



South Tahoe Public Utility District

# Responsiveness Summary for Item 12 Interim Remedial Action Plan

Feasibility Study of Remedial Alternatives to Mitigate  
Tetrachloroethylene Contamination (Agreement  
D1712508)

Ivo Bergsohn, PG, HG  
6/12/2020

*Funding for this project has been provided in full or in part through an agreement with the State Water Resources Control Board using funds from Proposition 1. The contents of this document do not necessarily reflect the views and policies of the foregoing, nor does mention of trade names or commercial products constitute endorsement or recommendation for use*

**RESPONSIVENESS SUMMARY FOR  
ITEM 12 INTERIM REMEDIAL ACTION PLAN  
FEASIBILITY STUDY OF REMEDIAL ALTERNATIVES TO MITIGATE TETRACHLOROETHYLENE  
CONTAMINATION  
CALSTARS AGREEMENT NO. D1712508  
June 12, 2020**

## **INTRODUCTION**

The South Tahoe Public Utility District (District) solicited public comment on the March 17 South Y Feasibility Study and March 17 Draft Interim Remedial Action Plan for the South Y PCE Facilities Feasibility Study (Agreement D1712508) during a public comment period that ran from March 17, 2020 through April 16, 2020. On April 16 the District received written comments from PES Environmental Inc. (PES) provided in Attachment A. The District also hosted an on-line meeting on March 31, 2020, in which the District discussed the proposed interim remedial action, as well as the interim remedial alternatives developed during the feasibility study and the criteria used for selection of the preferred alternative remedy. One question was received during the on-line meeting requesting copies of the model and related files for the South Y Fate and Transport Model, which was reiterated in an April 7 email received from PES. On April 24 supplemental comments were received from Counsel representing Fox Capital Management Corporation (Fox) and Counsel representing Seven Springs Limited Partnership (Seven Springs) provided in Attachment B. Responses to supplemental comments are provided at the end of this Responsiveness Summary.

### **1.1 Community Involvement Background**

It is the intent of the District to keep the public informed and receive input concerning its progress during the conduct of the South Y Feasibility Study. To that end, the District prepared fact sheets, media releases and web page postings; and hosted five Public Workshops convened at the City of South Lake Tahoe Council Chambers in South Lake Tahoe, CA. The March 31, 2020 on-line meeting presenting the proposed interim remedial action was hosted in-lieu of a public meeting in light of social distancing guidelines imposed during the COVID-19 public health emergency.

### **1.2 Notification of Public Comment Period**

A Notice of Availability for the Draft Interim Remedial Action Plan was published in the Tahoe Daily Tribune and posted on the District's web site. The District emailed notice of the public comment period and the March 31, 2020 on-line meeting to the approximately 70 people on its interested parties list for the South Y Feasibility Study.

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### **1.3 Explanation of Responsiveness Summary**

Comments received during the public comment for the Draft Interim Remedial Action Plan consists of an email request for a copy of the model and related files for the South Y Fate and Transport Model; and a 111-page electronic document including a 15-page comment letter attached to three appendices and two attachments. The South Y Fate and Transport model files have been provided to PES Environmental outside of this Responsiveness Summary. The comment letter received during the public comment on the Draft Interim Remedial Action Plan has been reviewed and considered by the District in the decision-making process and is addressed below in this Responsiveness Summary.

**PES Environmental, Inc.** Comments on Kennedy Jenks Consultants Inc.'s Draft Interim Remedial Action Plan (IRAP) and South Y PCE Facilities Feasibility Study (FS), South Lake Tahoe, CA, April 16, 2020

The District appreciates the information provided by PES in Sections 1 and 2 of the April 16<sup>th</sup> comment letter.. Specific comments on the Draft Interim Remedial Action Plan and Feasibility Study are provided in Section III of the comment letter. These comments and the District's accompanying responses are provided below.

**Comment 1.** In Section 1.1 of the FS, Kennedy Jenks erroneously refers Seven Springs and Fox as designated Responsible Parties for PCE contamination emanating from the LTLW site. This statement is not accurate and we request that the FS be modified to include all parties named in the Order.

**Response.** The District acknowledges that pursuant to the CAO, Seven Springs, Fox, Bobby Pages, Inc. and Connolly Development, Inc. have been named as Identified Dischargers by the LRWQCB.

**Comment 2.** The FS/IRAP utilizes a numeric groundwater flow & transport model that over simplifies and incorrectly depicts the lithologic conditions observed within the regional groundwater basin. The presence of fine-grained layers within the upper 130 feet inhibits vertical groundwater flow, and DRI's incorrect depiction of actual lithologic conditions precludes a proper simulation of vertical groundwater flow and PCE transport in and around the South Y area. Further refinement and discretization of Layers 1 and 2 should be performed to more accurately reflect observed lithologic conditions.

