site remediations, it is impossible to the District, Hargis, the Regional Board, DTSC or any of the source site remediation consultants or owners/operators to determine the risk of such "competition." How can the District know whether there is any risk

of such “competition” if it does not understand, analyze or describe the “source sites” remediations and remedial action plans? It cannot.

This statement should be deleted.

**D. The Supplemental RI Report fails to identify what geographic locations are contained in OU2 as distinct from “source sites”.**

The Supplemental RI Report, Sec. 1.2.1 at page 3, fails to distinguish between “source site” contamination and off-property contamination. It states that, “The occurrence, nature, magnitude, and extent of groundwater contamination in the Shallow Aquifer System being addressed as part of OU2 threatens water quality in the underlying Principal Aquifer System that is used extensively for domestic water supply...” This statement is entirely unsupported in the Supplemental RI Report.

While the Supplemental RI Report seems to suggest that “source sites” are not part of OU2, the it fails to identify those “source sites” with ongoing groundwater remediation and containment and separation from the purported OU2 commingled plume area. It fails to confirm that such “source sites” are not contributing to OU2 groundwater, which requires further remediation. Indeed, it is impossible to tell exactly where OU2 begins or what “commingled plumes” it actually includes.

Without a clear and precise description and mapping of the exact boundaries of OU2, it is impossible to determine whether any portions of OU2 require any further investigation; contain data gaps; require further analyses; may require remediation; or what or how remedial alternatives would be identified, much less selected and implemented. The District must clearly distinguish all areas subject to current remedial action plans from OU2. The District must clearly distinguish all areas within the reach of current remedial activities, including pump-and-treat systems, soil vapor extraction systems and any other active remedial measures from OU2.

The statement that groundwater contamination “threatens water quality in the underlying Principal Aquifer System” is also unsupported in the Supplemental RI Report. Nowhere does the Supplemental RI Report actually evaluate the nature, extent and level of risk of the purported “threat.”

The Human Health and Ecological Risk Assessment (HHERA) by Fick & Associates attached to the Supplemental RI Report relies on hypotheticals, assumptions and statements by others to evaluate the purported risk to a theoretical resident drinking directly from the Shallow Aquifer, despite the fact that nobody drinks from or is likely to drink from that Aquifer. The HHERA does not analyze the likelihood of the threat it cites nor does the Supplemental RI Report. The Supplemental RI

Report cannot circularly rely upon or cite the HHERA to identify “threat” of the Principal Aquifer.

The statements should be deleted.

**E. The Supplemental RI Report fails to assess the nature, extent and results of historic and ongoing remediation activities at “source sites”.**

The Supplemental RI Report, Sec. 3.1 at page 16, states that, “Many of the responsible and potentially responsible parties at identified source sites had been conducting individual site-specific assessment and limited remediation activity for some number of years, typically under the direction of local or State regulatory authorities, including local fire departments, the OCHCA, RWQCB, and/or DTSC.” This statement is inaccurate and unsupported in the Supplemental RI Report.

As discussed above, the Supplemental RI Report fails to actually assess the nature, extent and results of historic and ongoing remediation activities at all of the “source sites” it identifies. How can Hargis conclude that these activities have been “limited”? Some sites have been conducting remediation for decades and have removed most of the COC mass at those sites. Some sites have agency approved remediation plans and/or are conducting on-going remediation activities. Some sites have been cleaned up and received closure determinations from the Regional Board or DTSC. This statement illustrates the inadequacy of the Supplemental RI Report’s evaluation and consideration of the historic, ongoing and planned remedial activities in the South Basin.

The statement should be deleted.

**F. The Supplemental RI Report fails to identify, let alone describe, how any prior “source site” assessments were “insufficient”.**

The Supplemental RI Report, Sec. 3.1 at page 17, states that, “Assessment activities at individual source sites within the Study Area available at that time were typically insufficient to characterize the lateral and vertical extents of contamination in off-property groundwater.” This statement is unsupported and without a basis or methodology to describe it in the Supplemental RI Report.

There is no analysis of “individual source sites” contained in the Supplemental RI Report, as described above. Without analysis, how can Hargis conclude that prior assessments at such sites were “insufficient”? As part of historic and ongoing remediation activities in the South Basin, many sites prepared site assessments,

conceptual site models, remedial action plans and other analyses, which includes characterizing the lateral and vertical extent of COPCs associated with those sites. Those “sites” included “off-property groundwater.” For example, the site assessments and/or conceptual site models developed for the following sites all includes assessment of “off-property groundwater”: Campbell Trust, Embee, Gallade, Soco West, Textron, Diceon, ITT, Sabic, and others. There is no basis identified, let alone described, in the Supplemental RI Report to conclude that any of these assessments or conceptual site models were “insufficient.” Instead, this appears to simply be the District’s preference in order to justify its own separate and independent investigations, which were never coordinated with any of those sites’ investigations, let alone the Regional Board or DTSC’s preferences for how to further assess any “off-property” areas specific to any of those sites.

Without an analytical basis, data and evaluations necessary to make this statement, this statement should be deleted.

**G. The Supplemental RI Report affirms that a thick region-wide aquitard underlies the entire Study Area, but then improperly and without evidence concludes that there is a threat to the Principal Aquifer from shallow COCs without actually analyzing or explaining the role of this aquitard.**

At pages ES-4 & 27, the Supplemental RI Report indicates that “the overall integrity of the aquitard that separates the Shallow Aquifer System from the underlying Principal Aquifer System is indicated by the steep downward vertical hydraulic gradients that are induced across the aquitard as a result of large-scale regional groundwater extraction from the deeper aquifer systems.” This makes sense, and it points to the fact that the aquitards between the Shallow and the Principal and Deep Aquifers are very thick, composed of very low permeability materials, and thus not conducive to transport. The Supplemental RI Report notes at page 26 that, “the top of the aquitard underlying the Shallow Aquifer System and separating it from the underlying upper portions of the Principal Aquifer System was encountered at depths ranging from about 134 to 162 feet bls. The thickness of the aquitard ranged from about 22 to 44 feet.” This is indeed a very thick aquitard. The Supplemental RI Report, however, then concludes that there is a threat to the Principal and Deep Aquifers without analyzing or explaining the role that this aquitard plays in preventing COCs at specific locations at relatively shallow depths (less than 80 feet bls, generally) from being transported vertically downward.

This failure to analyze the role of the regional aquitard in separating the Shallow and Principal Aquifers, and the distinct groundwater chemistry, groundwater sources, infiltration, recharge and other ongoing processes that differ above and

below that aquitard, means that the Supplemental RI Report's conclusion is fundamentally lacking in support. The District cannot assess any threat to the Principal Aquifer without fully analyzing or explaining the role and processes affected by the regional aquitard. Indeed, the District and water providers have long publicly stated that the regional aquitard protects the Principal and Deep Aquifers from shallow contaminants.

**H. The Supplemental RI Report lacks any analyses or description of relationship between Principal and Deep Aquifer water sources and areas with COCs at shallow depths in the South Basin.**

Section 4 of the Supplemental RI Report fails to analyze or describe the relationship between the water sources for the Principal and Deep Aquifers (including recharge rates, infiltration rates and source areas, flow volumes from source areas) and water from the Shallow Aquifer within the Study Area. Such analyses and description are necessary to identify and quantify any risk that COCs could reach, let alone be detectable should they reach, the deeper aquifers from the upper 100' bgs of the Study Area.

In order to determine the potential environmental and health risks of COCs in the shallow depths of the Study Area, it is necessary to answer and assess whether the public water supply wells receive any, let alone a meaningful amount of, water from the Shallow Aquifer within the Study Area, including from areas in the shallowest 100' bgs. For example, many questions must be analyzed and answered, such as:

- What is the proportion of water that is pumped from the Principal and Deep Aquifers that comes from the upstream recharge zone (Forebay) compared to the Shallow Aquifer, compared to the Shallow Aquifer within the Study Area, compared to those portions of the shallowed depth of the Shallow Aquifer with COCs in groundwater?
- What is the proportion of recharge within the Study Area relative to the recharge in the Forebay and upstream recharge?
- How much new water comes in from the surface to the Shallow Aquifer, relative to that coming from upgradient recharge?

Without evaluating these questions and related source water issues, the Supplemental RI Report lacks any understanding, description or evaluation of the fate and transport and risk relationships between areas with COCs at shallow depths in the South Basin and the Principal and Deep Aquifers. Section 4 is thus

entirely inadequate to support any conclusion that the Principal and Deep Aquifers are at risk from COCs in the shallowest portion of the Shallow Zone at specific locations within the Study Area.

The Supplemental RI Report must directly assess and connect actual COCs at actual locations in the Study Area with actual transport pathway(s) and then determine the concentrations and mass such COCs will have once they reach (if they ever reach) the Principal and Deep Aquifers. If, for example, COCs exist at 4 times the MCL in a specific location within the Study Area and are then transported from that location to the Principal Aquifer and then are transported towards a water supply well, the Supplemental RI Report must assess the likelihood that such COCs will ever reach, let alone, be detectable at, a given water supply well. Even if, for example, TCE at 20 parts per billion (ppb) has been detected at a given location in the Study Area, there would be multiple processes operating on that TCE as it migrated downward. The Supplemental RI Report fails to assess such fate and transport processes or the likelihood that those processes will enable any COC to be transported hundreds of feet vertically, pass through the regional aquitard, be dispersed within the Principal Aquifer and reach any water supply well. The Supplemental RI Report's failure to conduct any such assessment is fatal to its usefulness and its compliance with any reasonable RI standard or NCP requirements.

**I. The Supplemental RI Report fails to identify any cones of depression for any ongoing remediation systems, fails to account for such cones of depression and fails to depict them.**

The Supplemental RI Report's Figures ES-3, 4-2, 4-4, and 4-6 present the overall hydraulic gradient in the "Shallow Aquifer System", but do not take into account the cones of depression at active groundwater remediation sites within the Study Area, including Gallade, ITT and any others which may be operating in the South Basin. The Supplemental RI Report's failure to analyze or include such cones of depression (and the related capture zones of groundwater remediation systems) presents an inaccurate depiction of the hydraulic gradients within the Study Area. This is yet another example of how the Supplemental RI Report's failure to examine, analyze and describe the varied remedial activities at "source sites" creates further inaccurate and incorrect analyses and conclusions about the various hydrogeological and fate and transport processes in the Study Area. The Supplemental RI Report cannot present an accurate depiction of the current hydrogeological conditions in the Study Area if it fails to consider and incorporate the effects and effectiveness of ongoing remediation systems.

The cones of depression at sites in the Study Area are well documented in monitoring data available from Regional Board and DTSC sources (and already contained in the District's and Hargis' databases). It is important to present the known information accurately to understand the fate and transport of COCs at different sites and throughout the Study Area, as well as for the risk assessment. The District cannot understand or assess the risk that COCs from a given location will migrate to the "off-property" areas it is purportedly interested in protecting without understanding the localized hydraulic gradients at those locations. The Supplemental RI Report instead improperly assumes that a generalized, Study Area-wide depiction of the hydraulic gradients is sufficient to identify areas which will require further investigation or potential remedial activities, but this flawed logic only emphasizes the problems created by the District's failure to assess "on-site" COCs, fate and transport processes, and the impact and effectiveness of ongoing and planned remediation activities.

These figures must be corrected or removed.

**J. The Supplemental RI Report incorrectly depicts "off-site" plumes as commingled and improperly identifies "source sites" which are depicted as detached from other sites' purported plumes.**

The Supplemental RI Report incorrectly depicts "off-site" plumes and also presents interpretations of plume contours which are internally inconsistent and contradictory. For example, the Supplemental RI Report's Figures 5-2 to 5-11, and Figures ES-5 and ES-7, depict a plume of COCs at the Gallade site as detached from the rest of the "off-site" plumes depicted to the purportedly "downgradient" direction, generally south. Given this depiction, the Gallade site cannot be considered a "source site" under the Supplemental RI Report's own definition of "source site," i.e. a site with a plume that has moved downgradient and is commingled with other plumes from other sources.

This also highlights a problem throughout the Supplemental RI Report, its failure to analyze source site data, remediation activities and histories and analyses to identify sites with effective remediation activities, which prevent any actual threat to downgradient areas.

The Supplemental RI Report's identification of Gallade as a "source site" should be removed from the Report. There is no basis provided or described in the Report for that identification.

**K. IRWD-3 data does not support Supplemental RI Report's statement that COCs migrated to that well in the Principal Aquifer.**

At page ES-8 of the Supplemental RI Report, the Report notes that, "it is possible that the detections of COCs in IRWD-3 were a result of migration of COCs from the Shallow Aquifer System to the Principal Aquifer System through former wells." Since the detections at IRWD-3 were confined to that location, it is instead likely that the COCs detected in that well migrated down through IRWD-3 from an extremely localized source. Past evidence and IRWD's own analyses of that well indicate as much. Prior to rehabilitation, IRWD's consultant, Richard C. & Associates LLC, analyzed data collected by IRWD and concluded that the well exhibited high total dissolved solids (TDS), sulfate (SO<sub>4</sub>), and perchlorate (ClO<sub>4</sub>) concentrations. Those concentrations reflected the geochemistry of the Shallow Aquifer, not the Principal or Deep Aquifer, and thus it is apparent that Shallow Aquifer groundwater was entering the well as a result of flaws in the well itself. A video examination of the site tube disclosed flaws (cracks) and apparent inflow at shallow depths. This pathway also appears to be the most likely pathway for COCs to enter the well from shallow depths, which indicates a local source. The Supplemental RI Report, however, fails to address this assessment, which IRWD itself considered in determining that it was appropriate to rehabilitate IRWD-3. Instead, the Supplemental RI Report improperly assumes that COCs detected years ago in that well (pre-rehabilitation) can only have traveled to that well within the Principal Aquifer. There is no data, analyses or lines of evidence (aside from the detections themselves) to support such a hypothesis. Instead, IRWD's data and analyses indicate a very local, shallow source. The most obvious is the Textron site.

In Figure 2-5, the data indicate that although IRWD-3 has been actively sampled and also pumped for water supply purposes by IRWD, TCE, PCE and 1,4-dioxane have not been detected in that well, with a few extremely low exceptions pre-rehabilitation. This raises many questions the Supplemental RI Report must answer, but fails to, including the following:

- If there was a significant plume originating in the Shallow Aquifer and reaching the Principal Aquifer through some as-yet unidentified pathway, wouldn't the concentrations continue to be detected at notable concentrations? Given that IRWD-3 and nearby wells have been operated as groundwater production wells, thereby drawing groundwater in the Principal and Deep Aquifers towards them, how does Hargis explain the lack of flow of such COCs to IRWD-3?
- How could a significant plume, if it existed, have such fast breakthrough and then no detections for years?

- If an “active” pathway existed via an abandoned, unidentified former agricultural well from the Shallow Aquifer to the Principal Aquifer and then to IRWD-3 existed, wouldn’t one observe detections of COCs following that pathway over the past decade?
- Given IRWD’s own data and analyses, isn’t the most likely source of COCs historically detected in IRWD-3 a very local, shallow source like the Textron site?

The Supplemental RI Report fails to address these obvious and crucial questions and this issue. Figure 2-5 should be deleted or amended.

**L. The data indicate that groundwater flow in the Shallow Aquifer is horizontal, not vertical.**

At page 29 of the Supplemental RI Report, Hargis notes that, “Water levels, horizontal directions of groundwater flow, and horizontal hydraulic gradients in the upper and lower portions of the Shallow Aquifer System within the Study Area have remained fairly uniform over time.” Hargis also notes that, “Comparison of water level hydrographs and water level elevation contour maps indicates that the magnitude of vertical gradients within the Shallow Aquifer System are much less than those between the Shallow Aquifer System and the underlying Principal Aquifer System.” Thus, most of the flow observed by Hargis in the data is horizontal in the Shallow Aquifer System. Given this, the Supplemental RI Report fails to explain the basis for its conceptual site model showing vertical flow as an “active” pathway from the Shallow Aquifer through the regional aquitard to the Principal Aquifer. There is no data or analyses in the Supplemental RI Report to support this statement.

