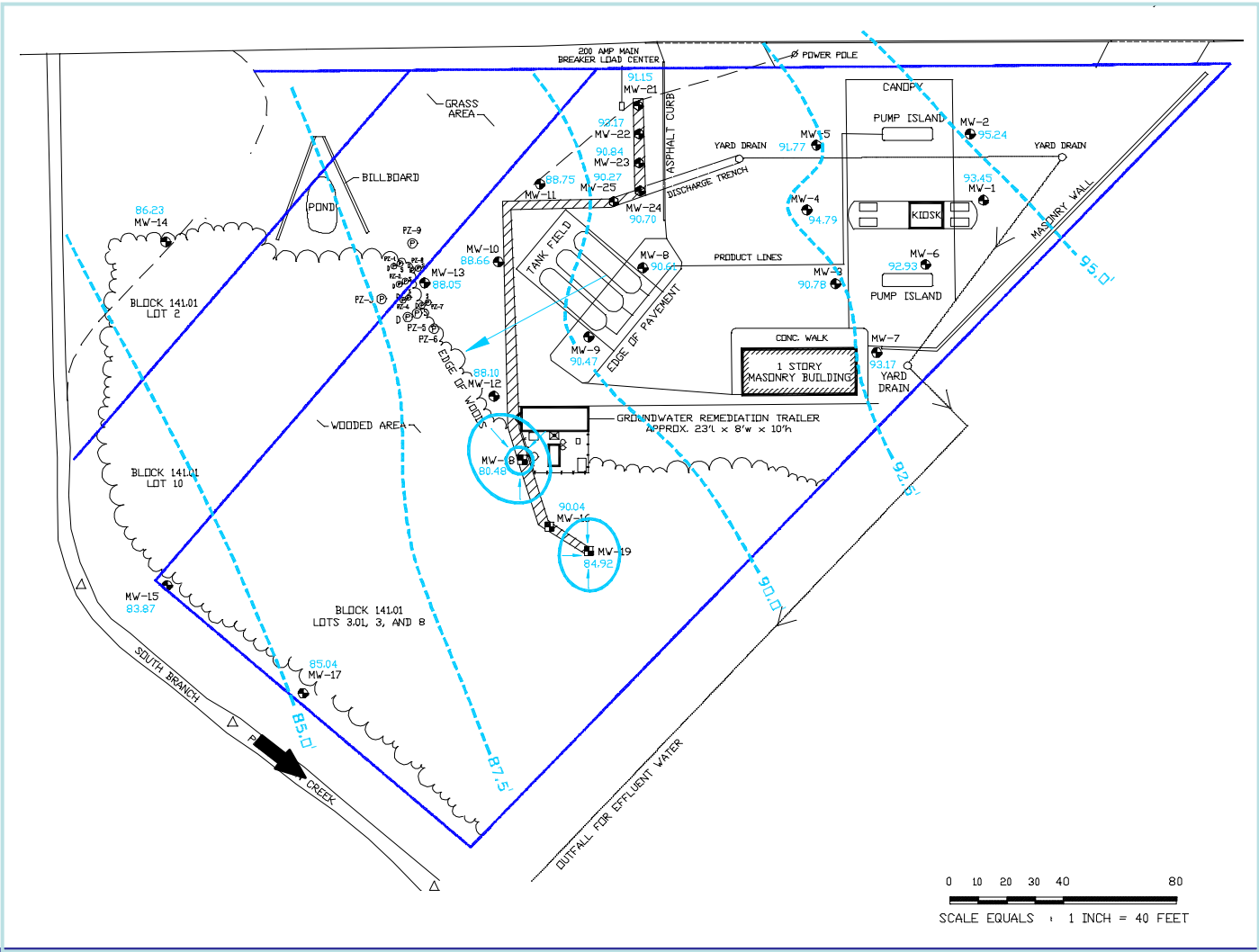




Accelerated Bioremediation &
Natural Attenuation by
iSOC™
Groundwater Remediation System
Case Study – Maple Shade