**Response.** The low permeability clay lens was used in the model to represent fine-grained layers that inhibit vertical groundwater flow between layers 1 and 2. While fine-grained layers are not explicitly represented in the model, the effects of those layers are still included in the hydraulic (vertical and horizontal hydraulic conductivities) and transport (dispersivities and effective porosities in transport parameters) parameterization of the model.

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**Comment 3.** The FS assumes that State Water Resources Control Board, Division of Drinking Water (DDW) will approve construction of replacement well R1, which may contain PCE greater than ten times the Maximum Contaminant Level (MCL). At such concentrations, this well would be an “extremely impaired source” under DDW guidelines and would create the situation that the FS is attempting to avoid; operating water supply wells that contain greater than 50 µg/L PCE. The FS neglects to evaluate the risks of constructing and operating a water supply well designed to remove groundwater with high PCE concentrations that will be subsequently treated and served to City of South Lake Tahoe businesses and residents. DDW states “[t]he use of an extremely impaired source should not be approved unless the additional health risk, relative to the use of other available drinking water sources, are known, minimized, and considered acceptable”. DDW also observes “[t]reatment technologies are not failure proof, and insufficiently treated or untreated water may, on occasion, pass through the treatment process and into the distribution system.” The FS does not evaluate the human health risks associated with failure of the proposed treatment system nor does the FS indicate whether DDW is amenable to reliance upon an extremely impaired source as part of the proposed remedial alternative. Instead, the assessment of remedial alternatives against the evaluation criterion of overall protection of human health and environment is cursory and incomplete. As discussed in Comment No. 15, below, if pumping and treating contaminated drinking water is deemed a viable option, then the FS should fully evaluate wellhead treatment at existing downgradient water supply wells and using the treated water as potable supply.

**Response.** Table 1-1 lists members of the State Water Resources Control Board Division of Drinking Water (SWRCB-DDW) that served in an advisory role during the South Feasibility Study on the Technical Advisory Committee (TAC). During the Feasibility Study, extensive discussions with the TAC were conducted considering various discharge options for groundwater treated to drinking water quality standards by a proposed groundwater treatment facility for Alternative 2 (described in Section 6.2.2.2 of the Feasibility Study Report). From these discussions detailed cost analysis was completed evaluating potable reuse versus two discharge to waste options (connection to the sanitary sewer or discharge to the City of South Lake Tahoe stormwater collection system). Additional discussions were also conducted directly with SWRCB-DDW staff to consider DDW requirements for potable reuse of extremely impaired sources as described in the March 26, 2016 Update of the 97-005 Process Memo for Extremely Impaired Sources – DRAFT. The potential cost impact to comply with the evaluation process described in the 97-005 Process Memo for an Alternative 2 option involving use of an extremely impaired source for potable reuse, with more rigorous standards for water treatment system design and demonstration testing was also discussed. Wellhead treatment alone was considered and carefully evaluated as part of Alternative 1: No Action in the Feasibility Study. Well operations under the No Action Alternative include operation of TKWC 2 (with GAC treatment) as a lag well for the TKWC water system and operation of LBWC 5 (with planned GAC treatment) as a lag well for the LBWC water system (see Section 4.1). The No Action

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Alternative was carefully evaluated for effectiveness, implementability, environmental effects and costs the results of which are presented in Section 6.1.

**Comment 4.** The numeric groundwater flow & transport model assumes all of the PCE mass originates from the immediate vicinity of the former LTLW site. Modeling multiple sources within the basin would change contaminant travel times, plume geometry, and simulated PCE concentrations. A sensitivity analysis should be performed to see how the model results would change with mass input at multiple sources.

**Response.** Multiple potential sources of PCE were identified prior to model development. The former LTLW site was selected to be the location of the simulated PCE source not because it was believed the LTLW was the sole source of mass in the South Y area, but because all other known potential sources were nearby and downgradient from the LTLW. These additional potential sources all fall within the simulated plume originating from the LTLW site, and simulation of additional sources at these sites would therefore serve only to locally increase concentrations and would not meaningfully affect simulated plume geometry for stress periods representing recent time. While changes to release points and timing may show effects in earlier stress periods, large PCE concentration data gaps during this time would make it impossible to know which tested release scenario most closely represented reality. Instead, the simulated plume originating from the LTLW site should be seen as an amalgamation of all PCE sources in the South Y area.

**Comment 5.** The fate and transport simulations for the preferred remedial alternative assume that remediation begins immediately, not after the estimated 3 to 7 years that are expected to implement this remedy. Therefore, the mass removal estimates are incorrect and evaluation of the potential to reduce PCE at LBWC#5 an TKWC#2 is also incorrect. Further it is unclear how far PCE will travel during this implementation period, which could change the siting/location of R1 and its mass removal efficiency.