The conceptual site model’s depiction of vertical flow down through the regional aquitard should be deleted.

**M. TDS and other constituents of Shallow Aquifer groundwater are not detected in the Principal Aquifer, yet one would expect them if an “active” pathway in fact existed.**

In Section 4.2.2., page 31 of the Supplemental RI Report, Hargis notes that the water quality in the Shallow Aquifer is poor due to high TDS, hardness, and nitrates. If there is indeed an “active” pathway and any significant transport from the Shallow Aquifer to the Principal or Deep Aquifers, why is it not reflected in the water quality of those aquifers?

One would expect to see the signature of the Shallow Aquifer in the Principal and Deep Aquifers if an “active” pathway existed, as the Supplemental RI Report proposes in its conceptual site model. The Supplemental RI Report must analyze and explain this lack of a signature of Shallow Aquifer constituents in the Principal and Deep Aquifers. Indeed, IRWD rehabilitated IRWD-3 due to the detection of precisely this Shallow Aquifer groundwater signature in IRWD-3 (see Richard C. Slade & Associates’ report on well rehabilitation). IRWD-3 was improperly leaking Shallow Aquifer groundwater into the Principal Aquifer and IRWD was detecting the signature of Shallow Aquifer constituents in that well. After IRWD rehabilitated that well, that signature vanished.

The Supplemental RI Report fails to evaluate the groundwater chemistry differences between the Principal and Shallow Aquifers. Such an analysis should be conducted. If Shallow Aquifer groundwater (whether carrying COCs or not) was following some unidentified “active” pathway down into the Principal Aquifer, the Shallow Aquifer’s signature chemistry would have been detected (along with any COCs). It has not. The lack of any analysis of this issue is further evidence that COCs have not reached the Principal Aquifer or followed that path to IRWD-3.

**N. The Supplemental RI Report identifies no evidence of COCs below 100 feet bgs and no actual threat to deeper groundwater.**

At page 41 of the Supplemental RI Report, Hargis summarizes the findings of contamination at depth: “There were approximately 16 sample locations located at depths greater than 100 feet below ground surface (Figure 5-19E). Of these, none showed increasing, indeterminate or stable trends. One of the sample locations within this interval had a decreasing concentration trend, which had concentrations equal to or below the respective MCL or NL. Approximately 15 of the sample locations had non-detectable concentrations or mostly non-detectable (less than four samples with a principal COC detection), of which none of the samples had detections greater than the MCL or NL, 5 of the samples had one or more detections that were less than or equal to the MCL or NL, and the remaining samples had no detectable concentrations.”

These data indicate that there is no evidence of contamination below 100 feet bgs. Hargis has delineated the vertical extent of contamination in the entire Study Area to be within the top 100 feet or less. Indeed, in the interval between 75 to 100 feet below ground surface, out of nine monitored locations, only one had increasing concentrations, and three had non-detectable concentrations (Figure 5-19D). Thus, with one exception, there is no evidence of substantial downward migration within the entire Study Area. Given this, the Supplemental RI Report’s conclusion that

there is a threat to the Principal Aquifer is highly hypothetical and unlikely, yet the Supplemental RI Report describes an “active” pathway between the Shallow and Principal Aquifers. There is no actual data to support the existence of such a pathway. The Supplemental RI Report must acknowledge this.

**O. The Supplemental RI Report’s figures are internally inconsistent and should be corrected.**

Figure 9-1 of the Supplemental RI Report does not accurately reflect the situation indicated in Figures 5-2 to 5-11. Figure 9-1 should be corrected to depict the same finding as for the individual COCs. The plume depicted by Hargis at the Gallade site is detached from the other sites.

The Supplemental RI Report should be corrected so that its figures are not internally inconsistent.

**P. Figure 9-1 does not support the Supplemental RI Report’s statements that former wells have created direct pathways through the regional aquitard.**

At page 54 of the Supplemental RI Report, Figure 9-1 is used to support the statement that, “the presence of former wells of unknown condition throughout the Study Area, particularly in areas where the upper/middle portion of the Shallow Aquifer System contains elevated concentrations of COPCs, likely have created multiple direct pathways for contamination to reach the Principal Aquifer System”. Figure 9-1 cannot be used to support this statement, since one cannot identify any “former wells of unknown condition” in the “upper/middle portion of the Shallow Aquifer System” that “likely have created multiple direct pathways for contamination to reach the Principal Aquifer System”. A conceptual diagram is not a fact or data point; without actual data points, this statement is an unsupported hypothesis.

Figure 9-1 should be deleted.

**Q. The Supplemental RI Report fails to adequately explain or analyze fate and transport processes that will affect COCs in the Study Area.**

At page 51 of the Supplemental RI Report, Hargis indicates that, “Advection of COPCs in groundwater downgradient of source properties within the Study Area is anticipated to be the predominant transport process for COPCs”. While advection is typically a predominant transport process in higher permeability media close to COC sources, with increasing travel distance dispersion becomes more significant

until it ultimately becomes the dominant process. Retardation is also significant to fate and transport of COCs, particularly in the shallower media in the South Basin, which consist of much more clayey, fine grained materials. COCs sorb strongly to the clays and other soils with high organic content in the Study Area. This will slow down their transport substantially and a key aspect in considering transport. In addition, while biodegradation may be secondary close to a COC source, over time and travel distance, this process becomes increasingly important.

The Supplemental RI Report fails to account for or analyze these other processes as they are components of fate and transport, to varying and specific degrees locations throughout the Study Area. The Report must address these other processes to explain how they are expected to affect the COCs of concern to the District. Without adequate analysis of the roles played by the other processes, the Supplemental RI Report is fatally flawed.

**R. The Supplemental RI Report fails to identify data gaps.**

At page 57, the Supplemental RI Report indicates that, “Data gaps that pertain to the preferred interim remedy will be identified and summarized in the FS Report.” It is necessary to identify any data gaps explicitly in this document, first to acknowledge them, and second to guide the investigation prior to any FS. If an FS is going to be performed with substantial data gaps, it will not produce a good outcome.

The current listing of data gaps is very generic and should focus on establishing whether the hypothesis that surface contamination is reaching the production aquifers in any substantial amount and more precisely locate any pathways for transport downward, since the current evidence is lacking in this regard, as Hargis admits. The analysis should also consider and evaluate remedial actions that are currently being taken at source sites and determine whether actions in those areas are effective in reducing potential risk to the deeper aquifers.

**S. The Supplemental RI Report fails to adequately analyze and discuss back diffusion.**

At ES-7, the Supplemental RI Report states that, “matrix back diffusion from source areas can also serve as a prolonged source of elevated concentrations of COPCs from source properties to downgradient off-property locations.” The District thus acknowledges that “back diffusion” can occur in the Study Area’s soil matrices, but the Supplemental RI Report fails to actually analyze the affects back diffusion are expected to have on any of the COCs that may be transported from “source properties”. Without such analysis of each “source area”, the Supplemental RI

Report cannot accurately describe the likelihood that any particular source area will “serve as a prolonged source” of COCs in downgradient off-property locations. The lack of any fate and transport model or other analysis of the impact back diffusion will have on source area concentrations and future migration to off-property locations means that the Supplemental RI Report fails to a sufficient picture of the future of COCs in the Study Area to be able to conduct an FS.

**T. The Supplemental RI Report fails to explain the purpose and use of its table of on-site data.**

Section 3.1, Page 18, of the Supplemental RI Report states, “Table 3-3 provides a summary of maximum concentrations of contaminants detected in groundwater samples collected from on-property at the respective source site properties, available data compiled by The District database contractor, and in some cases obtained from the GeoTracker Site in November 2018.” Since the District has stated that its RI is only addressing properties that are not “source sites” or “source areas”, it is unclear why the District has included these data. The District must explain the purpose and use of these data.

**U. The Supplemental RI Report fails to support its assertion that biodegradation is not affecting COCs.**

Section 7.0, page 52 of the Supplemental RI Report states, “Given the extent and concentrations of TCE, PCE, 1,1-DCE and 1,4-dioxane detected in groundwater downgradient of source area properties, it is expected that intrinsic biodegradation is not a dominant process affecting these COCs in groundwater.” There is no basis for this statement. Decreases in concentration are seen across the Study Area away from individual “source sites” and Hargis has not provided any analysis of the degree of biotic versus abiotic degradation that results in these decreasing downgradient concentrations.

This statement should be deleted.

**V. The Shallow Aquifer System is not a useable drinking water source.**

Section 7.0, page 52 of the Supplemental RI Report states, “An unrestricted use of groundwater within the Shallow Aquifer System would result in ingestion, dermal, and inhalation exposure to consumers. These pathways and exposures are considered as part of the HHERA (Section 8).” The statement about use of the Shallow Aquifer System for unrestricted use, including drinking water, does not comport with Hargis’ description in Section 4.2.2 of the Supplemental RI Report, which states that “Ambient, non-point source, water quality conditions in the

Shallow Aquifer System within the Study Area is characterized based on a variety of inorganic water quality indicators principally including TDS, hardness, chloride, sulfate, and nitrate. Results of testing indicate that water quality in shallower groundwater is generally poor with several indicators detected at concentrations greater than applicable secondary drinking water standards; and that ambient water quality in the Shallow Aquifer System generally improves with depth (Piper, A.M., et al., 1956; Aquilogic, 2015; Avocet, 2018). The available data suggest that elevated nitrate concentrations, and in some cases the occurrence of low but detectable concentrations of some compounds such as perchlorate, arsenic, selenium, and hexavalent chromium may be attributable to natural conditions or may result from non-industrial non-point source impacts from agricultural activity or other processes.”

There is no evidence of unrestricted use of Shallow Aquifer System groundwater, as the HHERA admits. The HHERA is purely a hypothetical exercise. The HHERA’s author admitted during his deposition that the HHERA is hypothetical in that it assumes the existence of a hypothetical resident who will hypothetically drink from a hypothetical drinking water well pulling groundwater directly from the contaminated portion of the Shallow Aquifer. There is no evidence that anyone will be likely to, able to or allowed by any oversight agency or municipality to use Shallow Aquifer System groundwater. The HHERA admits as much.

The Supplemental RI Report must be corrected to indicate that the existing, natural water quality of the Shallow Aquifer System is poor; that it is not useable as a drinking water source; that nobody presently uses it as a drinking water source; that nobody is likely to be able to or allowed to use it as a drinking water source in the future; and that the HHERA is a hypothetical exercise, not data or evidence of actual risk to human health or the environment.

In addition, the HHERA should be rejected for all of the above reasons.

**W. There is no basis for the statement that abandoned wells will act as vertical conduits.**

Section 9.1.3, page 55-56 of the Supplemental RI Report states, “Given the steep downward hydraulic gradient there is a high likelihood that one or more of the many abandoned and likely improperly destroyed water supply wells in areas where elevated concentrations of COPCs occur in the upper/middle portion of the Shallow Aquifer System will act as conduits for the transport of potentially substantial concentrations of contaminants from the Shallow Aquifer System vertically downward into the underlying Principal Aquifer System.” There is no evidence,

analysis or demonstration that this statement that there is a “high likelihood” of these former wells acting as conduits is accurate.

While IRWD-3 has been identified as a vertical conduit between the Shallow and Principal aquifer zones, IRWD rehabilitated that well so that it could no longer serve as a conduit.

This statement should be deleted.

**X. No correction of surveys that used different benchmarks.**

Appendix E, Table E-1 of the Supplemental RI Report provides a summary of reference point elevations for evaluation. However, in addition to the vertical datum, different surveys can utilize different regional benchmarks that require correction before comparing elevation points. The Supplemental RI Report’s discussion of reference points does not mention survey benchmarks for the various sites or appear to correct for different benchmarks.

The Supplemental RI Report should be corrected with correction based on the use of differing regional benchmarks.

**Y. The District must analyze and integrate key reports from all “source sites”.**

Appendix M of the Supplemental RI Report contains outdated, incomplete, insufficient and inaccurate information. While the District insists that the focus of the RI is “off-site properties” (i.e., downgradient of source properties), “source site” remediation summaries must be associated with the water quality data collected for both on-site and off-site (off-property) areas. Moreover, the Supplemental RI Report must analyze water quality trends for both in order to provide an accurate picture of current and future expected trends.

As the Regional Board has stated to the District, that the water quality data is directly related. Source site remediation summaries must accurately describe what one can expect to see in terms of the effects of on-site remediation events directly influencing off-site and downgradient water quality data. While Hargis has requested that Regional Board case managers to should provide links to key reports for each site detailing up-to-date remediation, this is insufficient to obtain a complete picture of source sites in the Study Area. DTSC and source site owners/operators/stakeholders should also provide links to key reports to each site. All such reports must be analyzed and integrated into the RI process and the

Supplemental RI Report if it is to accurately describe current water quality trends and depict likely future trends.

Appendix M must be revised and corrected.

**Z. Comment process and response to comments.**

Hargis has indicated to the Regional Board and DTSC that the remedial design will identify additional data gaps that will be filled prior to design of an interim remedy. The Regional Board then raised a concern that since the grant is for an RI/FS only, a remedial design and subsequent documents will not be submitted for comment and review and that comments provided to the District may not be sufficiently addressed nor incorporated into the final document. We share that concern. Any NCP compliant RI must directly and specifically address all stakeholder comments.

**AA. The Supplemental RI Report must include newer wells and on-site wells in order to accurately identify any areas where remediation might be required.**

The Supplemental RI Report arbitrarily screens out newer wells, which have sufficient datapoints (more than 4 sampling events) to prepare a trend and provide more recent water quality data. Filtering this data out is not appropriate. The Regional Board has explained the importance of considering on-site monitoring well networks and incorporating performance monitoring wells located in on-site locations from source sites throughout the Study Area because knowing the source site water quality will provide insight into what will eventually be seen downgradient. We agree with the Regional Board's concern.

The District cannot escape this evaluation by claiming that source property information is beyond the scope of Hargis' RI work or that the FS analysis will assume the source remediation is complete. If the Supplemental RI Report does not take into consideration on-site wells, it will not accurately identify locations where any remedy is needed and instead is likely to inaccurately depict a need for much more remediation than is actually necessary.

**BB. The Supplemental RI Report fails to adequately assess the SAM wells.**

With regards to Section 3.3.1 of the Supplemental RI Report's discussion of "Nested Monitor Well Installation," in contrast to what is stated in the Report, the destruction of well SAM-3/3 cannot "ensure that it was not acting as a potential vertical conduit" (p. 20). While a properly decommissioned well could minimize

future, potential long-term impacts from the well's improper construction, the District has failed to assess what groundwater impacts occurred due to the District's improper construction of well SAM-3/3. Thus, the Supplemental RI Report fails to assess whether or to what extent SAM-3/3 or any other SAM well functioned as a vertical conduit in the past.

Well construction data, presented on Table 3-4, do not indicate the well construction materials. Therefore, it is not clear that well integrity concerns were fully supported or assessed. Furthermore, the well logs presented in Appendix Q are limited to lithological data for wells SAM-1 – SAM-3. The Supplemental RI Report must provide the relevant information and assessment.

**CC. The Supplemental RI Report fails to account for or analyze local conditions in describing the hydraulic gradient within the South Basin.**

With regards to Section 4.2.1, the Supplemental RI Report describes steep downward vertical gradients in the Study Area as a regionally common and prevalent attribute, but fails to account for, describe or analyze local conditions at source sites that do not indicate such a vertical hydraulic gradient. Hydraulic data from the Standard Site, for example, do not support the assertion that steep downward vertical gradients exist throughout the South Basin. Moreover, with minor exceptions, the vertical extent of contamination does extend into the basal sand above the regional aquitard which separates the Shallow Aquifer from the Principal Aquifer.