iSOC™ Demonstration – Site Plan



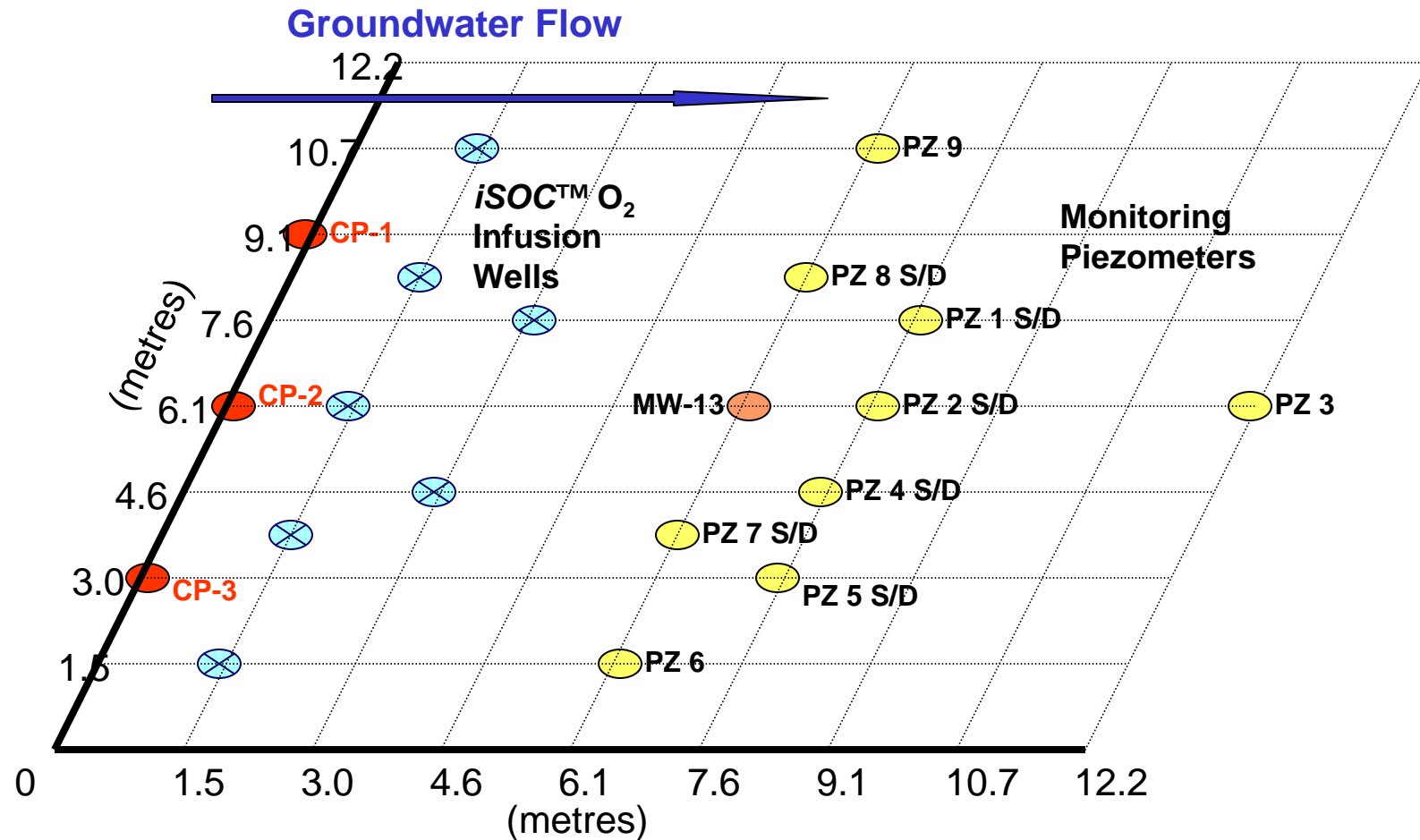
iSOC™ Demo– Site Conditions

- Active service station
- Sand & silty sand underlain by silts & clays
- Depth to groundwater: 1.8 – 3.7 m below ground surface
- Groundwater velocity: 9 – 12 cm/day
(conductivity 54 – 80 cm/d, gradient 0.028)
- Historical groundwater MTBE concentrations indicate slugs moving through aquifer
- Recovery wells yield up to 3.8 lpm, existing air stripper/GAC system has iron clogging problems (ferrous iron ~30 – 80 mg/l)

