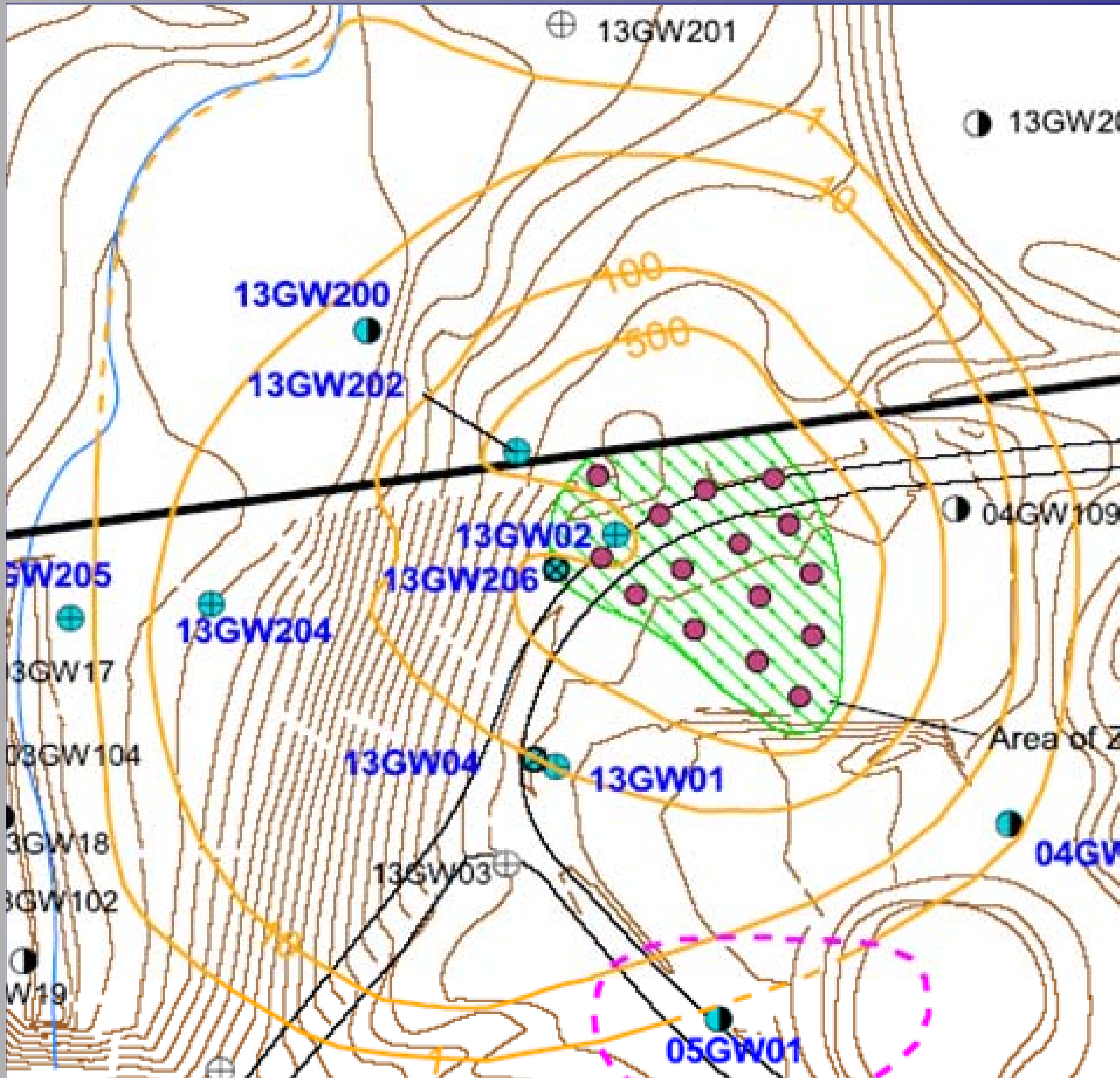
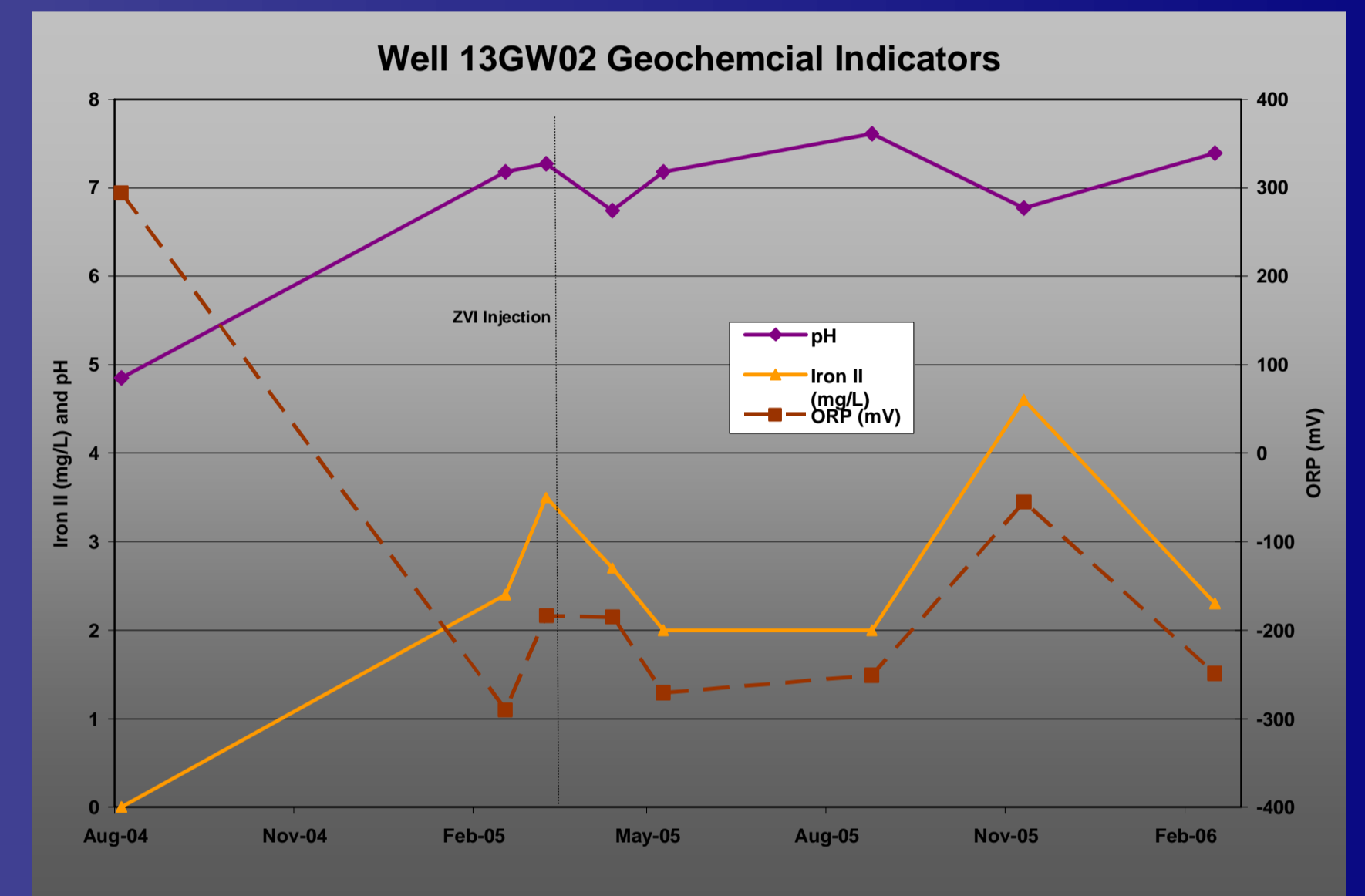