The Supplemental RI Report asserts that direct communication between local groundwater from the Shallow Aquifer and surface water (i.e., unlined drainage channels) exists, but fails to adequately evaluate this potential pathway. Moreover, the only discussion of this potential pathway is qualitative in nature. As a result, data and analyses are required to substantiate this statement. Hargis' use of "estimated" elevations for these drainage channels further weakens the plausibility of this statement.

**DD. The Supplemental RI Report's failure to analyze the meaning of the lack of COCs in the deeper zones of the Shallow Aquifer calls into question the Report's conclusion about vertical migration and the risk of migration of COCs from shallower depths.**

With regards to Section 5.3, the Supplemental RI Report fails to examine or discuss the import of the lack of COCs in the lower Shallow Aquifer, which indicates a corresponding absence of (or minimal) vertical migration from shallow to deeper

aquifer zones within that Aquifer. If such migration was occurring, one would expect to detect COCs in deeper portions of the Shallow Aquifer based on the Supplemental RI Report's conclusion but the fact that those COCs are not there indicates the flaws in the Report's conclusion.

**EE. The Supplemental RI Report's CSM is fundamentally flawed and the Report's conclusions flowing from it are thus unsupported.**

The Supplemental RI Report's assumption in Section 7.0 that natural attenuation is not dominant or impactful is too general to apply to the overall Study Area. Site-specific data for source sites indicate that natural attenuation is a material factor for the fate and transport of COCs beneath and proximal to sites.

The Supplemental RI Report fails to consider the variability of natural attenuation at different locations in the South Basin. Conditions throughout the South Basin are not be heterogeneous, as reflected in data from many of the individual "source sites".

The Supplemental RI Report states, "An unrestricted use of groundwater within the Shallow Aquifer System would result in ingestion, dermal, and inhalation exposure to consumers. Migration of COCs from the Shallow Aquifer System to the Principal Aquifer System through former wells can also result in a similar exposure pathway. Although not evaluated in the HHERA, it is possible that the detections of COCs in IRWD-3 were a result of this process." This statement presents an oversimplified transport concept. Moreover, it relies on the misinterpretation of what occurred at IRWD-3. There is no evidence to support the conclusion that COCs detected in IRWD-3 followed pathways created by abandoned, improperly closed former agricultural wells. Moreover, this statement is qualitative and without evidence or data to support it; it is a qualitative assumption, not actual data or evidence, and is thus unsupported. The Supplemental RI Report presents no such supporting data, evidence or analysis. One cannot conclude from the mere fact of detections in IRWD-3 that a pathway from former agricultural wells led those COCs to IRWD-3. The more likely pathway, which is supported by multiple lines of evidence discussed elsewhere in these comments, is directly down through IRWD-3's site tube and well bore themselves.

The Supplemental RI Report also states as follows: "Plumes of groundwater contamination emanating from chemical releases at individual source sites within the Study Area have migrated away from their source areas and in many cases have commingled to form a broad expanse of groundwater contamination in the Shallow Aquifer System...". This statement is also purely qualitative. It is not supported by any data, evidence, or analysis. Further, the Supplemental RI Report's failure to

include most of the available investigative data from the individual “source sites” means that this conclusion does not actually consider or evaluate whether “plumes of groundwater contamination” **ARE** “emanating from [any] individual source sites.” The Supplemental RI Report’s failure to incorporate and evaluate these data produces a fundamentally flawed analysis, incorrect conclusions unsupported by actual data or analyses and an inaccurate CSM.

The Report asserts that commingling of plumes has occurred, but fails to connect any specific source areas to specific “source sites” or other unidentified sources. Without any fate and transport analysis of each purported “source site”, the Supplemental RI Report cannot support this statement.

Both statements quoted above should be deleted. They are unsupported assumptions and hypotheses, not data- or evidence-based scientifically valid and defensible conclusions.

**FF. The Supplemental RI Report’s conclusions are unsupported and based on hypotheses and assumptions, not data, evidence and rigorous scientific analyses.**

Section 9 of the Supplemental RI Report contains unsupportable conclusions that are based on assumptions not supported by data, evidence or proper scientific analyses. The Supplemental RI Report asserts that “sufficient data” have been collected, but there is no reasonable basis for this conclusion. Data gaps remain in the Study Area, as discussed above. For example, little to no sampling has been completed in the area immediate north and upgradient of the Standard Site (downgradient from Extruded Plastics), as recommended by the Regional Board. This has been acknowledged in recent report comments. An RI process that relies on and incorporates purely qualitative assumptions and hypotheses, without any analyses of the data and evidence available to test those assumptions and hypotheses is fundamentally flawed. An RI process that fails to carefully assess the easily identified data gaps, such as those noted above, and determine whether those gaps affect the conclusions is fundamentally flawed. And, an RI process that assumes, without any evidence, the existence of a pathway that the data and past analyses do not support, without actually engaging with that data and those analyses, is fundamentally flawed.

Put simply, the Supplemental RI Report is fundamentally flawed. It cannot provide a defensible basis for an FS process. It does not even identify and describe the current nature and extent of COCs in the portions of the South Basin that the District claims to be concerned with. And, most significantly, the Supplemental RI Report’s failure to engage with the deep understanding, datasets, past analyses,

ongoing remedial activities and other information concerning the purported “source sites” targeted by the District dooms the Report to irrelevancy. The District has long ignored the stakeholders’ many attempts to engage and provide input for the District’s RI process. That purposeful decision has doomed the Supplemental RI Report by failing to enable Hargis to utilize the broad depth of experience and expertise that the stakeholders have built up over decades of investigation and remediation activities in the South Basin.

The only way to save the Supplemental RI Report is to begin the RI process with an open, transparent process which engages and utilizes the experienced stakeholders. This is what occurs at typical multiparty sites around the country. Such processes work. The District chose to go it alone, with no experience at such sites.

The District’s choice to build its own bureaucracy and RI process from scratch while ignoring that history and the stakeholders’ experience and skills created the present flawed Supplemental RI Report.

We appreciate the opportunity to provide these comments and look forward to reviewing a revised and updated version of the Supplemental RI Report.

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## Memorandum

Date: August 20, 2020  
To: Mr. Roy Herndon, P.G., C.Hg., Orange County Water District  
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Syed Rehan, P.E. (CA), BCEE, Geosyntec Consultants, Inc.  
From: Ravi Arulanantham, Ph.D., and Anthony Smith, Ph.D., P.E. (CA)  
Subject: Comments on OCWD's Supplemental Remedial Investigation Report  
South Basin Groundwater Protection Project, Operable Unit 2  
July 1, 2020

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Geosyntec has reviewed the Orange County Water District's (OCWD) Supplemental Remedial Investigation Report (Supplemental RI Report) for the South Basin Groundwater Protection Project, Operable Unit 2 (Study Area). The Supplemental RI Report, dated July 1, 2020, was prepared by Hargis and Associates, Inc. (Hargis) on behalf of OCWD. This memorandum presents our comments on the Supplemental RI Report.

### General Comments

*General Comment 1.* The scope of the Supplemental RI is incomplete.

California Health and Safety code section 25322.2 requires that, during the remedial investigation (RI) phase of a project, "the full extent of the contamination" be studied and understood before any Feasibility Study (FS) to select and implement a remedy can proceed. This same comment was memorialized in the July 11, 2019 letter from the Santa Ana Regional Water Quality Control Board (RWQCB) to OCWD. In this letter, the RWQCB wrote as an overall observation, "*after repeated conversations between OCWD and our staff, and more than four years since the previous 2015 preliminary Remedial Investigation Report was prepared, [OCWD] still has not incorporated all ongoing Source Site remediation. This must be completed before the FS is undertaken*". This Supplemental RI Report primarily deals with the off-property contamination emanating from individual sites and does not analyze the full extent and nature of contamination at each individual property, nor the consequences, if any, of on-property remediation impacting the rest of the on-site area (see 300 CFR Section 300.5 for definition of "on-site" pursuant to the National Contingency Plan [NCP]).

This is further validated in the Meeting Minutes from the February 12, 2020 meeting between OCWD and the RWQCB, where Hargis reiterated to the staff of the RWQCB that "*the focus of the SRI [Supplemental RI] is off-site properties and that the on-site data is outside of the scope of work.*" Therefore, the work presented in the Supplemental RI Report does not comply with the

requirements of California Health and Safety code section 25322.2 (which requires the full extent of the contamination to be studied and understood before any remedy can be implemented) and, furthermore, this Supplemental RI Report is not NCP compliant.

*General Comment 2.* The Supplemental RI Report lacks evidence showing impacts to supply wells in the study area.

Throughout the Supplemental RI Report, Hargis' description of the primary threat to the deeper water-bearing zones within the Study Area is solely based on historical impact at a single well, IRWD-3. No additional evidence of deep impacts was produced even after all the new work that was done (i.e., 2017-2019) to substantiate that there is a potential threat to deeper water-bearing zones from the shallow contamination at the individual sites within the Study Area. It is now known that the impact to well IRWD-3 was not due to vertical migration of chemicals but rather due to faulty construction of well IRWD-3. Since the well was repaired, operation of IRWD-3 has resumed (Page 13) and, as shown in Appendix N, volatile organic compounds (VOCs) have not been detected above normal reporting limits (i.e., 0.25 to 0.5 micrograms per liter).

*General Comment 3.* OCWD is "putting the cart before the horse".

The Supplemental RI Report clearly states that the purpose of the remedial investigation is to support an interim remedy for the shallow contamination in order to protect the deeper water bearing zones (according to the Supplemental RI Report, the upper portions of the Principal Aquifer System within the Study Area are generally 176 to 192 feet deep [Page 26]). However, all the RI work has so far shown that the shallow contamination has not migrated vertically within the Shallow Aquifer System beyond a depth of about 100 feet below ground surface (bgs) at nearly all sites. Moreover, source area remediations have not yet been completed at many sites, yet OCWD has already decided that an interim remedy is needed for the off-property shallow contamination in the entire Study Area to protect the underlying Principal Aquifer. This is analogous to "putting the cart before the horse".

### Specific Comments

*Specific Comment 1.* The following statement is not supported by the content provided in the Supplemental RI Report (Page ES-1): *"The occurrence, nature, magnitude, and extent of groundwater contamination in the Shallow Aquifer System being addressed as part of Operable Unit 2 threatens water quality in the underlying Principal Aquifer System that is used extensively for domestic water supply."*

The data show, and the Supplemental RI Report explicitly states, that the "lower portion" of the Shallow Aquifer System is effectively unimpacted (Page 37):

*“Groundwater sample location results for the occurrence and concentrations of principal COPCs detected in the lower portion of the Shallow Aquifer System, generally near or within the Basal Sand (to depths up to about 150 feet bls) are illustrated of [sic] Figure 5-12. Results of the analysis of groundwater samples collected at these locations indicate that TCE, PCE, 1,1-DCE, and 1,4-dioxane were either not detected or detected at a concentration of less than 1 ug/L, with the exception of a singular sample from one location in the heavily impacted area west of SR-55 where 1,4-dioxane was detected at a concentration of 6.3 ug/L.”*

Figure 5-12 indicates that a single, one-time grab sample (CPT-82) located at the northern perimeter of the Cherry Aerospace/Textron property, had a detection of 1,4-dioxane above the Notification Level (NL), which, it should be noted, is a regulatory guideline applicable to drinking water but is inapplicable for shallow groundwater that is not used for drinking water. Moreover, this one location illustrates the problem with the overall Supplemental RI trying to artificially isolate the “on-site” (improperly defined) versus “off-site” impacts. It is our understanding that OCWD has already settled with Cherry Aerospace/Textron with the condition that Cherry Aerospace/Textron conduct on-property and off-property remedial work. OCWD has a right to review and approve the remedial work plans for this site, yet this remedial work is not reflected in Appendix M (e.g., Offsite Interim Remedial Measures Work Plan Addendum, 2018).

The Executive Summary also describes the deep portion of the shallow aquifer as unimpacted (Page ES-9): *“With minor exception, the vertical extent of contamination does not appear to extend into the basal sand that occurs above the aquitard that separates the Shallow Aquifer System from the underlying Principal Aquifer System.”*

The same point is made in the discussion on concentration trends (Page 41):

*“There were approximately 16 sample locations located at depths greater than 100 feet below ground surface (Figure 5-19E). Of these, none showed increasing, indeterminate or stable trends. One of the sample locations within this interval had a decreasing concentration trend, which had concentrations equal to or below the respective MCL or NL. Approximately 15 of the sample locations had non-detectable concentrations or mostly non-detectable (less than four samples with a principal COPC detection), of which none of the samples had detections greater than the MCL or NL, 5 of the samples had one or more detections that were less than or equal to the MCL or NL, and the remaining samples had no detectable concentrations.”* Incorporating the information from Page 37 of the Supplemental RI Report cited above, all detections of primary contaminants of concern in this depth range were less than 1 microgram per liter and were therefore far below the applicable MCL or NL. It should be reiterated, as Hargis indicated on Page 32 of the Supplemental RI Report, that the NL applies only to drinking water and thus is not technically an applicable standard for Shallow Aquifer System groundwater as it is not currently used directly as a drinking water source. As the Supplemental RI Report notes (Page 31), “water quality in shallower groundwater is generally poor” within the Study Area and reflects other pre-industrial contaminants, largely from prior agricultural usage in the area, that makes the water unfit for drinking water purposes.

In addition, the Supplemental RI Report describes an aquitard that separates the Shallow Aquifer System from the underlying Principal Aquifer System:

*“The Shallow Aquifer System is separated from the upper portions of the underlying Principal Aquifer System by a sequence of predominantly fine-grained aquitard material of variable thickness that in large part appears to be laterally continuous across the Study Area.”* The Supplemental RI Report also cites vertical hydraulic gradients across the aquitard as an indicator of the competence of the aquitard (that is, the resistance to groundwater flow vertically through the aquitard) (Page ES-4): *“On a regional scale, the overall integrity of the aquitard that separates the Shallow Aquifer System from the underlying Principal Aquifer System is indicated by the steep downward vertical hydraulic gradients that are induced across the aquitard as a result of large-scale regional groundwater extraction from the deeper aquifer systems, with differences in water level elevations between the Shallow Aquifer System and the Principal Aquifer System frequently greater than 100 feet.”*

Given that the deep portion of the shallow aquifer (1) is effectively unimpacted, (2) shows no evidence of increasing contaminant concentrations over time, and (3) is separated from the underlying Principal Aquifer by an aquitard that appears to be largely continuous across the Study Area, the statement that contamination in the Shallow Aquifer threatens water quality in the Principal Aquifer is not supported by the data presented in the Supplemental RI Report. Rather, the statement relies entirely on historic impacts at IRWD-3 that are attributable to faulty well construction (which has since been repaired) and speculation as to potential vertical transport through conduits created by abandoned wells (e.g., Page ES-8: *“Migration of COPCs from the Shallow Aquifer System to the Principal Aquifer System through former wells can also result in a similar exposure pathway. Although not evaluated in the HHERA [Human Health and Ecological Risk Assessment], it is possible that the detections of COPCs in IRWD-3 were a result of this process.”*) The Supplemental RI Report states that abandoned wells were “likely improperly destroyed” without providing supporting evidence or data, and furthermore provides no documentation of OCWD attempting to locate these abandoned wells and verify that they were, in fact, improperly destroyed.

*Specific Comment 2:* The Supplemental RI erroneously characterizes the vertical extent of contamination in the study area.