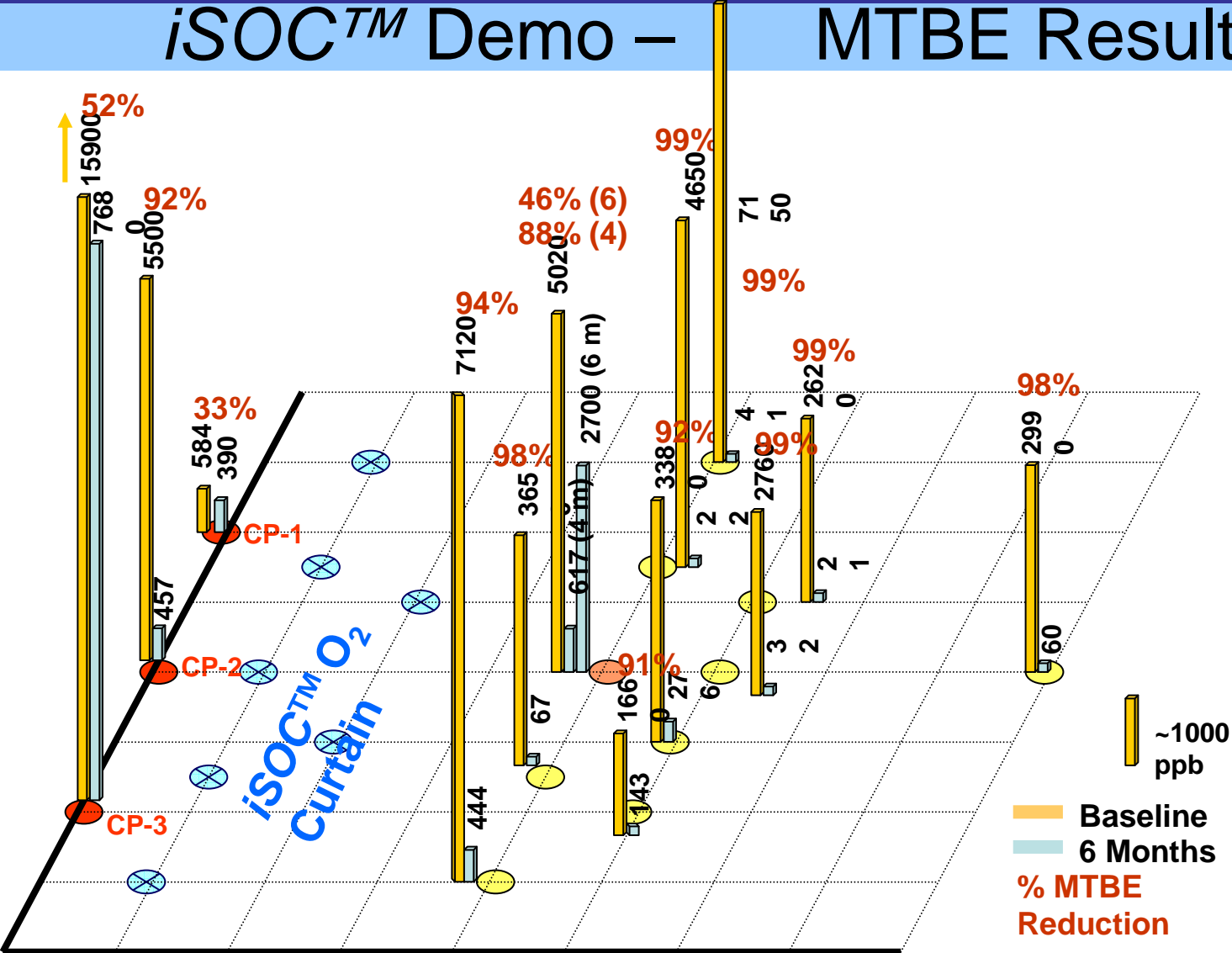
iSOC™ Demo– Baseline Conditions

- 28 wells (3 existing, 25 new) sampled for baseline event
- Wells sampled & analyzed for BTEX, MTBE, TBA, biological parameters, pH, temperature, & conductivity
- Baseline MTBE concentrations range from 3 to 7 ppm, TBA from 20 to 30 ppm, & Benzene up to 0.6 ppm
- Baseline event shows aquifer in anaerobic & reduced conditions