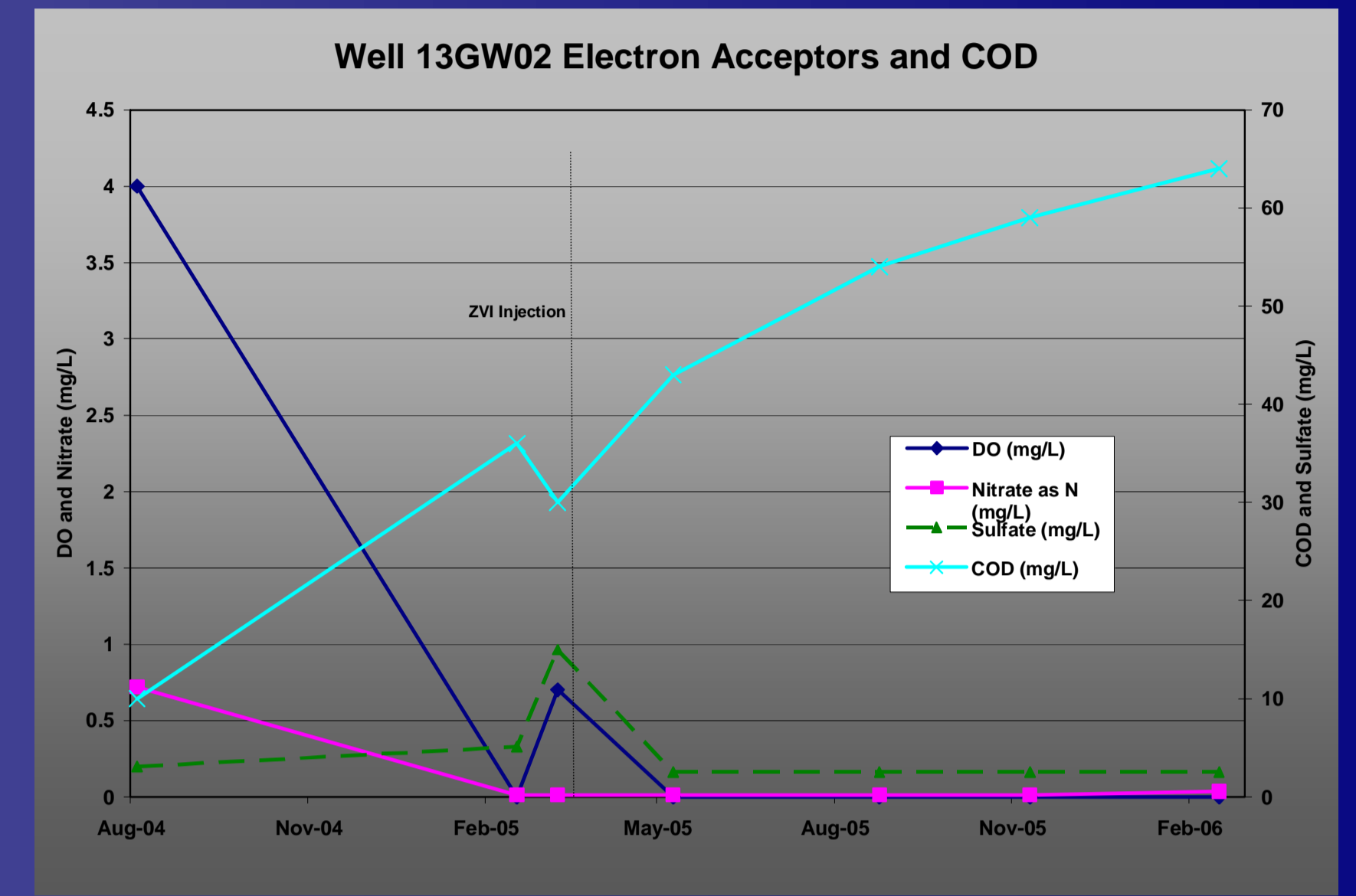