**Response.** For mass removed at the R1 site, results from the Alternative 2, option 2 model indicate that 50% of the total mass extracted over 20 years will be removed in the first 3 years, and 81% will be removed in the first 7 years. However, this does not mean that mass removed at the site would be reduced by 50-81% given a delay of 3-7 years. Assuming that mass will be removed from the R1 site at the same fractional rate over a 20 year period, mass removal beginning in 3-7 years can be estimated by scaling the total simulated mass removed at R1 in Alternative 2, option 2, to the ratio of predicted concentrations at R1 for the base (no-action) scenario in 3-7 years and for Alternative 2, option 2 at the simulated start of mass removal. Using this method, mass extraction at R1 beginning in 3-7 years is estimated to be between 77.7% (beginning in 3 years) and 47.6% (beginning in 7 years) of mass

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extraction beginning immediately, which was estimated to be 446.6 lbs. Therefore, mass extracted at R1 beginning in 3-7 years is estimated to be 347-213 lbs., respectively, for the non-conservative scenario.

Assuming a 3 to 7 year delay in implementation of Alternative 2, option 2, mass removed by TKWC 1, TKWC 2, and LBWC 5 can be assumed to be the same as estimated by the base scenario over that period (4.5-11.4, 36.4-84.5, and 10.8-24.0 lbs. at TKWC 1, TKWC 2, and LBWC 5, respectively). Mass removed at these wells following implementation of Alternative 2, option 2 scenario can be expected to be less than predicted by the base scenario but greater than predicted by Alternative 2, option 2.

Forward particle tracking at the R1 site for the base model indicates advective plume migration of approximately 150-350 meters (492-1148 feet) over the next 3-7 years, respectively.

**Comment 6.** Neither the FS nor DRI's modeling report describe the capture zone of the proposed replacement well at LBWC#4 so the effect of operating the replacement well on other parts of the plume cannot be assessed by PES.

**Response.** A 20-year capture zone analysis was completed for Alternative 2, option 2 using reverse particle tracking. The results are shown in Figure 1, overlaid on PCE contours generated from recent sampling.

**Comment 7.** In Table 2-2, the PCE mass removed is noted as 800 to 5,000 pounds for preferred remedial alternative, which differs from the range of 700 to 3,500 pounds referenced in the Executive Summary (ES-IV) and Section 6.2.1.1. Which range is incorrect? Are the simulated concentrations from R1 available? Preliminary calculations indicate that the total mass of PCE dissolved in the entire plume is on the order of 1,000 pounds. Based on this analysis and the fact that the preferred remedial alternative is not designed to remove the entire PCE mass comprising the plume. Estimates of GAC use and O&M Costs associated with GAC management should be revised.

**Response.** Simulated concentrations at the planned location of R1 are presented in Figure 2 for Alternative 1A (Base model) and Alternative 2A, option 2 (Targeted Pumping). The model results for PCE mass removed during 2018-2038 for the Preferred Remedial Alternative is 773 lbs. to 3,293 lbs., which was been rounded to 2 significant figures, 770 lbs. to 3,300 lbs. The correct values have been rounded to 2 significant figures and updated throughout the Feasibility Study and Interim Remedial Action Plan.

**Comment 8.** The assumed/simulated concentration of 325 µg/L (Table 6-3) from well R1 is inconsistent with groundwater analytical data for this area (e.g., 42.5 µg/L at LBWC#4; 71 µg/L at Sonic-3; and 74 µg/L at CPT-E04).

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**Response.** The concentration reported for R1 in Table 6-3 is the maximum simulated concentration, which occurred in 1994. The simulated concentration at R1 for the base model (Alternative 1A) was 128.4 ug/l for the 2020 WY (Figure 2).

**Comment 9.** The FS appears to be based on the assumption that the LTLW site is the sole source of PCE in groundwater in the South Y Area. Based on numerous lines of evidence it is apparent that there are a significant number of sites within the South Y area that utilize or utilized PCE and are sources of PCE in groundwater. Thorough characterization and remediation of these PCE source properties needs to be conducted to remove PCE mass from the vadose zone and groundwater at the sources. Investigation of these sites is a significant data gap that needs to be optimized performance of the remedy. Substantial cost reduction of the preferred alternative can be achieved through source removal and significantly less GAC and associated O&M will be required to achieve the cleanup goals.

**Response.** The Feasibility Study was conducted to identify a cost-effective means of removing PCE from groundwater and manage existing groundwater sources to maintain adequate drinking water supply and quality by preventing the migration of PCE contaminated groundwater to down-gradient receptor wells. The May 2019 Fate and Transport Modeling Report acknowledges that multiple potential sources including Norma's Dry Cleaners, Sierra Cleaners, TCI, Redwood Oil, and Big O Tires have also been identified in the South Y area; however, the contribution of each of these sites to the existing plume is unknown. As indicated in the response to Comment 4 the former LTLW site was selected to be the location of the simulated PCE source not because it was believed the LTLW was the sole source of mass in the South Y area, but because all other known potential sources were nearby and downgradient from the LTLW site. In Section 1 of the Draft Interim Remedial Action Plan it is recognized that the preferred remedy is an interim measure and that implementation would be effective in conjunction with remediation by other parties at source area sites contributing groundwater contamination to the South Y Plume.

