Draft Response to Comments
Department of Toxic Substances Control, October 4, 2010

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1		In addition to removing obstructions like pipe, pumps, and tubing, all of the wells that have silted up should be bailed to within five-to-ten feet of their original depth before beginning grouting or perforating to better ensure completing effective seals for the full lengths of the wells.	Wells INJ, EXT, and CAS2 are silted up (approximately 25, 12, and 20 feet from original depths, respectively). As discussed with DTSC, the silted up portion of the well does not extend beyond the screened portion of the well. Therefore, the silt will remain in place and the portion of the well above the silt will be perforated with a Mills knife and grouted.
3		Table 1 identifies seven wells that are proposed to be destroyed by overdrilling and grouting from the bottom to the top. We agree with the proposed method and believe it should be considered for all of the wells.	Overdrilling was considered for all wells. However, this is not possible for some deeper wells, and wells inside buildings.
4		The steel cased wells are proposed to be grouted in two stages. First the bottom screen or lowest intervals reachable will be sealed (likely with sand-cement grout). Second the casings will be perforated (ripped) using a Mills knife from the newly-grouted interval to near the ground surface. Following that, the perforated casing will be grouted from the bottom to the top. • For the second stage of borehole grouting, we believe that neat cement or a cement-bentonite grout should be used and will provide better infiltration into fine-grained strata than would sand-cement grout. • The frequency of density of perforating needs to be specified. Re-establishing the integrity of fine-grained, low-permeability strata is a primary goal of well decommissioning. Accordingly, the casing adjacent to finer-grained sediments should be more heavily perforated than casing adjacent to coarser strata. Perforating frequencies should preferentially target finer-grained strata as identified based on available boring logs and well construction logs. For example, perforate five-foot long intervals adjacent to fine-grained strata at a schedule of three cuts (~120 degrees radically) per foot in addition to perforating the rest of the casing at a lower density. • If fine-grained intervals cannot be identified based on available data, the use of natural gamma logging should be considered.	A neat cement grout will be used for the borehole grouting. A column has been added to Table 1 in the Technical Memorandum which outlines intervals of high-density perforating.

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5		The tech memo states "RES1 and RES2 will be drilled inside the casing to determine whether the electrodes that had been grouted in place provide a hollow area or whether the wells are already grouted in their entirety. If no open space is discovered, no further destruction is proposed." The proposed approach will not address gaps and leaks between the outside of the casing and the adjacent sediments. Also, drilling out the inside of the casing will likely damage the annular seal. The integrity of the cement annular seal could be investigated using cement bonding logging, but the results might not be conclusive. The casings should be removed or perforated and grouted similar to the other wells.	RES1 and RES2 will be considered closed in place given their construction specifications. These two borings were drilled as part of a geolithic study and had no slotting in the casing and were not developed as wells. These borings were used by researchers to hold sensors underground at specific depth intervals. The sensors were lowered into the casings then grouted into place. When these borings were drilled, the researchers specified that the outer grout material be mixed with salt water, as described above. Tetra Tech consulted chemists within Tetra Tech as well as a UC Berkeley professor. Each professional stated that high sodium chloride concentrations are often used to accelerate the curing process and to gain strength and should not affect the long term stability of the grout. They also stated that the salt could potentially corrode the steel casing. According to the design specifications, the casings for RES1 and RES2 were to be 2 feet of steel casing followed by 8 feet of PVC casing, so only 20 percent of the casing is steel. The casing is enclosed in grout on the inside and outside of the casing; therefore, the stability of the borings as a whole are considered intact and comparable to a closed boring, which is in essence, a column of grout. This conclusion is backed up by a 1964 study, "The Effect of Salt in Concrete on Compressive Strength, Water Vapor Transmission, and Corrosion of Reinforcing Steel" which is included as Attachment 5 to this report.
6		Water quality sampling is not proposed but the Tech Memo states "Temporary piezometers have been installed adjacent to the well closure locations…" Please confirm that the referenced piezometers are down gradient and at similar depths as the shallow well closures, supporting this determination with a ground water elevation contour map illustrating site features, water levels, contours and well locations. Also, collect ground water samples for analysis from deeper wells before destruction or propose grab sampling from corresponding depth intervals at down gradient locations.	Figure 2 shows the wells proposed for closure as well as the piezometers installed as part of the Field Sampling Workplan groundwater investigation. Also shown on Figure 2 are the groundwater contours collected in November 2010. This figure shows that the piezometers cover the entire RFS, and provide chemical and groundwater flow data from both upgradient and downgradient of the wells proposed for closure. This information provides sufficient chemical information to close shallow wells proposed for closure without additional sampling Deeper wells OBS6 and EXT will be sampled and analyzed for pesticides, polychlorinated biphenyls (PCB), semi-volatile organic compounds (SVOC), total extractable petroleum hydrocarbons (TPH-e), total purgeable petroleum hydrocarbons (TPH-p), polycyclic aromatic hydrocarbons (PAH), and VOCs.