1 Year Post-Injection – February 2006



- Electron acceptors and geochemical conditions in TRZ 1 year after ZVI injection:
 - DO at 0 mg/L
 - Nitrate at 0.035 mg/L
 - Sulfate at <2.5 mg/L (nondetect)
 - COD at 64 mg/L
 - pH at 7.39
 - ORP at -249 mV
 - Iron II at 2.3 mg/L



Conclusions

- ZVI was effective at decreasing cVOCs in the TRZ. Effective results were demonstrated within 1 month after the injection.
- The ZVI is expected to continue dehalogenating the cVOCs in the TRZ for another year. Reinjection will be evaluated in 2007.
- Achieved effective radius of at least 20 feet in saprolite formation using pneumatic fracturing and liquid atomized injection of a ZVI slurry with nitrogen gas (i.e., the FeroxSM method).
- Need better monitoring well coverage in TRZ to evaluate reduction of cVOCs throughout entire TRZ.

Uncertainties

- 500 µg/L contour area is likely smaller than shown; however, TRZ cannot be accurately delineated at this time. Additional monitoring wells will be installed in summer 2006 in the TRZ to determine cVOC reduction throughout entire TRZ.
- Monitoring well coverage is limited outside of the GSA property on the north side of the TRZ.
- Was sufficient ZVI injected to create strongly-reducing conditions that promote abiotic degradation processes? Post-injection ORP levels in the source area are on the order of -200 mV and some modest increase in intermediate by-products have been observed (although their concentrations appear to be decreasing). Both suggest that biological degradation may be a key component.
- Impact of ZVI downgradient and timeframe of remediation. Is well 13GW204 impacted by the ZVI? Did the ZVI push groundwater and cVOCs toward 13GW204 faster than normal groundwater flow?



Design Cost	\$11,400
Implementation Cost (Drilling and Injection)	\$410,000
Monitoring Cost	\$20,000
Analytical Cost	\$23,000
Final Cost:	\$464,400
Completion Date:	Basis of Design – October 2004 Implementation – February 2005 Performance monitoring – Ongoing