**Comment 10.** As shown in Appendices B and C, well R1 will not fully capture the PCE plume north and east of Ruth Avenue businesses. The source or sources of this plume must be abated and PCE mass removed from groundwater.

**Response:** Section 1 of the Draft Interim Remedial Action Plan indicates that the preferred remedial alternative is an interim measure that meets the water purveyors objectives of replacing lost water production and preventing PCE contaminant migration in the South Y Area while increasing PCE mass removal and reducing clean-up times needed for PCE concentrations to decline below maximum contaminant levels (MCLs) at down-gradient receptor wells. As an interim measure not intended to address source control, the water purveyors understand that implementation of this alternative would

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be effective in conjunction with remediation by other parties at source area sites contributing groundwater contamination to the South Y Plume.

**Comment 11.** If the preferred alternative is selected, in order to ensure extracted water from Well R1 does not need to be discharged to storm water conveyance or sanitary sewer for treatment, pumping from LBWC#5 and LBWC#1 should be metered so that all water extracted from well R1 is used as a potable drinking water source.

**Response.** Water production from both LBWC5 and LBWC1 are metered by Lukins Brothers Water Company (LBWC). Section 2 of the Draft Interim Remedial Action Plan outlines five phases during implementation of the preferred remedial alternative that would be employed to enable use of R1 as a potable drinking water source.

**Comment 12.** Operation of the groundwater extraction wells at the distal end of the PCE plume should be selected to contain and control the PCE affected groundwater rather than spread the PCE affected groundwater laterally and/or vertically.

**Response.** Section 1.1.1 of the Draft Interim Remedial Action Plan describes the proposed location for R1 at 843 Hazel Drive, South Lake Tahoe, CA. This location is situated within the middle of the South Y Plume. Receptor wells LBWC5, TKWC2 and TKWC1 used for drinking water supply are situated down-gradient with respect to R1 along the plume front. Neither new nor existing wells located at the distal end of the South Y Plume are proposed as extraction wells as part of the preferred alternative remedy.

**Comment 13.** The estimated fees for O&M shown in Table 7-1 for Options 2 and 3 appear to be wrong. It is not clear how O&M fees for sewer discharge (Option 2) and sewer/Stormwater system discharge (Option 3) can be higher than those associated with potable reuse (Option 1).

**Response.** The costs for O&M presented in the South Y Feasibility Study assume that discharges from R1 to the sanitary sewer would require a Special Discharge Permit from the District. Costs and expenses related to a Special Discharge Permit include; 1) an annual permit fee of \$600; 2) a discharge rate fee of \$6.50 per one thousand gallons; 3) District laboratory and testing costs; and 4) District's cost and expenses including, but not limited to inspections, testing and sampling. When these Special Discharge Permit costs are considered, potable reuse (Option 1) was determined to be the most cost-effective discharge option. Values have been rounded to 2 significant figures throughout the Feasibility Study and the IRAP.

**Comment 14.** There is no cost-benefit analysis for providing treated, potable water from R1 to the water purveyors. However, the costs for treatment of iron and manganese are included and range from \$470,000 to \$1,000,000 with a 25% contingency. If the proposed remedy includes costs for treatment of