Appendix A, Section 1.3 of the Supplemental RI Report states *“Collectively, these monitoring wells have identified contaminant concentrations exceeding one thousand times drinking water standards (i.e., Maximum Contaminant Levels [MCLs]) in shallow groundwater (i.e., less than 100 feet bgs).”* This statement is incorrect — there is no sample at a depth near 100 feet bgs with concentrations exceeding one thousand times drinking water standards. The statement should be reworded to distinguish the maximum depth of contaminant concentrations exceeding one-thousand times drinking water standards from the thickness of the shallow groundwater.

*Specific Comment 3:* The Supplemental RI Report states “OCWD is addressing this threat by conducting an RI/FS in support of an interim remedy for OU2 groundwater contamination”. Typically, completion of the NCP process leads to selection and implementation of a final remedy. It is unusual to complete a FS for selection and implementation of an interim remedy. The Supplemental RI Report should be revised to describe the final remedy for OU-2 and/or discuss the approach for developing a final remedy for OU-2.

### *Closing*

As outlined above, the Supplemental RI is incomplete and many data gaps remain. Hargis has not sufficiently evaluated the remedial work that is planned or already begun at source sites within the Study Area for their effectiveness at reducing contamination in the Shallow Aquifer System. Additionally, the vertical transport of contaminants from the Shallow Aquifer System to the Principal Aquifer System through the soil matrix or conduits created by wells that Hargis assumes are improperly abandoned is unverified and not supported by evidence or data. Currently, there is no evidence that the Principal Aquifer System is contaminated within the Study Area as a result of contaminant migration from the Shallow Aquifer System. Moreover, a quantitative risk assessment evaluating the potential vertical transport of shallow contaminants, and the resulting threat to the Principal Aquifer System that serves as a drinking water supply, has not been conducted. Rather, the risk assessment in the Supplemental RI Report evaluates only the contamination that impacts the shallow groundwater, which is neither currently used as a drinking water source nor likely to be used as a drinking water source in the future due to degradation by both industrial and non-industrial constituents. Because of these deficiencies, the Supplemental RI fails to satisfy the requirements of California Health and Safety code section 25322.2 and the NCP. Contrary to the requirements of the NCP process, OCWD is already describing an interim remedial action in this Supplemental RI Report for the shallow groundwater contamination within the Study Area prior to completing RI activities.

\* \* \* \* \*

August 20, 2020

**VIA E-MAIL AND U.S. MAIL**

rherndon@ocwd.com

Mr. Roy Herndon  
Chief Hydrogeologist  
Orange County Water District  
18700 Ward Street  
Fountain Valley, CA 92708

Re: **JULY 2020 SOUTH BASIN SUPPLEMENTAL REMEDIAL  
INVESTIGATION REPORT**

Dear Mr. Herndon:

Orange County Business Council (OCBC) appreciates the opportunity to submit these comments on the Orange County Water District's July 1, 2020 *Supplemental Remedial Investigation Report, Orange County Water District, South Basin Groundwater Protection Project, Operable Unit 2* (Supplemental RI). We are responding to your circulation of the Supplemental RI to the South Basin Advisory Group on July 8, 2020 requesting comments.

A clean and reliable water supply is integral to Orange County's economic prosperity and high quality of life, integral to OCBC's mission. Furthermore, the need to foster public agency cooperation on legacy clean up sites, not burden economic activity during these times of financial strain must be considered in light of the role the private sector has long played in remediation. OCBC underscores the importance of responsibly managing and protecting groundwater in the South Basin to meet the critical needs of Orange County's diverse business community and economic development priorities.

OCBC sees three major problems with the Supplemental RI and the long process that produced it:

1. The Supplemental RI fails to assess the effects, influence, scope or effectiveness of the past, ongoing and planned future remedial activities at the many sites in the South Basin that have cleaned up or continue to clean up contaminants. Without such assessments, it is impossible to determine what, if any, additional cleanup activities might be necessary.
2. The Supplemental RI does not adequately consider whether natural attenuation is a reasonably protective remedy for large parts of the South Basin.
3. The District failed to consult with the public about the nature and scope of any of the investigations described in the Supplemental RI.

### **SITE REMEDIAL WORK IN THE SOUTH BASIN**

As Orange County Water District ("OCWD") is well aware, the Santa Ana Regional Water Quality Control Board ("Regional Board") and California Department of Toxic Substances Control ("DTSC") are overseeing the ongoing remediation of many sites in the South Basin, and have overseen closure of sites previously cleaned up. These sites include areas both on and off the properties of those conducting the cleanups. These two agencies are designated as the primary oversight agencies for these cleanups, and they should continue to take the lead in evaluating the cleanups to determine whether any other actions are needed. OCWD should avoid duplicative activities, and especially activities that interfere with those ongoing cleanups. Such interference would only slow those cleanups, making them more difficult and costlier.

Despite their obvious importance, the Supplemental RI does not adequately evaluate the historic, current and planned site remedies, especially the past, current and potential positive effects of those remedial activities on areas which are outside the property boundaries of those who conducted or are conducting the cleanups. OCWD should specifically evaluate the past, current and potential future positive effects of remedial activities for each cleanup site to determine what those effects will be on the extent and nature of contaminants of potential concern ("COPCs") associated with each cleanup site, including areas that are within and outside of each property boundary. Instead, the Preliminary RI merely lists cleanup sites and notes the remedial activities of each listed site in Appendix M, but fails to analyze, assess, evaluate or otherwise determine any of the outcomes of those remedial activities. A properly conducted remedial investigation must include such evaluations in order to ensure that a clear and accurate picture of the nature and extent of COPCs is developed for the next step, the determination of whether a feasibility study ("FS") is necessary and, if one is, its extent.

Further, the Supplemental RI incorrectly conflates "off-property" with "off-site." At many of the cleanup sites currently overseen by DTSC and the Regional Board, the "sites" include areas both on and off the properties of those who conducted or continue to conduct cleanups. OCWD appears, however, to consider any "off-property" area to be "off-site." This is inaccurate and produces an incorrect picture of the nature and extent of COPCs that might require further action. The Supplemental RI must first define the precise scope of the "problem" it is attempting to address, those areas which are not presently within the scope of any site's remedial action plan or planned future cleanup activities.

As you are aware, the Regional Board recently evaluated some of the current remedies being implemented at sites in the southeastern region of the South Basin and determined that they should be excluded from OCWD's "Study Area". While the Regional Board did not evaluate other parts of the Study Area, when the same standards are applied to the other parts, it is apparent that the rest of the Study Area should also be excluded. The Supplemental RI fails to evaluate this issue, but it must.

### **POTENTIAL FOR NATURAL ATTENUATION**

The Supplemental RI depicts an area of groundwater with COPCs in the South Basin's Shallow Aquifer about three miles long north to south, and a mile wide east to west laterally. Vertically, there are no COPCs below 100' bgs, and none near the basal sand at the bottom of the Shallow Aquifer System.

At the same time, the Supplemental RI's plume maps (in Appendix J) indicate that the COPC concentrations in large parts of the shallow portions of the Shallow Aquifer are less than five times maximum contaminant level ("MCL") for any given COPC. According to OCWD's own RI/FS consultant and expert witness Anthony Brown, it is reasonable to refrain from active cleanup in areas with such low concentrations, and to leave them to monitoring and natural attenuation. Yet, the Supplemental RI fails to adequately evaluate or discuss the effectiveness of natural attenuation in those areas.

The Supplemental RI acknowledges that COPCs move out of the South Basin's groundwater in three ways: (1) extraction wells for cleanup sites; (2) flow of shallow groundwater into storm channels; and, (3) flow of shallow groundwater out of the area to the south. The Supplemental RI also acknowledges that some fate and transport processes for the COPCs occur in the South Basin.

But the Supplemental RI fails to provide a quantitative evaluation of the amounts of COPCs exiting the South Basin through the site-related extraction wells or the channels, or by flowing out of the area to the south. It also fails to provide an adequate fate and transport analysis of COPCs in the South Basin over time, including the effects of ongoing concentrations of COPCs purportedly migrating off the "source sites", and natural attenuation of COPC concentrations on and downgradient of each of the "source sites". Without such evaluations in the final RI, any FS cannot fairly consider the potential for monitoring to natural attenuation as a reasonable remedy for large parts of the South Basin.

### **PUBLIC CONSULTATION AND PARTICIPATION**

OCWD began its remedial investigation in the South Basin in 2007. Yet the first time it held a Stakeholder Advisory Committee meeting was in October 2019. Until that time, while OCWD occasionally released some information about its South Basin investigations public, it never afforded local governments within the county, or organizations or members of the public an opportunity to comment on any of the plans for or results of its investigations.

All the investigations on which the Supplemental RI now relies occurred well before the initial October 2019 meeting. OCWD planned for, designed, installed and sampled the first set of SAM wells in 2009. It planned for, designed, installed and sampled 200 CPTs between 2009 to 2013. It planned, prepared and released its Preliminary Remedial Investigation Report in October 2015. It planned, prepared and released its Field Sampling Plan for the Supplemental Remedial Investigation in May 2017, and planned, designed and installed a second set of SAM wells that summer. It shared drafts of its Supplemental RI with the Regional Board and DTSC, but did not make them available to the public. Yet, for none of these investigation efforts and documents did it once seek review and input from the many local governments, public entities

Page Four  
August 20, 2020  
Mr. Roy Herndon

like water providers, organizations such as mine, property owners and operators, or affected residents.

From this history, it is clear that the OCWD failed to consult with or seek comment from the public on any of the scoping and planning for the investigations and analyses that comprise the current Supplemental RI. Because of this failure, OCWD's South Basin remedial investigation fails to comply with the National Contingency Plan. More significantly, this failure is bad government. Government must be transparent and must actively involve all stakeholders in planning and deciding how to best spend public dollars and best protect important public water resources.

### **CONCLUSION**

The Supplemental RI does not consider the effectiveness of past, current and planned site cleanups in the South Basin. And it does not fairly assess the future effects of natural attenuation of COPCs. Therefore, the document is inadequate in itself, and cannot serve as a basis for an evaluation of remedial alternatives in a subsequent Feasibility Study.

OCWD should complete its current, if belated, consultation with local governments, civic organizations, and members of the public about these and other problems with the Supplemental RI. The District then must prepare a new RI that cures all problems identified, in continuing consultation with the public and all stakeholders.

We will continue to work closely with our members, local governments, other civic organizations and the public to promote good government and sound public policy that protects our drinking water resources. The Supplemental RI, unfortunately, must be substantially reworked in order to reach that goal.

Very truly yours,



Lucy Dunn  
President and Chief Executive Officer  
Orange County Business Council

LD:l

Cc: Jennifer Ward, Senior Vice President, Government Affairs, OCBC

August 21, 2020

Roy Herndon  
Chief Hydrogeologist  
Orange County Water District  
18700 Ward Street  
Fountain Valley, CA 92708

Dear Mr. Herndon,

This letter provides comments on the July 1, 2020 Supplemental Remedial Investigation Report, Orange County Water District, South Basin Groundwater Protection Project, Operable Unit 2 (Supplemental RI Report) prepared by Hargis + Associates, Inc. (Hargis) for the Orange County Water District (District). Based on your email dated August 4, 2020, it is my understanding that the comment period is open until August 21, 2020.

**Comment #1 – No Interference with Ongoing Offsite Remedies**

Exec Summary (ES-2, paragraph 1) states:

*“OCWD is conducting the SBGPP RI/FS in cooperation with DTSC and RWQCB to develop an interim remedy or remedies (Interim Remedy) to address chemical contaminants that have impacted groundwater in the Study Area (i.e. contamination that has migrated off of source sites where releases have occurred and are commingled downgradient), and to do so in a manner consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations [CFR], Part 300), commonly referred to as the National Contingency Plan or NCP. The Interim Remedy is meant to complement, not compete with, on-going groundwater source remediation being implemented under the oversight of RWQCB and DTSC.”*

The third line of the paragraph above refers to “source sites” and the last sentence refers to “groundwater source remediation. The Supplemental RI Report should state that OCWD’s Interim Remedy will not interfere with off-site groundwater remediation being conducted under RWQCB supervision, such as that being carried out south of the former GE Plastics site, in addition to stating that the Interim Remedy will “complement, not compete with, on-going groundwater source remediation being implemented under the oversight of RWQCB and DTSC.” This clarification would eliminate the reading that OCWD’s Interim Remedy could interfere with remediation of groundwater that is not categorized as “source” remediation.

This clarification would be consistent with the previous agreement between RWQCB and OCWD where OCWD agreed it would not interfere with ongoing offsite remedies being implemented by responsible parties.

OCWD's "Revised Draft Supplemental Remedial Investigation Report" (SRI), submitted on December 26, 2019, Appendix R, Response to Comment 8 states:

*"It was agreed that the RWQCB-SA would identify off-property areas that they believe should be excluded from analysis as part of the FS. It is anticipated that this will be provided in the first quarter of 2020 to maintain schedule for FS."*

On February 3, 2020, RWQCB responded to this comment by stating:

*"Attachment 1 depicts the off-property areas that we believe should be excluded from analysis of the FS."*

Attachment 1 of RWQCB's February 3, 2020 letter shows a large area, mostly to the east of the SR-55 corridor, where ongoing offsite remediation is already being implemented by private parties under the oversight of RWQCB.

***It is requested that the OCWD Supplemental RI Report be revised to reflect:***

- 1. The input from RWQCB that the area shown in OCWD's February 3, 2020 letter (Attachment 1) should be excluded from analysis of the FS; and***
- 2. OCWD's previous agreement not to interfere with ongoing remedies (onsite and offsite) being implemented by other parties, in particular, the offsite remedy that is being implemented to clean up perchlorate from the former GE Plastics site at 1831 Carnegie Ave site.***

## **Comment #2 – Remediation Progress Being Achieved by Private Parties**

The July 11, 2019 Comment from RWQCB states:

*"The Supplemental Remedial Investigation Report, after repeated conversations between OCWD and our staff and more than four years since the previous 2015 Preliminary Remedial Investigation Report was prepared, still has not incorporated all ongoing Source Site remediation."*

The February 3, 2020 comment from RWQCB states:

*“Appendix M Summary of Groundwater Source Remediation – This appendix does not provide sufficient detail to identify the source area remediation that is occurring in order to design an appropriate and complimentary interim remedy. The details provided on individual source sites were either entirely incorrect or remain outdated.”*

Appendix M of the Supplemental RI Report does include a summary of some limited historical and current remediation activities at the various Source Sites in the South Basin. In most cases, these brief summaries include several sentences copied and pasted from technical reports submitted by the Responsible Party to RWQCB. Note however, in most cases (if not all), there is no description of the remediation progress that has been made by private parties, for example, in the case of remediation of perchlorate from the LNP site. To illustrate, at the former GE Plastics site (Facility ID No.7), Appendix M, Section 2.5, does not include any progress summary from the recent quarterly monitoring reports submitted to RWQCB to inform the reader of the following:

**Onsite:**

- Off-site migration of perchlorate-impacted groundwater has been stopped by Phase 1 groundwater extraction and treatment and Phase 2 remedial activities in the EX1 area.
- As of first quarter 2020, groundwater concentrations of perchlorate greater than 100,000 micrograms/liter ( $\mu\text{g/L}$ ) has been completely eliminated by successful remedial actions. The area where perchlorate concentrations remain above 10,000  $\mu\text{g/L}$  has been reduced more than 95%, and the area of groundwater impacted with concentrations of perchlorate greater than 100  $\mu\text{g/L}$  has been reduced by approximately 80% to date.
- A 94-percent decline in the maximum perchlorate concentration has been achieved in groundwater on site and the more than 95% concentration reduction in wells immediately downgradient.
- Maximum percent reductions in perchlorate concentration average more than 98% at the extraction wells (excluding the relatively new well EX7). Four of the seven Phase 1 extraction wells have shown maximum percent reductions exceeding 99%.