iSOC[™] Demo – Treatment Area Schematic

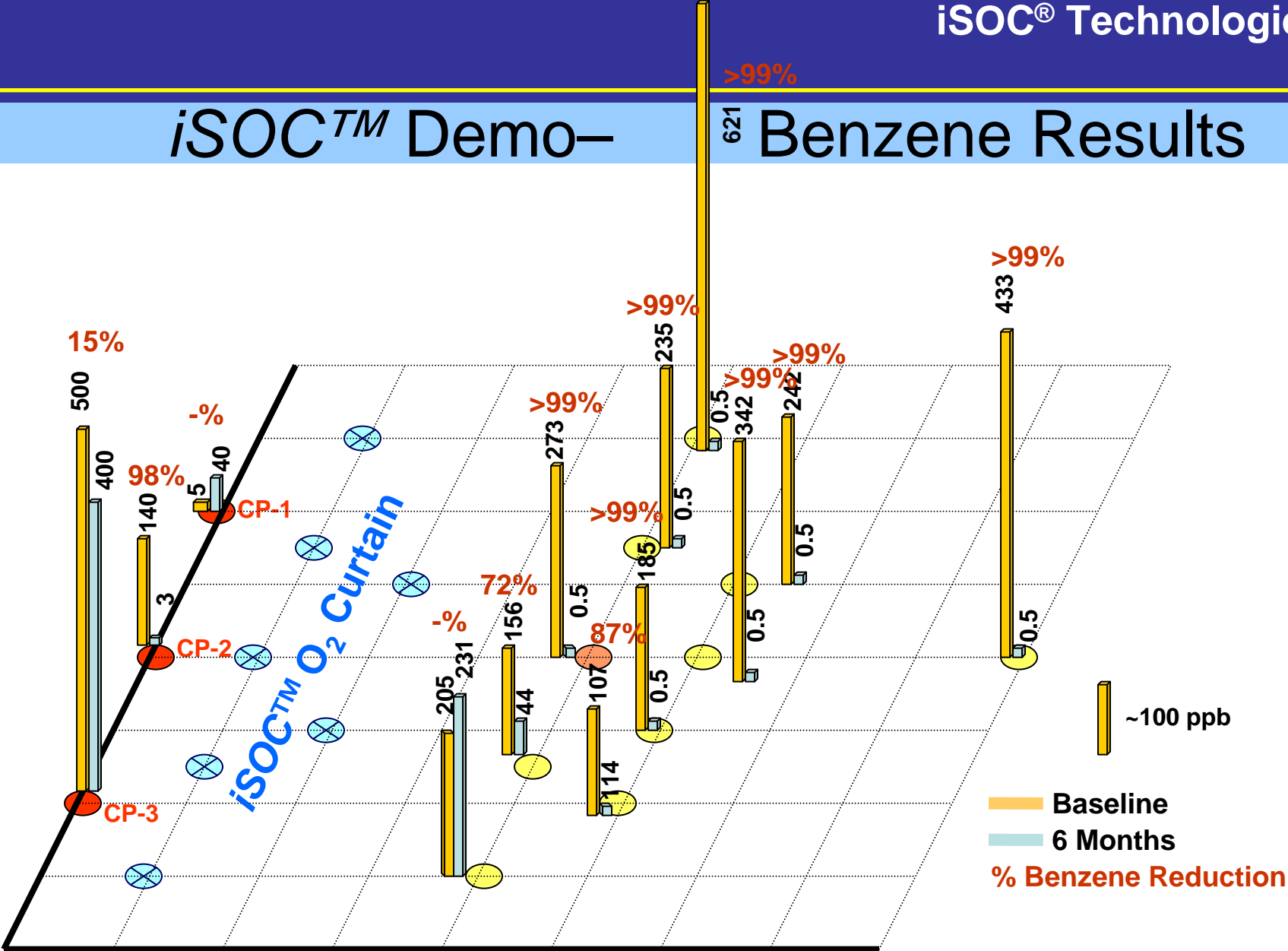


iSOC[™] Demo – MTBE Results

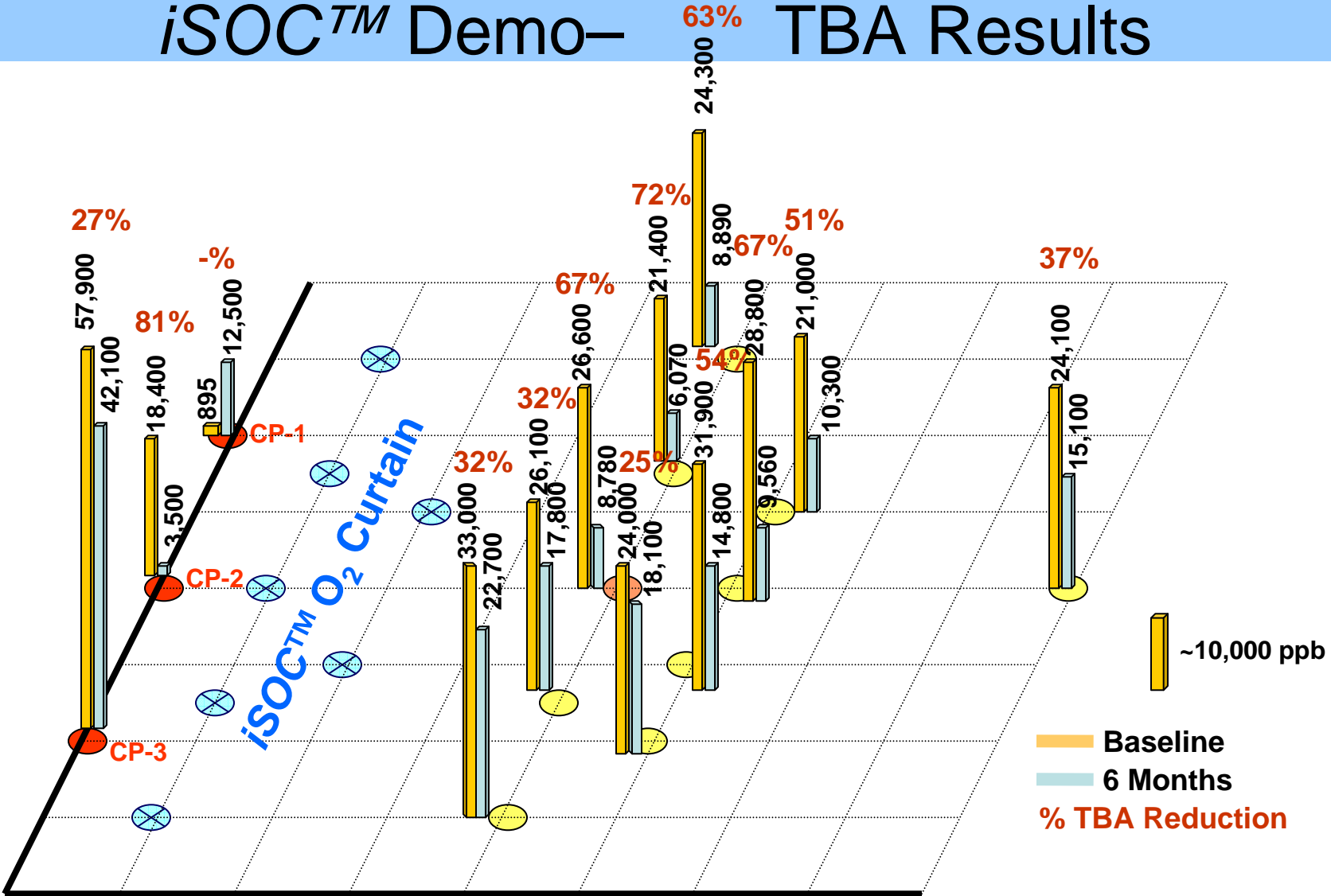


iSOC[™] Demo-

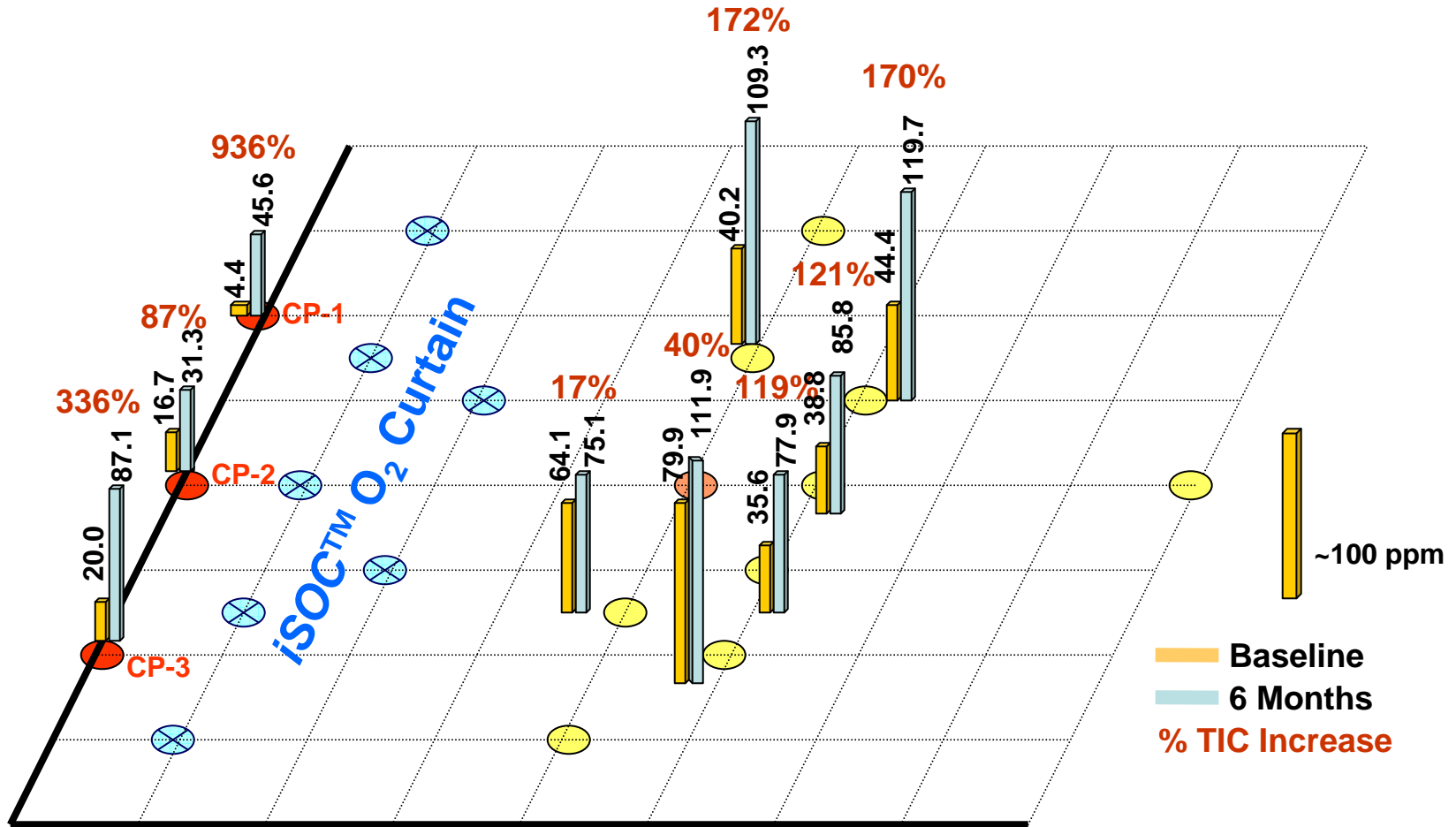
Benzene Results



iSOC[™] Demo- TBA Results



iSOC[™] Demo – Groundwater TIC Results



*iSOC*TM Demonstration– Conclusions

- 3 months after *iSOC*TM system installed, an effective barrier of DO was established
- *iSOC*TM O₂ barrier effective in attenuating MTBE, TBA & Benzene throughout 6-month study period
- Significant reductions downgradient of *iSOC*TM O₂ barrier were comparable for shallow & deep piezometers: MTBE - 89%, TBA – 54%, Benzene - >96%
- Data indicates aerobic degradation of MTBE downgradient of *iSOC*TM O₂ barrier—possible anaerobic biodegradation outside of test location

iSOC™ Demonstration– Conclusions

- Comparable attenuation rates estimated for MTBE & Benzene and lower attenuation rates estimated for TBA
- Reductions in MTBE, TBA & Benzene mirror decreasing trend in BOD₅ to COD, & VOC to COD ratios
- Total VOC to BOD₅ ratios indicate a significant portion of VOC's not readily degradable
- Elevated levels of ferrous iron, BOD₅, & COD did not inhibit aerobic degradation or interfere with *iSOC™* system performance