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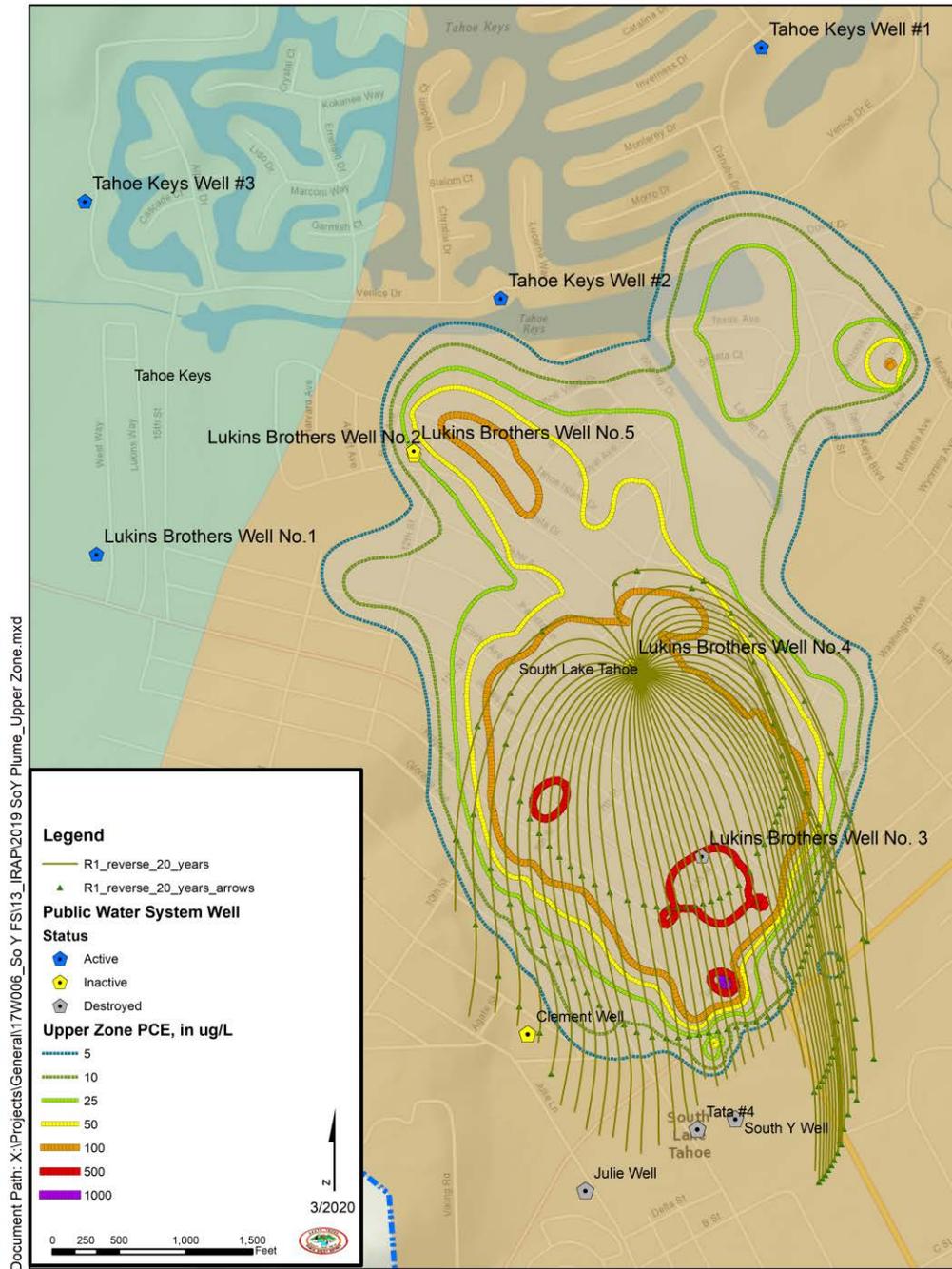
background conditions in order to supply potable water, the remedy should benefit from a credit for providing treated, potable water or the costs for the treatment for background conditions should be removed from the estimated fees.

**Response.** Treated groundwater from the R1 groundwater treatment facility is proposed to be discharged to the distribution systems of the District, TKWC and LBWC for potable reuse. Treatment costs for the removal of iron and manganese to meet Secondary Drinking Water Standards are included as removal of these regulated contaminants would be a condition for acceptance of this treated water into the District, TKWC and LBWC water distribution systems.

**Comment 15.** It is unclear why wellhead treatment alone was not considered as an alternative. Wellhead treatment using GAC at a downgradient water supply using realistic PCE mass loading in conjunction with the current plan for LBWC#5 should be fully considered and costs should be developed for this alternative. This alternative in conjunction with source remediation will remove PCE mass from the groundwater and the infrastructure to support this alternative is likely currently available at the downgradient water supply wells.