**Offsite Area:**

- Perchlorate concentration contours for the first and second water-bearing zones immediately downgradient of the perchlorate remediation biobarrier along Deere Avenue reflect the fact that the biobarrier has since its installation been destroying perchlorate in second water-bearing zone groundwater that passes through it.

- Complete (100%) reduction of perchlorate has already been achieved at 31 of the 36 wells for the biobarrier performance monitoring programs and reduction to a concentration below 6 µg/L has been achieved at two additional locations. In the future, with ongoing maintenance of the biobarrier via reinjection of EVO, complete perchlorate reduction is expected to be observed at wells farther downgradient of the biobarrier as remediated groundwater flows from the line of biobarrier injection points to these downgradient wells. Perchlorate reductions are generally expected to occur sooner in downgradient wells closer to the line of biobarrier injection points than wells located further downgradient.

Through its oversight role, RWQCB is aware of the above summarized remediation progress being made by private parties in relation to perchlorate from the former GE Plastics site at 1831 Carnegie Ave site in both on-site and off-site areas. To be accurate and complete in describing the nature and extent of contamination, this progress should also be summarized in the Supplemental RI Report.

***It is requested that a summary of the progress of the perchlorate remediation achieved and continuing at the GE Plastics site at 1831 Carnegie Avenue should be added to Appendix M so the reader of the OCWD Supplemental RI Report can properly put into context the efforts being achieved by this private party remediation program.***

### **Comment #3 – Use of Outdated Data No Longer Representative of Current Conditions**

Referenced in Section 3.1 (Source Identification and Characterization), Table 3-3 provides a summary of Maximum Concentrations of Compounds of Potential Concern detected in On-Property Groundwater at Identified Source Locations. In some cases, the Maximum Concentrations listed in Table 3-3 are more than 15 years out of date, do not reflect current conditions, do not reflect the progress of remediation that has been accomplished since the historic maximum concentrations were originally measured, and do not present an accurate basis for the development of remedial alternatives or the selection of a preferred alternative on the basis of any Feasibility Study (FS) using the RI as a foundation. For example, at the former GE Plastics facility (Facility ID No. 7), OCWD's Table 3-3 presents a maximum perchlorate concentration of 690,000 ug/L. Missing from this data presentation is the fact that that measurement occurred on June 3, 2004 at extraction well EX3, and after many years of active remediation at the GE Plastics site, the perchlorate concentrations in well EX3 is now approximately 96% lower in 2020 sampling events.

***It is requested that Table 3-3 be revised to reflect current and relevant conditions of Facility ID No. 7 (former GE Plastics Site).***

#### **Comment #4 – Offsite Remediation Being Implemented by Private Parties**

Section 3.2 (Source Control Groundwater Remediation) states the following:

*“The current status of groundwater source remediation efforts at selected source properties has been compiled based on available documents on Geotracker and Envirostor as of September 2019 (Appendix M). The location and general types of groundwater remediation conducted in the SBGPP has been summarized (Figure 3-2). These groundwater remediation activities have been and/or are being overseen by the RWQCB or DTSC. These agencies ensure that these remedial actions are or will be effective in providing source control to mitigate continued contaminant migration from on-property to downgradient areas.”*

This text and Figure 3-2 are limited to the locations where onsite remediation has or is being implemented but it does not reflect the locations where offsite remediation has or is being implemented.

***It is requested that OCWD amend the text description in Section 3.2 and Figure 3-2 to include the types and locations where offsite perchlorate remediation is being implemented under RWQCB supervision related to the former GE Plastics site at 1831 Carnegie Avenue.***

#### **Comment #5 – Misalignment of COCs in SRI vs. HHERA**

Section 5.2 of the Supplemental RI Report (Principal Compounds of Potential Concern for this Report) – states that five compounds, TCE, PCE, 1,1-DCE, 1,4-dioxane, and perchlorate, are referred to as “principal COPCs” for further discussion of the nature and extent of off-property contamination in Shallow Aquifer System Study Area. Adequate justification for the inclusion of these five compounds and the exclusion of other compounds is not provided.

The July 1, 2020 Human Health and Ecological Risk Assessment (HHERA) (Appendix K to the Supplemental RI Report) states:

*“The top ten risk-driving COPCs for cancer endpoint (ILCR values) are as follows:*

- 1. 1,2,3-Trichloropropane (1,2,3-TCP);*
- 2. Benzene;*
- 3. Chromium (Hexavalent);*
- 4. Vinyl chloride;*
- 5. Tetrachloroethene (PCE);*

6. Trichloroethylene (TCE);
7. Dichloromethane;
8. Naphthalene;
9. Arsenic; and
10. 1,2-Dibromoethane (EDB).

*The top ten risk-driving COPCs for noncancer endpoint (HQ values) are as follows:*

1. Trichloroethylene;
2. Benzene;
3. Diesel Range Organics;
4. Gasoline Range Organics;
5. Arsenic;
6. 1,1,2-Trichloroethane (1,1,2-TCA)
7. TPH-g;
8. p-Bromofluorobenzene;
9. Naphthalene; and
10. Hydrogen Sulfide.”

The HHERA does not list perchlorate as a principal risk driver.

***It is requested that OCWD remove perchlorate as a “principal COPC” in the Supplemental RI Report to be consistent with the HHERA since the HHERA has not identified perchlorate as a principal constituent driving risks and the Supplemental RI Report does not present environmental reasons for naming perchlorate as a “Principal COPC” based on current, accurate, and complete data.***

*In all aspects, including scope, focus, selection of the chemicals to be sampled for, and data presentation, the Supplemental RI Report and the predecessor documents upon which it is based, should be based exclusively on environmental and human health factors and should not be shaped by a predetermined preference for a particular remedy such as groundwater extraction, conveyance to a central location, and use in the Groundwater Replenishment System*

*This letter incorporates the facts and other points made in the general South Basin comments of Gallade Chemical, Inc. et al on the Supplemental RI but not necessarily all of the arguments and ultimate conclusions.*



**SRDC | Comments on July 1, 2020 Draft SRI**  
South Basin Groundwater Protection Project

Please let me know if you have questions or need clarification on any of my comments in this letter<sup>1</sup>.

Thank you,

A handwritten signature in black ink, appearing to read "John Wood", with a stylized arrow-like flourish extending to the right.

John Wood  
President  
Split Rock Diversified Corp.

cc: Nick Amini – Santa Ana RWQCB  
Mona Behrooz – Santa Ana RWQCB  
Chad Nishida – Santa Ana RWQCB

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<sup>1</sup> As a long-term former GE Plastics and SABIC employee, I have been working since 2002 on the investigation and remediation of constituents related to the GE Plastics site at 1831 Carnegie Ave., and of course, these comments are made on behalf of SABIC.

## Herndon, Roy

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**From:** Stanek, Jeffrey <Jeffrey.Stanek@itt.com>  
**Sent:** Friday, August 21, 2020 11:51 AM  
**To:** Herndon, Roy  
**Subject:** RE: South Basin Supplemental Remedial Investigation Report

Hi Roy:

ITT's comments on the South Basin Supplemental Remedial Investigation Report are provided below.

1. Figure ES-5: This figure depicts historical maximum concentrations. The figure should appropriately include a disclaimer clarifying that the concentrations depicted are not consistent with current conditions for sites which have undertaken remediation. Also, there is a reference to 2012 water level contours in the legend, but there are no water level contours presented on the figure. If water level contours are to be added, 2012 data are outdated.
2. Table 3-2: ITT Cannon is misspelled.
3. Figures ES-7, 5-13 and 9-1: These figures depict historical maximum concentrations detected at various locations. The figures should appropriately include a disclaimer clarifying that the concentrations depicted are not consistent with current conditions for sites which have undertaken remediation.
4. Figures 5-2, 5-4 and 5-9 do not include current representative concentrations of TCE, PCE and 1,4-dioxane in groundwater at the former ITT property located at 666 East Dyer Road. Please be advised that ITT completed in-situ thermal remediation in June 2018, and updated groundwater concentrations are presented in the *Volatile Organic Compound Thermal Remediation Completion Report* dated August 31, 2018 that was submitted to the Santa Ana Regional Water Quality Control Board and available to the public on Geotracker.

Regards,  
Jeff

**Jeffrey M. Stanek, PG, CEG, CHG**

Director, Environmental Affairs  
ITT Inc.  
56 Technology Drive  
Irvine, CA 92618  
Office (949) 562-7401  
Cell (714) 308-4341

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**From:** Herndon, Roy <rherndon@ocwd.com>  
**Sent:** Tuesday, August 4, 2020 5:11 PM  
**To:** Gabriele.Windgasse@cdph.ca.gov; jrusso@cityofirvine.org; nsaba@santa-ana.org; mwest@tustinca.org; Ashley.dummer@waterboards.ca.gov; Robert.Reeves@waterboards.ca.gov; Aparjeet.Rangi@Waterboards.ca.gov; Meghan.Tosney@waterboards.ca.gov; joe.karkoski@waterboards.ca.gov; Peter.garcia@dtsc.ca.gov; Javier.hinojosa@dtsc.ca.gov; Yolanda.garza@dtsc.ca.gov; Emad.yemut@dtsc.ca.gov; Chiarin.yen@dtsc.ca.gov; Dina.Kourda@dtsc.ca.gov; srehan@geosyntec.com; ESmalstig@Geosyntec.com; Pnyquist@greenbergglusker.com; dlivermore@integral-corp.com; burton@irwd.com; welch@irwd.com; abracho@latinohealthaccess.org; aurzua@latinohealthaccess.org; Yardenazwang-weissman@morganlewis.com; John.vanvlear@ndlf.com; miguel@occcopico.org; leonel@occcopico.org; Amartinez@ochca.com; Bolin, David <DBolin@ocwd.com>; jwring@ringbenderlaw.com; ndupont@ringbenderlaw.com; jparker@sheppardmullin.com; Ann.Sturdivant@waterboards.ca.gov; Nick.Amini@waterboards.ca.gov; Nishida, Chad@Waterboards <chad.nishida@waterboards.ca.gov>; Mehrnoosh.Behrooz@Waterboards.ca.gov; Jessica.Law@Waterboards.ca.gov; jtdavis@shb.com; Adam.fox@squirepb.com; Angus.mcgrath@stantec.com; Greg.hoehn@stantec.com;

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**Cc:** Calderon, Emily <ecalderon@ocwd.com>; Kennedy, John <jkennedy@ocwd.com>; Chris Ross <cross@enganalytics.com>

**Subject:** [EXT]South Basin Supplemental Remedial Investigation Report

Dear South Basin SAG Members,

On July 8 the Orange County Water District (OCWD) sent an email with a link to the *SUPPLEMENTAL REMEDIAL INVESTIGATION REPORT, ORANGE COUNTY WATER DISTRICT, SOUTH BASIN GROUNDWATER PROTECTION PROJECT, OPERABLE UNIT 2* for your review and comment and requested that comments be provided within 30 days. To provide additional time to review and comment, **OCWD is extending the due date to August 21, 2020, to submit comments to Roy Herndon at OCWD.**

This report is available at <https://www.ocwd.com/what-we-do/water-quality/groundwater-cleanup/south-basin/> for your access.

Please contact me at [rherndon@ocwd.com](mailto:rherndon@ocwd.com) if you have any questions.

**Roy Herndon**  
Chief of Hydrogeology



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**Orange County Water District**  
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## MEMORANDUM

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**To:** Mr. Rick Gallade, Gallade Chemical Inc.

**From:** David Livermore, P.G., Andrew Halmstad, and Mauri Fabio

**Date:** August 21, 2020

**Subject:** Integral's Review and Comments on the Orange County Water District's July 1, 2020, Supplemental RI Report

**Project No.:** C474

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This technical memorandum provides our review and comments on the July 1, 2020, Supplemental Remedial Investigation Report, Orange County Water District, South Basin Groundwater Protection Project, Operable Unit 2 (Supplemental RI Report) prepared by Hargis + Associates, Inc. (Hargis) for the Orange County Water District (OCWD).

Integral has reviewed the Supplemental RI Report and provided below our comments, divided into general and specific comment categories.

### GENERAL COMMENTS

1. The Supplemental RI Report defines Operable Unit 2 (OU2) as "groundwater contamination in the Shallow Aquifer System off-property of numerous groundwater contamination source sites located within the SBGPP Study Area where groundwater contaminant plumes emanating from individual source sites have migrated and commingled." Yet, in several parts of the Supplemental RI Report, Hargis has used data from on-property soil and groundwater to define off-property contamination (e.g., see Specific Comments 3, 4, and 11 below). These errors lead to erroneous conclusions. All on-property data being used to define off-property contamination should be removed from the off-property presentation and analysis.
2. The Supplemental RI Report does not adequately acknowledge or address past, ongoing and planned remediation at individual "source sites." This information

and analysis is essential to understanding whether contaminants of concern are likely to migrate downgradient from individual "source sites." Specifically, the Gallade remediation system is not acknowledged, assessed, analyzed, or discussed in the Supplemental RI Report. This is particularly problematic for the Supplemental RI Report's discussion of groundwater plumes in the northern portion of the Study Area.

The Supplemental RI Report cannot reach any conclusions about hydraulic gradients and transport pathways in the vicinity of the Gallade site without careful consideration and analysis of the extent, effectiveness, and future plans for Gallade's ongoing remediation. The Supplemental RI Report cannot reach any conclusions about the need for groundwater remediation immediately downgradient of the Gallade property without such consideration and analysis. The Supplemental RI Report cannot reach any conclusions about the potential impact of any OCWD remedial activities without such an understanding. In sum, the Supplemental RI Report's failure to evaluate Gallade's historical, ongoing, and future planned remedial activities is a critical flaw that should be corrected.

3. The Supplemental RI Report's analysis of groundwater potentiometric surface and groundwater flow paths in what are termed the "upper portion" and "middle portion" of the Shallow Aquifer System is incorrect and scientifically invalid. First, for the Gallade site, potentiometric data from both Shallow and Deep A wells (Gallade terminology) are improperly used to construct the Supplemental RI Report's "Shallow" potentiometric surface maps at Figures 4-2, 4-4, and 4-6. These wells are screened in distinctly different portions of the Shallow Aquifer system and are demonstrably in separate flow systems with distinct potentiometric head differences (see e.g., Figures 12–14 of Integral 2011). The mixing of potentiometric data from distinct and separate groundwater flow systems to represent an overall shallow groundwater flow path is technically incorrect and erroneous.

Second, groundwater data from specific Gallade remediation wells were omitted from the "Shallow Aquifer System" potentiometric surface figures. The omission of remediation wells that specifically demonstrate the drawdown and modification of the regional groundwater gradient around the Gallade site provides a false depiction of the groundwater flow and potential COPC transport both on and off the Gallade property. The omission of these remediation well potentiometric surface data must be corrected.

Finally, the 2014 and 2017/18 data analysis in the Supplemental RI Report omits all potentiometric data from the Gallade property. The omission of such data, which establish the drawdown and zone of influence of the Gallade remediation system,

creates an erroneous depiction of groundwater flow through this portion of the Study Area.

4. Because COPC concentrations in groundwater are dependent on the current and future actions at "source sites," as well as natural attenuation, dispersion, and other processes, the Supplemental RI Report's fate and transport analysis is wholly lacking. The Supplemental RI Report contains no analysis of specific "source sites" or any expected ongoing contribution from each of these sites into "off-site areas" of concern to the OCWD. Without such analysis, there is no basis to evaluate the effectiveness of past, current, and future remediation at "source sites." Without such analysis, there is no basis for predicting OU2 groundwater concentrations long-term. Without such analysis, there is no basis to establish the need and location of any remediation areas in a future feasibility study (FS). And, without such analysis, there is no basis to even identify "source sites" as sources of COPCs to those areas that the OCWD is concerned about.
5. The Supplemental RI Report's fate and transport analysis lacks a modeling component. Given the complexity of the OCWD's self-defined "Study Area," which contains multiple "source sites," each with its own set of circumstances (e.g., chemical concentrations in soil and groundwater, remediation status, site-specific hydrostratigraphic characteristics, site-specific chemical transport and degradation characteristics), and the need to analyze fate and transport into the future based on these complex circumstances, a groundwater flow and contaminant transport model is the only way to conduct science-based decision-making to identify areas requiring further investigation, data gaps, and to drive remedy definition and selection in any future FS.