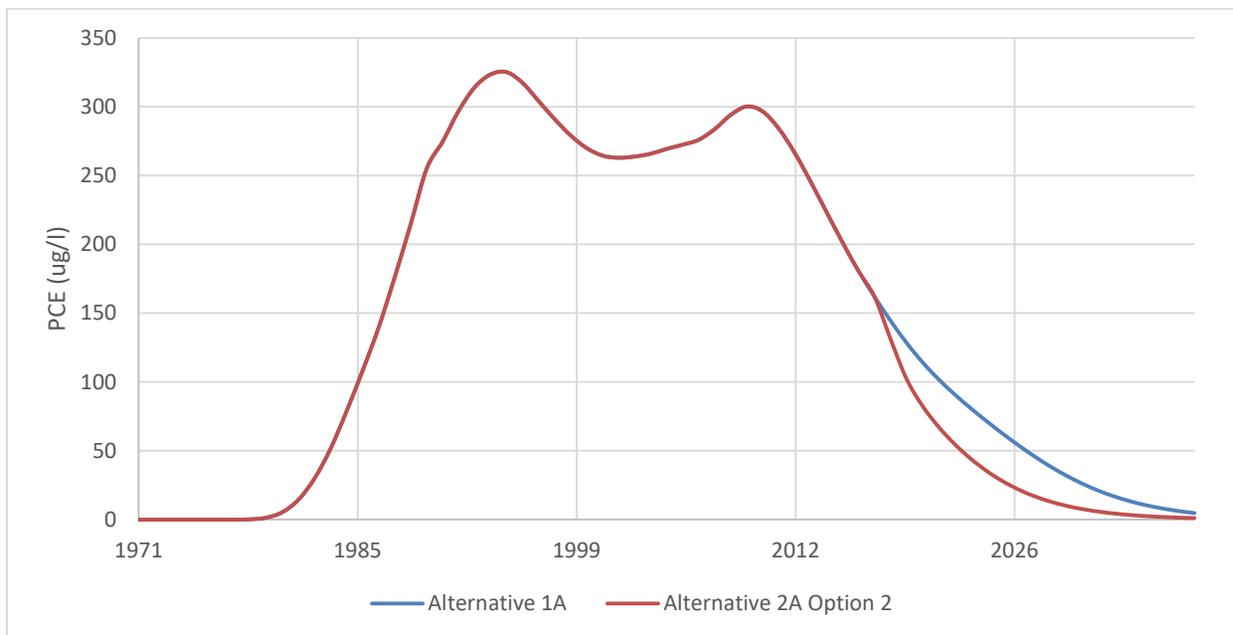
**Response.** Wellhead treatment alone was considered and carefully evaluated as part of Alternative 1: No Action through the Feasibility Study. Well operations under the No Action Alternative include operation of TKWC 2 (with GAC treatment) as a lag well for the TKWC water system and operation of LBWC 5 (with planned GAC treatment) as a lag well for the LBWC water system (see Section 4.1 of the Feasibility Study). The No Action Alternative was carefully evaluated for effectiveness, implementability, environmental effects and costs, the results of which are presented in Section 6.1 of the Feasibility Study.

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**Figure 1.** 20-year reverse particle tracking results at the R1 site for Alternative 2, option 2, indicating the 20-year capture zone for this hypothetical well, overlain on PCE contours generated from recent sampling efforts.

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**Figure 2.** Simulated concentrations at the R1 site for the base (no-action) scenario (Alternative 1A), and Alternative 2A, option 2.

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**Scott H. Reisch, Tarantino, William F.** Supplemental Comments on Kennedy Jenks Consultants Inc.'s Draft Interim Remedial Action Plan (IRAP) and South Y PCE Facilities Feasibility Study (FS), South Lake Tahoe, CA, April 24, 2020

The District appreciates the supplemental comments provided by Scott Reisch, Counsel for Fox and William Tarantino, Counsel for Seven Springs in their review of the Draft Interim Remedial Action Plan and South Y PCE Facilities Feasibility Study. These supplemental comments and responses to those comments are provided below.

**Comment 1:** We have concerns about the process pursuant to which this plan was developed. Both the Technical Advisory Committee ("TAC") and the Stakeholder Advisory Group ("SAG") include representatives of Lukins Brothers Water Company ("LBWC"), and employees of Tahoe Keys Water Company ("TKWC"). Both LBWC and TKWC have filed litigation claims against alleged responsible parties and stand to benefit financially from the preferred remedial alternative identified by the FS. Such financial benefits appear to include construction of a new water supply well with treatment facility/structure at the 843 Hazel Drive, which is owned by LBWC. Further, the IRAP indicates that LBWC may receive rental/leasing fees for use of the 843 Hazel Drive property. IRAP at 4 ("Agreements will be needed to either lease the property or obtain access from LBWC to construct and operate the R1 groundwater treatment facility.")

Further, the members of the TAC representing LBWC and TKWC do not appear to have technical backgrounds in groundwater remediation, migration of contaminants, and the management of groundwater sources. According to LinkedIn profiles for these individuals, neither has a background in geology, engineering, water resources management, or other technical degree. Yet, each of these members of the TAC is "[r]esponsible for review of Technical Work Plans and Technical Reports." FS at 4. They are further responsible for "[a]ssist[ing] in resolving technical issues associated with project implementation." *Id.* It is concerning that technical aspects of the FS were formulated relying on non-technical representatives from water purveyors.

**Response:** The Feasibility Study was conducted to identify a cost-effective means of removing PCE from groundwater and manage existing groundwater sources to maintain adequate drinking water supply and quality by preventing the migration of PCE contaminated groundwater to down-gradient receptor wells. PCE groundwater contamination from this plume has impaired groundwater sources used for drinking water supply in the LBWC, TKWC and District's water systems. As the remedial alternatives considered to address this problem were evaluated based on effectiveness, implementability, environmental effects and costs, the TAC was broadened to include management from LBWC and TKWC. Input from these

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agencies was deemed to be critical in order to develop and select a preferred remedy that would be acceptable for possible implementation.