## **SPECIFIC COMMENTS**

1. Executive Summary, ES-2 Background, page ES-3. The Supplemental RI Report states, "Plumes of groundwater contamination emanating from chemical releases at individual source sites within the Study Area have migrated away from their source areas and in many cases have commingled to form a broad expanse of groundwater contamination in the Shallow Aquifer System..." (emphasis added). This statement is not supported by analysis or presentation anywhere in the Supplemental RI Report. A chemical fate and transport analysis supported by modeling, calculations, and other analyses should be presented to support this statement, otherwise it should be deleted. Further, there is no basis in the Supplemental RI Report to support application of this statement to the Gallade site.

The Supplemental RI Report's own plume contour maps demonstrate no commingling of COPCs originating on the Gallade property with any other plumes. Given this, Gallade should be removed from the Supplemental RI Report as a "source site"; it is not, as the Supplemental RI Report's own analyses demonstrates.

2. Executive Summary, page ES-4. The Supplemental RI Report indicates that "the overall integrity of the aquitard that separates the Shallow Aquifer System from the underlying Principal Aquifer System is indicated by the steep downward vertical hydraulic gradients that are induced across the aquitard as a result of large-scale regional groundwater extraction from the deeper aquifer systems." The aquitards between the Shallow, the Principal, and the Deep Aquifers are thick, composed of very low permeability materials, and therefore are not conducive to contaminant transport. The Supplemental RI Report notes at page 26 that, "the top of the aquitard underlying the Shallow Aquifer System and separating it from the underlying upper portions of the Principal Aquifer System was encountered at depths ranging from about 134 to 162 feet bgs. The thickness of the aquitard ranged from about 22 to 44 feet." These statements further support the fact that this aquitard is thick. However, the Supplemental RI Report provides no analysis or explanation as to the role this aquitard undoubtedly plays in preventing COPCs potentially present in relatively shallow depths (e.g., less than 100 ft) from being transported through the aquitard. The aquitard's role in preventing direct movement of water between the Shallow and Principal Aquifers is further supported by other lines of evidence, including the difference in the general chemistry (i.e., total dissolved solids, anions, and cations) between the Shallow and Principal Aquifers. Instead, the Supplemental RI Report incorrectly concludes that there is a threat to the Principal and Deep Aquifers without describing the role this aquitard plays. The failure to analyze the role of the regional aquitard in separating the Shallow and Principal Aquifers, and the distinct groundwater chemistry, infiltration, and groundwater recharge that differ above and below that aquitard, means that the Supplemental RI Report's conclusion is fundamentally unsupported.
3. Figure ES-5. This figure does not accurately show the separation between the Gallade site and the Embee site to the southeast and is inconsistent with the other figures upon which Figure ES-5 is based. Figures 5-2 (trichloroethene), 5-4 (tetrachloroethene), 5-6 (1,1,-dichloroethene), 5-8 (1,4-dioxane), and 5-10 (perchlorate), all depict the separation between COPCs associated with the Gallade site and COPCs from the Embee site to the southeast. Figure ES-5 should be corrected to show the separation and extent of chemicals on the Gallade property consistent with the underlying figures.

4. Figure ES-6. This figure does not distinguish sites versus "off-site areas." The Supplemental RI Report should clearly delineate what the OCWD describes as "Operable Unit No. 2" (OU2) from the "source sites" and illustrate the "source sites" and their respective "on-site" and "off-site" (or "on-property" and "off-property") remediation. For example, the extent of the capture zone for Gallade's remediation systems should be depicted in order to show the extent of effectiveness of those systems and the "off-property" areas for which those systems are containing and/or capturing COPCs. It is imperative that the Supplemental RI Report contain a clear and precise distinction of the line between those areas where the "source sites" are conducting or planning to conduct remediation activities and those areas where such activities are not currently planned. This should include delineation of the complete extent of the geographic areas within the scope of each site's remedial action plan where such plans include off-property areas. For example, some remedial action plans include monitored natural attenuation over a broad area downgradient of the "source" property. The Supplemental RI Report's failure to even consider, let alone evaluate, such remediation plans has produced an incorrect description of the purported "problem," (i.e., COPCs downgradient of "source sites" that are not planned for future remedial activities) and will produce an incorrect conclusion about the depth and location of any remedy in any particular area. For the Gallade site, the Supplemental RI Report's complete failure to evaluate this issue produces an incorrect understanding of the necessity of any future remediation activities in off-property areas; the Supplemental RI Report has not even correctly identified the area that is actually downgradient from the Gallade site. There are no offsite areas downgradient of the Gallade site, because Gallade's groundwater remediation systems pull groundwater from off-property areas in every direction, which produces groundwater flow directions towards the Gallade site from the north, south, east, and west (Integral 2011, 2013). The Supplemental RI Report's failure to account for this leads to the mistaken conclusion that any groundwater south of the Gallade southern property boundary is downgradient, when that is not true.
5. Executive Summary, ES-6 Conceptual Site Model, page E-7. The conceptual site model is inaccurate. Sites with ongoing remediation and containment of their groundwater contamination within their site boundaries should be shown in Figure ES-6 to capture the range of actual site conditions with this conceptual site model of groundwater.

In addition, the Supplemental RI Report's description of "[f]ormer abandoned and likely improperly destroyed water wells in the Study Area [which] may also act as conduits for the transport of groundwater containing COPCs from the Shallow

Aquifer System downward into the underlying Principal Aquifer System" is entirely unsupported and hypothetical.

In addition, the impact of improperly constructed or old and physically corroded water supply wells, such as Irvine Ranch Water District (IRWD)-3, which can act or may have acted as vertical conduits, should be discussed in this section. Well IRWD-3 has been shown to have allowed short-circuiting of contamination between aquifers. Past evidence and IRWD's own analyses of that well indicate as much. Prior to rehabilitation, IRWD's consultant, Richard C. Slade & Associates LLC, analyzed data collected by IRWD and concluded that the well exhibited high total dissolved solids, sulfate (SO<sub>4</sub>), and perchlorate (ClO<sub>4</sub>) concentrations. Those concentrations reflect the geochemistry of the Shallow Aquifer, not the Principal or Deep Aquifer, and thus it is apparent that Shallow Aquifer groundwater was entering the well as a result of flaws in the well itself. This appears to be the most likely pathway for COPCs to enter the well from shallow depths, which indicates a local source. The Supplemental RI Report, however, does not address this assessment, which contributed to IRWD rehabilitating IRWD-3. At a minimum, this fact-based assessment and its result, well rehabilitation, should be discussed.

6. Section 1.1 Report Purpose, page 2. The Supplemental RI Report states, "The Interim Remedy is meant to complement, not compete with, on-going groundwater source remediation being implemented under the oversight of RWQCB and ... DTSC..." (emphasis added). Nowhere in the Supplemental RI Report has this statement been evaluated and validated. There is no basis or data for this statement. For example, the Supplemental RI Report contains no discussion or evaluation of the nature, scope and extent of Gallade's remediation systems, or the location, depth, or scope of OCWD's proposed groundwater remediation pumping. This statement should be deleted (or supported with data and analyses).
7. Section 1.2 Background and Context, page 3. The Supplemental RI Report states, "Plumes of groundwater contamination emanating from chemical releases at individual source sites within the Study Area have migrated away from their source areas and in many cases have commingled to form a broad expanse of groundwater contamination in the Shallow Aquifer System..." (emphasis added). See Specific Comments 1 and 4, above. The statement that COPCs from "source sites" have migrated away from "source areas" (which are not defined) is overly general and not supported by analysis or presentation anywhere in the Supplemental RI Report. The statement that COPCs from "source sites" have "commingled" is overly general and not supported by analysis or presentation anywhere in the Supplemental RI Report. In addition, the Supplemental RI Report fails to identify any "individual

source sites" from which COPCs have "commingled." For example, the Supplemental RI Report cannot and does not identify the Gallade site as a "source site" from which COPCs have emanated or commingled. This statement also fails to define what is meant by "source areas," which is another example of the Supplemental RI Report's failure to delineate the boundary between OU2, where the OCWD is evaluating the need for potential remediation, and "source sites," where the OCWD states that no such remediation is being evaluated. Without a careful and rigorous fate and transport analysis supported by modeling, calculations, and/or other analyses, this statement cannot be supported and should be deleted.

8. Section 1.2.1 Impacts to Groundwater in the Principal Aquifer System, page 3. The Supplemental RI Report fails to adequately distinguish and delineate between "source site" contamination and "off-property" contamination. The statement that "[t]he occurrence, nature, magnitude, and extent of groundwater contamination in the Shallow Aquifer System being addressed as part of OU2 threatens water quality in the underlying Principal Aquifer System that is used extensively for domestic water supply..." is an example of this. The Supplemental RI Report needs to state clearly and directly that "source sites" are not part of OU2 and that "source sites" with ongoing and/or planned groundwater remediation and containment and separation from any "commingled" plume area in OU2, as acknowledged by Hargis (see Specific Comments 5, 6, and 7), are not contributing to COPCs in OU2 groundwater. For example, the Supplemental RI Report fails to distinguish between groundwater containing COPCs associated with the Gallade site, and OU2 groundwater. If the OCWD cannot identify that boundary between OU2 and groundwater within the influence of Gallade's remediation systems, the Supplemental RI Report has not accurately identified where OU2 ends and the Gallade "site" begins. Because of Gallade's ongoing groundwater remediation, the Gallade property boundary is not the correct boundary.
9. Section 3.1 Source Identification and Characterization, page 16. The Supplemental RI Report states, "Many of the responsible and potentially responsible parties at identified source sites had been conducting individual site-specific assessment and limited remediation activity for some number of years, typically under the direction of local or State regulatory authorities, including local fire departments, the OCHCA, RWQCB, and/or DTSC..." (emphasis added). This statement is an incomplete and inaccurate statement for some "source sites" in the Study Area. For example, the Gallade site has been thoroughly investigated over more than three decades and Gallade's groundwater extraction and treatment remediation systems have been in place and containing Gallade site groundwater for more than 27 years.

It is incorrect to suggest that Gallade's remediation activities over that time period are "limited." This statement should be deleted or qualified. Moreover, the Supplemental RI Report fails to identify which "responsible and potential responsible parties" it is referring to. This statement is purely general and irrelevant to Gallade, and Gallade, thus, should be removed from the Supplemental RI Report as a "source site."

10. Section 3.1 Source Identification and Characterization, page 17. The Supplemental RI Report states, "Assessment activities at individual source sites within the Study Area available at that time were typically insufficient to characterize the lateral and vertical extents of contamination in off-property groundwater..." (emphasis added). This statement improperly and incorrectly implies that no site characterization was sufficient. This was not true for Gallade, which had adequately and sufficiently characterized the lateral and vertical extent of COPCs at the Gallade site. This statement cannot be made without careful analysis of each "source site" and the remediation activities conducted at those sites. There is no basis anywhere in the Supplemental RI Report to support this statement. This statement should be deleted or corrected to reflect the range of characterization at each "source site" including Gallade.
11. Section 3.1 Source Identification and Characterization, page 17. The Supplemental RI Report states, "More recent information for a subset of previously identified source sites has been compiled in Appendix D based on records available on SWRCB's Geotracker website and from DTSC's EnviroStor data management system (DTSC, 2018)." The two semiannual monitoring reports provided in Appendix D for Gallade site are a small fraction of the existing characterization information for the Gallade site. Hargis should review and include the data and reports documenting the remedial investigations and subsequent remedial action plans for the Gallade site, including but not limited to the Updated Conceptual Site Model Report (Updated CSM, Integral 2011), the Evaluation of the Capture Zone of the Gallade Chemical, Inc.'s Remediation System (Integral 2013), the Revised Remedial Action Plan (Revised RAP 2016a), the Revised Offsite Investigation Summary Report (Integral 2017), the Revised Area A Remedial Action Work Plan (Integral 2019), the Revised Area A Removal Action Completion Report (Integral 2020a), and the Revised Area C Remedial Action Work Plan (Integral 2020b). Without a complete set of data, reports, and analyses of the Gallade site, the Supplemental RI Report fails to adequately characterize, describe, analyze or consider the Gallade site information.

12. Section 3.1, Page 17, last paragraph. The Supplemental RI Report states, "Table 3-2 provides a summary of maximum concentrations of contaminants detected in soil and soil vapor at a subset of source site properties based on available data...." This statement is inaccurate. Table 3-2 contains a summary of the purported "source sites" on-property remediation.

Also, this statement uses the phrase "source site properties," but this phrase is undefined in the Supplemental RI Report, which uses multiple different phrases about similar concepts without consistency or definitions (e.g., "source site," "source area," "source site properties," "on-site," "off-site"). The resulting discussions are confusing, inconsistent and imprecise. The use of separate terms should be defined and consistent.

13. Section 3.1, Page 18, first paragraph. The Supplemental RI Report states, "Table 3-3 provides a summary of maximum concentrations of contaminants detected in groundwater samples collected from on-property at the respective source site properties, available data compiled by OCWD database contractor, and in some cases obtained from the Geotracker Site in November 2018." See Response to Specific Comment No. 12 above. In addition, since the Supplemental RI Report is described as only addressing "off-site properties" (i.e., not "source sites"), the relevance and use of these data is unclear. For Gallade, the use of maximum concentrations does not provide a current, accurate accounting of conditions particularly given the long-term and ongoing operation of Gallade's treatment systems. Given ongoing remediation at the Gallade site the use of maximum concentrations such as those depicted by the Supplemental RI Report in Table 3-3 is irrelevant to current conditions at the Gallade site, because maximum concentrations for most COPCs at onsite wells occurred 20-30 years ago.
14. Section 3.2 Source Control Groundwater Remediation, Page 18. The Supplemental RI Report states, "The current status of groundwater source remediation efforts at selected source properties has been compiled based on available documents on Geotracker and Envirostor as of September 2019 (Appendix M)." The brief summary paragraph describing the Gallade site is wholly inadequate and does not explain the extensive remediation that has been and is continuing to be conducted at the site. A more complete review and summary of the remediation at the Gallade site should be provided, such as has been provided for other sites (e.g., see the summary for GE Plastics in Appendix M). The following documents should be reviewed, considered, analyzed, and cited to provide more complete description of the remediation process and the groundwater and soil remediation completed to date at the Gallade site: the Revised RAP (Integral 2016a), the revised offsite

investigation report (Integral 2017), the Revised Area A Remedial Action Work Plan (Integral 2019), the Revised Area A Removal Action Completion Report (Integral 2020a), and the Revised Area C Remedial Action Work Plan (Integral 2020b). Without such consideration, analyses, discussion and evaluation, the Supplemental RI Report fails to accurately describe the "current status of groundwater" remediation efforts. In addition, Gallade is not a "source property." The Supplemental RI Report depicts the Gallade site's COPCs as an island detached from other groundwater plumes. Gallade should be removed from the Supplemental RI Report's list of "source properties" or "source sites."

15. Section 4. The Supplemental RI Report does not analyze or describe the relationship between the contributing water sources of the Principal and Deep Aquifers (e.g., recharge, infiltration, and flow estimates) and the Shallow Aquifer within the Study Area. Such a discussion is critical to understanding and describing the potential risks the COPCs in the Shallow Aquifer pose to the Principal and Deep Aquifers. The Supplemental RI also does not quantify the risk from COPCs in the Shallow Aquifer in the Project Area migrating to the Principal and Deep Aquifers. Without this analysis, the Supplemental RI does not meet the requirements of a typical NCP-compliant remedial investigation. In addition, the Supplemental RI Report fails to describe any specific pathway from the Gallade site to the Principal or Deep Aquifers for COPCs from the Gallade site.
16. Section 4.2, Page 25, first paragraph of section. The Supplemental RI Report states, "Information regarding off-property groundwater monitor wells have been compiled (Table 4-1)." This table inaccurately lists select Gallade wells as "off-property" that are on the Gallade site (see comment on Table 4-1 below). The wells listed inaccurately should be removed from Table 4-1.
17. Section 4.2.1 Occurrence and Movement of Groundwater, Page 28. The Supplemental RI Report states, "Water level elevation contour maps for the upper and lower portions of the Shallow Aquifer System have been prepared with data from 2012 and 2014 (Figures 4-2 to 4-5) which bracket the range of Study Area groundwater flow conditions during times of higher and lower hydraulic stresses induced locally by regional pumping. Water level elevation contour maps using data from 2017/2018 reflect recent groundwater flow conditions (Figures 4-6 to 4-7)." Figure 4-2 does not accurately depict the groundwater pumping and extraction, which causes overlapping cones of depression creating a zone of influence and inward hydraulic gradients toward the Gallade site. Figure 4-2 also inappropriately aggregates data from Gallade's Shallow and Deep A groundwater zones, which, while they are both within about 60 ft below ground surface, have distinctly

different hydrostratigraphic characteristics and potentiometric surfaces—see for example First and Second Quarter Semiannual Groundwater Monitoring and Remediation Report (Integral 2020c). Figures 4-4 and 4-6 omit data from the Gallade site and thus fail to depict or represent the zone of influence and drawdown that is occurring as a result of Gallade's remediation. The maps should be corrected.

18. Section 4.2.2, Page 31. The Supplemental RI Report states, "Previous investigators surmised that elevated concentrations of TDS and nitrate detected in some Principal Aquifer System production wells (e.g. IRWD-5) may be indicators of local hydraulic communication between the Shallow Aquifer System and the Principal Aquifer System (Todd, 2007)." Production wells have been shown to be conduits between the Principal Aquifer and shallower groundwater, including the Shallow Aquifer (see discussion of IRWD-3 in Specific Comment 5, above). The Supplemental RI Report also fails to identify what is meant by "local"; local could refer to the immediate area around a production well, such as IRWD-3. In addition, the Supplemental RI Report implies that this statement is evidence of pathways between the Shallow Aquifer and Principal Aquifer through unidentified former agricultural production wells, but this implication is not supported by any data or analysis. The Supplemental RI Report should clearly state that "local hydraulic communication" is a hypothesis never evaluated except at IRWD-3, where the "communication" was corrected through rehabilitation of the well by IRWD. Finally, there is no statement, data or analysis that there is any "local hydraulic communication" anywhere in the Study Area, including at the Gallade site, which allows or could allow COPCs from shallow depths to reach deeper depths, whether down to the basal sand or through the regional aquitard into the Principal Aquifer.
19. Section 5.1 Chemical Compounds Frequency of Detection, page 32. The Supplemental RI Report states, "The number of off-source-site property groundwater samples analyzed for individual compounds and constituents, the frequency of detection of individual compounds and constituents, and the maximum concentrations of detected compounds have been summarized (Table 5-4)." The statistical summary in this table contains errors and should be corrected. For the Gallade site, "source site" data were attributed as "off-site (OU2)" data and those data points should be removed from Table 5-4. See Specific Comment 34.

Also, the statement uses the phrase "off-source-site property" without defining what it means. Given the Supplemental RI Report's many phrases around the same concept, this just confuses the description and is unclear. This term should be clearly defined.

20. Section 5.2.1 Trichloroethylene and Tetrachloroethylene, page 34. The Supplemental RI Report states, "The regular occurrence and distributions of TCE and PCE 'hot spots' in this area is indicative of multiple plumes from multiple sources that have commingled, and where the highest concentrations of TCE and PCE are detected in deeper groundwater within the middle portion of the Shallow Aquifer System (Figures 5-2 through 5-5)." This description is overgeneralized and overbroad to the extent it is not meaningful. It is unclear what is being referred to as a "hot spot." That phrase is not defined in the Supplemental RI Report, the term "deeper" is not defined, and the Supplemental RI Report fails to identify locations where the highest concentrations of TCE and PCE have been detected in "deeper" groundwater. The Gallade site does not have "deeper" TCE and PCE contamination in the middle portion of the Shallow Aquifer System, as shown in Figures 5-3 and 5-5, and thus Gallade does not have a plume that is commingled with any other "deeper" plume. The statement does not apply to the Gallade site, which should be noted.

Also, the figure reference for the middle portion of the shallow aquifer (as defined by Hargis) is wrong; Figures 5-3 and 5-5 depict that area. The figure citation should be corrected.

21. Section 5.2.1 Trichloroethylene and Tetrachloroethylene, page 34-35. The Supplemental RI Report states, "TCE/PCE plumes in the upper portion of the Shallow Aquifer System that originate at source sites west of SR-55 extend laterally downgradient in the direction of groundwater flow into the southern portion of the Study Area east of SR-55 where they commingle with other contaminant plumes originating from sources north of MacArthur Boulevard (Figures 5-2 through 5-5). Lesser magnitude impacts of lesser lateral and vertical extent are apparent in other areas along the SR-55 corridor to the north and south, and elsewhere in the southern portion of the Study Area east of the SR-55 corridor. The lateral extents of TCE and PCE in the upper portion of the Shallow Aquifer System are greater than the lateral extents of these compounds in the middle portion of the Shallow Aquifer System and may be a function of the timing of operations and chemical releases, or subsurface conditions, or both." This statement is overgeneralized and incorrect. Not all TCE and PCE in the upper portion of the Shallow Aquifer System commingle and "...extend laterally downgradient in the direction of groundwater flow into the southern portion of the Study Area east of SR-55 where they commingle with other contaminant plumes originating from sources north of MacArthur Boulevard...." For example, the extent of TCE (Figure 5-2) and PCE (Figure 5-4) is shown to end near the edges of the Gallade site and does not

commingle with other neighboring source site plumes. This statement should be corrected.

Also, the last sentence fails to mention the extensive groundwater extraction and changes in hydraulic gradients that occur at Gallade and other sites, which prevents migration of COPCs from those sites. This omission should be corrected.

22. Section 5.2.2 1,1-Dichloroethylene and 1,4-Dioxane, page 35. The Supplemental RI Report states, "The occurrence and distributions of 1,1-DCE and 1,4-dioxane in Shallow Aquifer System groundwater are similar to each other and in large part similar to the occurrence and distributions of TCE and PCE. The highest concentrations of these compounds and largest lateral and vertical extents are commingled with other groundwater impacts in the area west of SR-55. Groundwater impacts in the upper portion of the Shallow Aquifer System extend downgradient in the direction of groundwater flow into the southern portion of the Study Area east of SR-55 (Figures 5-2 through 5-9)." This statement is inaccurate and misleading. The occurrence and distribution of 1,1-DCE and 1,4-dioxane in Shallow Aquifer System groundwater in the Gallade area is not at all like the distribution of PCE and TCE and is not commingled with other groundwater impacts in the area west of SR-55. This statement is overgeneralized, overbroad and inaccurate. It should be corrected.

The figure references in this sentence for these chemicals in the upper portion of the Shallow Aquifer (as defined by Hargis) are wrong; Figures 5-6 (1,1-DCE) and 5-8 (1,4-dioxane) depict Hargis' interpretation of COPCs in this area. The figure citation should be corrected.

23. Section 5.2.4 Total Principal COPCs, page 36. The Supplemental RI Report states, "The extent of total principal COPCs in groundwater has been estimated based on the detection of principal COPCs exceeding 1 µg/l for VOCs and 1,4-dioxane and 6 µg /l for perchlorate (Figure 5-13)." Figure 5-13 does not accurately show the separation between the Gallade site and the Embee site to the southeast and is inconsistent with the other Supplemental RI Report figures upon which Figure 5-13 is based. Figures 5-2 (trichloroethene), 5-4 (tetrachloroethene), 5-6 (1,1,-dichlorethene), 5-8 (1,4-dioxane), and 5-10 (perchlorate) all show the separation between the COPCs Hargis interprets as associated with the Gallade site and Embee contamination to the southeast. Figure 5-13 should be corrected to depict the separation and extent of COPCs on the Gallade property as shown in the underlying Supplemental RI Report 5-2 (trichloroethene), 5-4 (tetrachloroethene), 5-6 (1,1,-dichlorethene), 5-8 (1,4-dioxane), 5-10 (perchlorate).

24. Section 5.5 Vertical Distribution of Water Quality in Shallow Aquifer System, page 38. The Supplemental RI Report states, "The most recent available water quality data includes sample results as of September 30, 2018 and more recent data for selected sites requested by RWQCB. During the database update process, results for other Sites were also available after September 30, 2018. These collective data are the most recent available data and have been incorporated into the 14 cross sections. Figures 5-17A to 5-17N provide an overview of Hargis' interpretation of the approximate vertical distribution of the principal COPCs along the respective cross section lines." More recent data are available for the Gallade site and should be used as they have been for other sites. See, Third and Fourth Quarter 2018 Semiannual Groundwater Monitoring and Remediation Report (Integral 2020d), and First and Second Quarter 2019 Semiannual Groundwater Monitoring and Remediation Report (Integral 2020c).
25. Section 5.6 Water Quality Trends, page 39. The Supplemental RI Report states, "The time series water quality figures have been prepared for monitor wells that have the following attributes: • It is located off the respective source properties; • Has 10 or more sampling events; • Has one or more samples collected on or after January 1, 2015; and • Has four or more detections of principal COPCs." (Emphasis added.) It is unclear why the data sets must include "four or more detections." Data sets where there have never been any detections or where the detections were at the beginning of the data analysis period are important for understanding chemical distribution and stability and the extent of COPCs. These data should be included in the trend analyses and analysis of nature and extent of COPCs. In addition, the phrase "off the respective source properties" is undefined and confusing (see earlier comments on multiple phrases used for the same concept).
26. Section 7.0 Conceptual Site Model, page 51. The Supplemental RI Report states, "There are numerous contaminant source areas within the Study Area. Some of the VOC source areas contain DNAPL or residual DNAPL (Aquilogic, 2015) that will continue to act as long-term sources of contamination to off-property groundwater if not contained or removed. Most, if not all of the source areas are decades old. Given the heterogeneous (sic) mix of sediments, with a relatively high proportion of fine-grained sediments, matrix back diffusion from source areas can also serve as a prolonged source of elevated concentrations of COPCs from source properties to downgradient off-property locations. Remediation of source areas is expected to be conducted by potential responsible parties in tandem with the interim remedy resulting from this RI/FS." See comments above on the phrase "source areas." In addition, this statement does not describe "source sites" with ongoing, active remediation. Instead, it improperly implies that no "source sites" have been

remediated and that all "source sites" are impacting groundwater in OU2. This is incorrect. In addition, this statement indicates that some "source sites" have been actively remediating groundwater and containing COPCs such that those COPCs do not impact OU2, or impact OU2 to a degree that active remediation in OU2 would be required. In addition, the conceptual site model is unsupported by data, analysis, and discussion.

27. Section 7.0 Conceptual Site Model, page 51. The Supplemental RI Report states, "Advection of COPCs in groundwater downgradient of source properties within the Study Area is anticipated to be the predominant transport process for COPCs in Shallow Aquifer System groundwater, primarily through coarser zones. Former abandoned and likely improperly destroyed water wells in the Study Area may also act as conduits for the transport of groundwater containing COPCs from the Shallow Aquifer System downward into the underlying Principal Aquifer System. In the southern portion of the Study Area, some portion of COPCs in groundwater in the upper portion of the Shallow Aquifer System has migrated to surface water channels that extend below the water table (Harding Lawson Associates, 2000). Additional groundwater containing COPCs is expected to flow in a southerly direction beyond the Study Area." This statement fails to acknowledge that some "source sites" have ongoing, active remediation. While Gallade is not a "source site," the Supplemental RI Report should acknowledge and explicitly describe fate and transport associated with the Gallade site, as with all "source sites" identified in the Supplemental RI Report.
28. Section 7.0 Conceptual Site Model, page 52. The Supplemental RI Report states, "Given the extent and concentrations of TCE, PCE, 1,1-DCE and 1,4-dioxane detected in groundwater downgradient of source area properties, it is expected that intrinsic biodegradation is not a dominant process affecting these COPCs in groundwater." There is no basis in the Supplemental RI Report for this statement. Decreases in concentration are seen across the Study Area at significant distances from individual "source sites." The Supplemental RI Report contains no analysis of the degree of biotic versus abiotic degradation that results in these decreasing COPC concentrations. This statement should be deleted.
29. Section 7.0 Conceptual Site Model, page 52. The Supplemental RI Report states, "An unrestricted use of groundwater within the Shallow Aquifer System would result in ingestion, dermal, and inhalation exposure to consumers. These pathways and exposures are considered as part of the HHERA (Section 8)." The statement about use of the Shallow Aquifer System for unrestricted use, including drinking water, does not comport with Hargis' description in Section 4.2.2 of the

Supplemental RI Report, which states "Ambient, non-point source, water quality conditions in the Shallow Aquifer System within the Study Area is characterized based on a variety of inorganic water quality indicators principally including total dissolved solids (TDS), hardness, chloride, sulfate, and nitrate. Results of testing indicate that water quality in shallower groundwater is generally poor with several indicators detected at concentrations greater than applicable secondary drinking water standards; and that ambient water quality in the Shallow Aquifer System generally improves with depth (Piper, A.M., et al., 1956; Aquilogic, 2015; Avocet, 2018). The available data suggest that elevated nitrate concentrations, and in some cases the occurrence of low but detectable concentrations of some compounds such as perchlorate, arsenic, selenium, and hexavalent chromium may be attributable to natural conditions or may result from non-industrial non-point source impacts from agricultural activity or other processes." The existing, natural water quality of the Shallow Aquifer System is poor and not useable as a drinking water source. In addition, there are no data, or discussion in the Supplemental RI Report that the Shallow Aquifer is being or will be used for drinking water. Because of the existing water quality as characterized by Hargis and the fact that there are no residents in the Study Area who are or would be directly exposed to Shallow Aquifer groundwater in this manner, the statement should be deleted.

30. Section 7.0 Conceptual Site Model, page 52. The Supplemental RI Report states, "Migration of COPCs from the Shallow Aquifer System to the Principal Aquifer System through former wells can also result in a similar exposure pathway. Although not evaluated in the HHERA, it is possible that the detections of COPCs in IRWD-3 were a result of this process." There are no data or analyses to support this statement. In addition, active production wells themselves have been demonstrated to be conduits for groundwater from the Shallow Aquifer System to the Principal Aquifer System (see Specific Comments 5 and 18 concerning IRWD-3).
31. Section 9.1.1 Nature and Extent of Contamination, page 54. The Supplemental RI Report states, "In many cases, contaminant plumes migrating away from sources have commingled downgradient of source properties." There is no basis in the Supplemental RI Report for this statement, especially with respect to Gallade. The Supplemental RI Report's plume maps demonstrate that COPCs associated with the Gallade site have not commingled downgradient of the Gallade site. See also General Comments 2, 4, and 6, as well as Specific Comments 1, 7, and 8.
32. Section 9.1.3 Contaminant Fate and Transport, page 55. The Supplemental RI Report text states "The current contaminant distribution in groundwater has resulted from migration of these contaminants from multiple source areas." There is no basis in

the Supplemental RI Report for this statement. In addition, see Specific Comments (e.g., 1, 7, and 8) above with respect to Gallade. There is no basis in the Supplemental RI Report to attribute this statement to the Gallade site. In addition, the Supplemental RI Report's plume maps demonstrate that COPCs associated with the Gallade site have not commingled downgradient of the Gallade site.