**Comment 2:** While non-technical, financially-interested water purveyors are well-represented on these committees, the broader community is not. The sole “community rate payer” representative on the SAG is Harold Singer. The FS identifies Mr. Singer as “retired” but fails to mention the position from which he retired. Mr. Singer was the Executive Officer of the Lahontan Regional Water Quality Control Board (“LRWQCB”) for many years, where he oversaw numerous (and, unfortunately, utterly inadequate) investigations into PCE discharges throughout the South Lake Tahoe area. He is hardly a typical community rate payer, and, at a minimum, his background should be fully disclosed in the FS.

**Response:** Mr. Singer’s 23 years of experience as Executive Officer at the Lahontan Regional Water Quality Control Board and local resident is not a typical community rate payer. His knowledge, work experience and deep understanding of groundwater issues are regarded as significant assets to the SAG.

**Comment 3:** The full impact of the water purveyors on the FS process is unknown. What is known is that the water purveyors succeeded in inserting in the FS four “Additional Remedial Action Objectives (“RAOs”)” that “are important to the water purveyors” but which were not identified as RAOs through consideration of EPA guidance documents. FS at 7. RAOs are critically important as they are the criteria by which remedial alternatives are identified and evaluated. In the FS, the Additional RAOs include “preserve ability to recover future HVOC response costs from responsible parties and/or state grant funding.” FS at 7. The Additional RAOs do not support the overarching goal of the FS, which is “to identify cost-effective remedial alternatives that can be taken to remove PCE from groundwater and manage existing groundwater sources to maintain adequate drinking water supply and quantity.” FS at 6. In other words, rather than being based on public health and the environment, as well as overall cost effectiveness, the inclusion of these Additional RAOs means the FS has a built in preference for a remedial alternative that benefits TAC members LBWC and TKWC—both of whom have already filed lawsuits against alleged responsible parties—in their litigation.

Other Additional RAOs include “preference for potable reuse of any extracted groundwater resources” and “[r]educe water treatment costs,” which again, were not identified as RAOs in accordance with EPA guidance. FS at 7. Because of these Additional RAOs, the “remedial alternatives were not targeted specifically at wellhead treatment, though that is a typical focus of RAOs.” FS at 7. In short, the FS dismissed a typical remedial alternative simply because the water purveyors did not like it. *See also* FS at 40 (rejecting a remedial alternative that showed “great effectiveness” due to “water purveyor concerns.”)

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**Response:** The RAOs were developed based on EPA Guidance, site-specific remedial objectives and input from the TAC. EPA Guidance referenced in the Feasibility Study was developed by EPA to help identify the full range of remedial objectives that are appropriate for a particular CERCLA or RCRA groundwater clean-up site. In their guidance EPA acknowledges that the full range of remedial objectives may differ due to a number of factors including but not limited to source characteristics, site characteristics, and response type. For these reasons, EPA guidelines are flexible and also encourage the use of site-specific remedial objectives. For example, the TAC's objective included restoring the beneficial uses of groundwater. To that end, South Y-Specific RAOs included groundwater treatment levels that would insure public acceptance for potable reuse; and preference for potable reuse over discharge to waste. Under Special Condition D of the grant Agreement D1712508 used to fund the Feasibility Study, the recipient is required to exercise reasonable efforts to recover the costs of groundwater clean-up from the parties responsible for the contamination. During the Feasibility Study cost recovery was also being considered and ultimately pursued by LBWC and TKWC in response to water quality impairments of their drinking water wells. For these reasons a South Y-Specific RAO was added requiring the Feasibility Study to be conducted in a manner that preserved both the state's and water purveyor's rights to pursue cost recovery. Use of the South Y RAOs acknowledges the differing objectives for the South Y Feasibility Study and use of these RAOs are believed to be consistent with EPA Guidance.

**Comment 4:** The FS's improper identification of RAOs appears to have resulted in pre-selecting the preferred alternative. Although most of the RAOs are based on EPA guidance, the FS includes, without explanation, a "South Y-Specific RAO" described as "Area of Attainment: Address groundwater in mid-plume area including groundwater above 100 feet bgs with high concentrations of PCE in mid-plume and/or replacement wells in deeper aquifer outside of the plume." According to EPA guidance that the FS relied upon to identify RAOs, "[t]he area of attainment defines the area over which cleanup levels will be achieved in the ground water. It encompasses the area outside the boundary of any waste remaining in place and up to the boundary of the contaminant plume." See EPA, Office of Emergency and Remedial Response, Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites, EPA/540/G-88/003., at 5-

The FS ignores this definition and narrowly redefines the "area of attainment." Based on the FS's re-interpretation of the "Area of Attainment" RAO, it is no wonder that the FS's preferred alternative matches this pre-selected objective.

Other RAOs are entirely ignored or mis-applied. In particular, based on EPA guidance, the FS identifies an RAO as "Control and minimize further migration of contaminants from source materials to ground water (source control)". See FS at 6-7. Unfortunately, the FS then translates this "source-control" RAO into a "South Y-Specific RAO" that is focused on reductions at drinking water wells instead of sources.