33. Section 9.1.3 Contaminant Fate and Transport, page 55-56. The Supplemental RI Report states, "Given the steep downward hydraulic gradient there is a high likelihood that one or more of the many abandoned and likely improperly destroyed water supply wells in areas where elevated concentrations of COPCs occur in the upper/middle portion of the Shallow Aquifer System will act as conduits for the transport of potentially substantial concentrations of contaminants from the Shallow Aquifer System vertically downward into the underlying Principal Aquifer System" (emphasis added). There are no data or analysis or demonstration that there is a "high likelihood" of any former wells actually existing, let alone acting as conduits. Also, as discussed at Specific Comment 5 and 18 above, IRWD-3 has acted as a vertical conduit between the Shallow and Principal Aquifer zones. In addition, the Supplemental RI Report fails to identify any particular "source sites," including Gallade, from which COPCs have traveled or risk traveling on such a pathway. This statement is entirely hypothetical and should be acknowledged as such.
34. Section 9.2 Conclusions. The Supplemental RI Report states, "Contaminant plumes in groundwater have migrated away from source properties and have commingled." There is no basis in the Supplemental RI Report for this statement., especially with respect to Gallade. The Supplemental RI Report's plume maps demonstrate that COPCs associated with the Gallade site have not commingled downgradient of the Gallade site. See also General Comments 2, 4, and 6, as well as Specific Comments 1, 7, and 8.
35. Table 4-1, Page 1 of 7. Table 4-1 is inaccurate. It lists three Gallade on-property wells as "off-property" wells. Wells E-14, E-3, and E-4 are all on the Gallade property and should be removed from Table 4-1. Furthermore, any interpretation of "off-property" contamination based on these wells should be corrected as these wells are on the Gallade site and within the capture zone of the Gallade onsite groundwater remediation systems. In addition, wells MW-20, MW-21, MW-22, and MW-23 are upgradient or cross-gradient of the Gallade property as a result of the effects of Gallade's groundwater remediation systems. The sources of COPCs to MW-20, MW-21, MW-22, and MW-23, if any, are not from the Gallade property but are from presently unidentified sources upgradient or cross-gradient to the Gallade

property. Table 4-1 and the Supplemental RI Report should be corrected to note this and accurately describe, interpret, and analyze these data.

36. Table 5-1, Pages 11 and 12 of 29. Table 5-1 is inaccurate. It lists three Gallade on-property soil borings as "off-property" groundwater grab sample locations. Soil borings B-112, B-29, and CPT-1 are all located on the Gallade property and should be removed from Table 5-1. Furthermore, any interpretation of "off-property" contamination based on these soil borings should be modified corrected as these soil borings are on the Gallade property and within the capture zone of the Gallade on-site groundwater remediation systems. Finally, grab groundwater samples were not collected from borings B-112 and B-29. The Supplemental RI Report should be corrected to remove those borings from any table and analyses.
37. Table 5-2, Page 12 of 30. Table 6-2 is inaccurate. It lists six Gallade on-property locations as "off-property" groundwater sample locations. Soil borings B-112, B-29, and CPT-1, and monitoring wells E-14, E-3, and E-4 are all located on the Gallade property and should be removed from Table 6-2. Furthermore, any interpretation of "off-property" contamination based on these groundwater samples should be corrected based on the fact that these six locations are on the Gallade site and within the cone of influence of the Gallade onsite groundwater remediation systems. Finally, grab groundwater samples were not collected from Gallade site borings B-112 and B-29. The Supplemental RI Report should be corrected to remove those borings from any table and analyses of "off property" contamination.
38. Figures 5-2 to 5-11, and Figures ES-5 and ES-7. Figures 5-1 to 5-11 depict Hargis' interpreted isocontours of individual COPCs, including COPCs on and immediately around the Gallade property. On each of the Section 5 figures, the isocontours are depicted as detached from the rest of the other "source site's" plumes in the incorrectly labeled "downgradient" direction, generally south. ("Downgradient" at the Gallade is in towards the Gallade groundwater extraction system wells from all directions; see Specific Comment 4, above.) The Gallade site cannot be considered a "source site" under the Supplemental RI Report's own definition of "source site." The Supplemental RI Report defines a "source site" as a site with a plume that has moved downgradient of the property on which it purportedly originated and is commingled with other plumes from other sources.

In addition, the depiction of "Principal Compounds of Concern" in Figures ES-5 and ES-7, however, shows a narrow band of the 1 µg/L isocontour connecting the southeastern-most corner of the Gallade property to the neighboring isocontours present at and adjacent to the Embee property. There are no data, interpretation, analysis or justification for the discrepancy between Figures ES-5 and ES-7 and the

individual isocontour depictions in the Section 5 figures (Figures 5-2 to 5-11). Those Section 5 figures all depict COPCs associated with the Gallade property as disconnected from any other plume and not commingled with any other plume. Given the lack of a connection between the Gallade site and any neighboring contours on the Section 5 figures, the Executive Summary figures are incorrect. (See also Specific Comment 3 describing further why Hargis' interpretation is not correct.) The Supplemental RI Report's identification of Gallade as a "source site" should be removed from the report, and the Executive Summary Figures ES-5 and ES-7 should be corrected to be consistent with the isocontours illustrated in Section 5 figures.

39. Figure 5-17A (Cross Section A-A'). The combination of five separate COPCs on this cross section is misleading and confusing and inaccurately suggests connections between different COPC sources. If multiple COPCs are to be presented, they should be displayed separately on individual cross sections. It is unclear what interval the Upper Sand represents in this cross section. The Upper Sand is not defined or described in Section 4.2, Study Area Conditions. The Upper Sand is penetrated by wells in Gallade's Deep A zone; therefore, the thickness of the "finer zones" above this unit should thin to the south. Specifically, 3-M-1, 3-M-5 intersect the top of this Upper Sand as the top of the Upper Sand shallows to the south because of a thinning of the "finer zone." The water quality contours beneath Gallade are incorrect. The 1 µg/L perchlorate contour at 2-SAM-CPT-91 should not be connected with the 4.4 µg/L 1,4-dioxane contour at 3-MW-27. These are different COPCs and should not be connected by a concentration contour. Also, these wells represent COPCs upgradient of Gallade; therefore, the 1 µg/L contour for each of these COPCs should be shown open ended to the left of CPT-91 (query marks could be shown if the source of these COPCs is not known upgradient). The value of 1.2 µg/L PCE at MW-35B is incorrect. It should be shown as non-detect. The last four groundwater sampling events at this well have been non-detect at 0.5 µg/L detection limit at MW-35B. The 10 µg/L contour at 3-MW-1 should be reversed and shown as an open ended contour to the left of the well. The concentration of PCE in this well represents an upgradient, offsite source to Gallade (see also, for example, data for E-7, another upgradient Shallow well on Gallade). The 1 µg/L and 10 µg/L contours under the Gallade site (i.e., beneath 3-E-15 and 3-E-13) should be drawn to the top of the "approximate water table" between 3-E-15 and 3-MW-1. At the downgradient end of the Gallade site, the 1 µg/L and 10 µg/L contours should connect with the 1 µg/L and 10 µg/L contours at the "approximate water table" between 3-M-1 and 3-MW-25. The connection of 1 µg/L and 10 µg/L contours between 1,1-DCE at 3-MW-25 and TCE at 2-SAM-CPT-87 is incorrect, and it is inappropriate to connect contours for two different COPCs (see first sentence of this

comment). To the left of "Diceon Electronics start" the 1 µg/L and 10 µg/L contours should be closed to the left (i.e., they do not connect to the upgradient contours as summarized above).

40. Figure 5-17G (Cross Section G-G'). The combination of five separate COPCs on this cross section is misleading and confusing and inaccurately suggests connections between different COPC sources. If multiple COPCs are to be presented, they should be displayed separately on individual cross sections. It is unclear what interval the Upper Sand represents in this cross section. The Upper Sand is not defined or described in Section 4.2, Study Area Conditions. The Upper Sand is penetrated by wells in Gallade's Deep A zone; therefore, the thickness of the "finer zones" above this unit should thin to the south between "Gallade Chemical" and "Diceon Electronics." Specifically, 3-M-3, 3-M-4, and 3-M-5 intersect the top of this Upper Sand as the top of the Upper Sand shallows to the south because of a thinning of the "finer zone." See the Revised Offsite Investigation Summary Report (Integral 2017) Appendix A for the borehole logs for these sample points. The water quality contours (1 µg/L, 10 µg/L, and 100 µg/L) extending upgradient of 2-SAM-CPT-88A should be closed immediately to the left of 2-SAM-CPT-88A.
41. Appendix E, Table E-1 provides a summary of reference point elevation for evaluation. However, in addition to the vertical datum, different surveys can utilize different regional benchmarks that require correction before comparing elevation points. The Supplemental RI Report's discussion of reference points does not mention survey benchmarks for the various sites or appear to correct for different benchmarks. The Supplemental RI Report elevations should be corrected based on the regional benchmark used for each individual survey point.
42. Appendix J, Table J-1, lists "Aquilogic" as the "Source" for multiple sample IDs. However, it is not clear how the data were transferred from Aquilogic to Hargis and it is not clear how Aquilogic obtained the data. In addition, it is not clear what, if any, quality assurance steps were undertaken by Hargis or Aquilogic to ensure accuracy and completeness of the data. The Supplemental RI Report should be revised to clearly discuss what data quality assurance steps were completed on these data.
43. Appendix J, Table J-1. Gallade (Facility ID 3) sample results for MW-25 and MW-26 are listed as "No" under the "On-Figure" column. Hargis does not provide a rationale for excluding sample results that justifies excluding MW-25 and MW-26 from the generation of isocontours. These data points should be included in order to provide a complete and accurate estimation of VOC extent in the Supplemental RI Report. In addition, given that Hargis depicts COPCs at and around MW-24 and

(incorrectly) assumes groundwater flow directions generally to the south, Hargis should incorporate MW-26 into its analysis because it is directly downgradient (in Hargis' interpretation) of MW-24.

44. Appendix J, Table J-3. Gallade (Facility ID 3) sample results for MW-26S, MW-2D, MW-3, and MW-33A are listed as "No" under the "On-Figure" column. Hargis does not provide any rationale for excluding sample results that justifies excluding these sample results from the generation of isocontours. These data points should be included in order to provide a complete and accurate estimation of VOC extent in the Supplemental RI Report.
45. Appendix M, Section 2.1 Gallade Chemical (Facility ID 3), page M-2. The statement "Gallade Chemical Incorporated was formerly located at 1230 East Street and Gertrude Place, Santa Ana, CA, and operated as a chemical packaging and distribution plant" is inaccurate. Gallade Chemical Inc. is currently located at 1230 East St. Gertrude Place, Santa Ana, CA. It currently operates as a chemical repackaging and distribution location.
46. Appendix M, Section 2.1 Gallade Chemical (Facility ID 3), page M-2. The statement, "Off-property remediation has not taken place at the former Gallade Chemicals Incorporated facility" is incorrect and misleading. It incorrectly implies "off-property" remediation has not occurred and, in addition, that such remediation is needed. It is not. Investigations beginning as early as 1990 and as recent as 2017 have shown that COPCs associated with the Gallade property have not migrated off of the Gallade property, are instead contained on the property, and therefore do not require further remediation (Integral 2017). In addition, investigations and reports have determined that contaminants originating from off-property, non-Gallade sources have been contained, pulled onto the Gallade property, extracted and treated by Gallade's remediation systems (Integral 2011, 2014, and 2015). The Gallade remediation systems' active groundwater pumping creates an expansive zone of influence and capture zone well beyond Gallade's property boundary (Integral 2017). The statement should be deleted from Appendix M. The Supplemental RI Report should reference Gallade's "off-property" investigations (Integral 2014, 2015, and 2016b).
47. Appendix M, Section 2.1, Gallade Chemical (Facility ID 3), page M-2. This section should be updated with the soil removal action activity in Area A completed in fall 2019 (Integral 2020a).

48. Appendix M, Section 2.1, Gallade Chemical (Facility ID 3), page M-2. The reference to "former" Gallade Chemicals Incorporated facility should be removed. Gallade is a currently operating business in the City of Santa Ana.
49. Appendix M, Section 3.0 References, page M-31. The list of Gallade remediation documents is inaccurate and incomplete. References should include the Revised Remedial Action Plan (Integral 2016a), Offsite Investigation Work Plan (Integral 2016b), Revised Offsite Investigation Summary Report (Integral 2017), Revised Area A Removal Action Work Plan (Integral 2019), Revised Area A Removal Action Completion Report (Integral 2020a), and Revised Area C Removal Action Work Plan (Integral 2020b).
50. Appendix M, Table M-1, page 1 of 13. Table M-1 inaccurately describes information pertaining to the Gallade remediation system. Of the 25 wells listed on Table M-1, almost all information is incorrect. Table M-1 should be updated as follows:

Well ID	Correction
E-1	Monitoring well only.
E-10	DPE component only, active since January 2003
E-11	DPE component only, active since January 2003
E-12	DPE component only, active since January 2003
E-13	DPE component only, active since January 2003
E-14	DPE component only, active since January 2003
E-15	DPE component only, active since January 2003
E-16	DPE component only, active since January 2003
E-2	Monitoring well only
E-2A	DPE component only, active since January 2003
E-2D	Monitoring well only
E-3	DPE component only, active since January 2003
E-4	Monitoring well only
E-5	Monitoring well only
E-6	Formerly pump and treat component, replaced by well E-6R, well location decommissioned in 2008
E-6R	Accurate
E-7	Monitoring well only
E-8	Monitoring well only
E-9	Monitoring well only

Well ID	Correction
MW-2	Component of DPE system since January 2004. From 1990 – 2003 part of pump and treat system.
MW-2D	Monitoring well only
MW-3	Pump and treat component only, active since 1990
MW-18	DPE component only, active since January 2003
MW-19	DPE component only, active since January 2003
MW-24	Pump and treat component only, active since 2003

51. Appendix P, Table P-1, Page 1 of 14. The wells MW-20, MW-21, MW-22, and MW-23 are all hydraulically upgradient of the Gallade property. Gallade's ongoing, long-term operation of its remediation systems has created groundwater flow into the property from all directions, and the capture zones of Gallade's remediation wells extends well beyond the Gallade property boundaries.
52. Appendix P, Table P-3, Page 1 of 17. The wells MW-20, MW-21, MW-22, and MW-23 are all hydraulically upgradient of the Gallade property. Gallade's ongoing, long-term operation of its remediation systems has created groundwater flow into the property from all directions, and the capture zones of Gallade's remediation wells extends well beyond the Gallade property boundaries.
53. Appendix P, Table P-5. Why weren't Gallade on property wells included? Gallade has been remediating groundwater from 1990 to present. The Mann Kendall Trend Analysis is extremely relevant to the Gallade remediation system groundwater and COPC capture and effectiveness. Decreasing trends in Gallade onsite wells are expected. This information is directly relevant to the Supplemental RI Report conclusions with respect to the need, or lack thereof, of off "source site" (OU2) groundwater remediation near Gallade.
54. Appendix Q. Borehole logs for many of the wells used in cross sections A-A' and G-G' are missing from the Appendix Q. The borehole logs for the following wells should be included: 3-E-5, 3-E-15, 3-E-13, 3-MW-27, 3-M-1, 3-E-10, 3-MW-36B, 3-E-6R, 3-MW-25, 3-M-1, 3-M-5, 3-M-3, and 3-M-4.

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Integral. 2020b. Revised Area C removal action work plan. Prepared for Gallade Chemical, Inc., Santa Ana, CA. Integral Consulting Inc., Portland, OR. August 19.

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