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*Id.* The FS's decision to ignore source control RAOs conflict with EPA guidance, which stresses the importance of addressing contamination caused by multiple sources and cautions that failing to do so will result in a less effective remedy. See, EPA, Office of Emergency and Remedial Response, *Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites*, EPA/540/G-88/003., at B-1, B-4

**Response:** The TAC acknowledged the primacy and responsibility of the Lahontan Regional Water Quality Control Board (LRWQCB) for directing the investigation and clean-up of PCE groundwater contamination at source area sites. Therefore, a South Y-Specific RAO was developed targeting clean-up efforts within the mid-plume area to prevent the migration of PCE contamination to down-gradient receptor wells while removing potential interference with on-going or future groundwater clean-up efforts at identified source area sites.

**Comment 5:** The FS states that the DRI model was based on releases of PCE in the late 1970s. FS at 14. Based on the testimony of Lake Tahoe Laundry Works operators, the spill at the Lake Tahoe Laundry Works Site is believed to have occurred before November 1973. And, in fact, the DRI model itself indicates that it is based on the assumption that a release at Lake Tahoe Laundry works occurred before 1973. See DRI, Fate and Transport Modeling of the South Y PCE Groundwater Contamination Plume (Jun. 28, 2019) at 5-6.

**Response:** Background and site investigation findings included in the May 12, 2017 LRWQCB Clean-up and Abatement Order R6T-2017-0022(CAO R6T-2017-0022) indicates that a dry cleaning unit operated at the former Lake Tahoe Laundry Works facility since at least 1972 until about 1979. The FS will be corrected to coincide with the assumption used in the June 28 Fate and Transport Modeling Report which is in agreement with the findings included in CAO R6T-2017-0022.

**Comment 6:** As indicated on page 8 of our April 16, 2020, comments, EKI has calculated the mass of PCE dissolved in the PCE plume to be much lower than assumed in the FS. EKI's calculations (see attached) indicate the estimated PCE mass within the entire South Y plume ranges from approximately 100 to 300 pounds, whereas the FS states modeling "completed by DRI suggests that about 700 to 3,500 pounds (lbs.) of PCE may be expected to be removed from groundwater." FS at iv.

**Response:** As described in Section 2.2.4 of the Feasibility Study Report the South Y Fate and Transport Model was used to predict PCE mass removal, PCE concentration trends, clean-up times and plume extent. The Fate and Transport Model was derived from a sub-section of the South Tahoe Groundwater Model which was developed by DRI to address Basin Management Objectives defined in the groundwater management plan for the Tahoe South Subbasin (6-005.01). Due to limited data on source area locations and PCE concentrations, the amount of PCE contaminant mass added to the Fate and Transport Model (source term) was adjusted to the amount of PCE mass needed to generate a

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contaminant plume that matched the observed PCE groundwater concentration trends at selected receptor wells used for model calibration. During predictive model runs for alternatives evaluation, two simulations were performed for each alternative. These included an initial simulation using the calibrated model parameters including source depletion and biogenic decay and a conservative simulation assuming a persistent source with no biogenic decay. Additionally, both models allowed for the simulation of sorption of PCE to organic matter in the aquifer, a concentration-dependent process which temporarily 'removes' mass from groundwater and then releases it when ambient groundwater concentrations are lower. The total mass removed reported in the Feasibility Study Report is the predicted total PCE contaminant mass removed by specified pumping wells over the future period (2019- 2038) used to simulate groundwater clean-up.

Thank you for the PCE Mass calculations provided in the April 24 letter from EKI [*Transmittal of Calculations Regarding Perchloroethylene Mass in Groundwater Within South Y Area, South Lake Tahoe California (EKI A70020.01)*]. Based on the information contained in this letter it is our understanding that the PCE mass reported by EKI is based on isoconcentration contour maps of the South Y Plume presented in EKI's April 2020 Investigation Summary Report. As the data and methods used to estimate the PCE contaminant mass in the South Y Plume differ, it is no surprise that the predicted mass in the South Y Plume reported by EKI is significantly different than the predicted total PCE contaminant mass removed by pumping wells estimated using the South Y Fate and Transport Model.

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**Attachment A**

Comments on Kennedy Jenks Consultants Inc.'s *Draft Interim Remedial Action Plan (IRAP)* and *South Y PCE Facilities Feasibility Study (FS)* South Lake Tahoe, California (PES Environmental Inc., April 16, 2020).

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**Attachment B**

Supplemental Comments on Kennedy Jenks Consultants Inc.'s *Draft Interim Remedial Action Plan (IRAP)* and *South Y PCE Facilities Feasibility Study (FS)* South Lake Tahoe, California (Scott H. Reisch and Tarantino, William F., April 24, 2020).