Air Force Civil Engineer Center

FORMER WILLIAMS AIR FORCE BASE

Site ST012
Former Liquid Fuels Storage Area Remedial Action

BCT Conference Call
22 June 2016

Battle Ready…Built Right!

ED_005025_00005605-00001

Site ST012 Update

- Post SEE Decommissioning/Enhanced Bioremediation (EBR) construction activities
- Monitoring during SEE to EBR transition
- Response to comments on RD/RAWP Addendum 2
- Initial response to EPA Jun 17, 2016

Post SEE Decommissioning/EBR Construction Activities

Site ST012 SEE Decommissioning

- Piping and well stickups cleared from cell phone lot and Ulysses
- Steam and extraction legs removed (except for portions that will be reused during EBR)
- Front end weir tanks removed
- Eductor feed pumps removed
- 20,000-gallon LNAPL storage tanks removed
- Thermal accelerators removed
- Electrical wire removed from piping legs and spooled
- Working on process system area removals
- Ulysses Ave and cell phone lot reopened on Jun 16, 2016

Site ST012 EBR Construction

- Trenching Across Ulysses Ave completed
- Drilling nearly complete (details provided later in presentation)
- CZ wells screened for vapor concentrations and vacuum influence (details provided on later slide)
- Evaluating inserting Flame-oxidizer on line for higher capacity
- SEE wells screened for NAPL and recovery following NAPL removal (details provided on later slide)
- Baseline and perimeter well sampling of SEE wells completed 23 May 2016 (details provided on later slide)
- Electrical and equipment installation for EBR system started

Site ST012 EBR Construction

- Development/redevelopment of new/existing wells in process
- Pump installation in process
- Sample newly installed wells in Jun 2016
- Continue EBR treatment system installation, install well pumps and piping, connect electrical systems Jun to Jul 2016
- Commission system and start extraction in Aug 2016
- Injection anticipated to begin in Sep 2016 (following establishment of hydraulic gradients)

Site ST012 EBR Drilling Second Shift

•UWBZ28/LSZ51

- •Positive Dye Tests at 170 and 185 ft bgs (UWBZ)
- •No positive Dye Tests in LSZ
- •Warm soil core not noted
- •Screened 165-195 and 215-225 ft bgs

•LSZ43

- •Encountered a steam/energy release at 196-206 ft bgs
- •Hot zone drilling subsequently modified resulting in less detailed data

•LSZ50

- •No positive Dye Tests in UWBZ
- •Positive Dye Test at 210 and 220 ft bgs (LSZ)
- •No indications of warm soil core
- •Screened 210-230 ft bgs

•Previously installed well

6/22/2016

Site ST012 EBR Drilling Third Shift

•LSZ43

•No positive dye tests
•Soil core hot
•Screened 205-225 ft bgs

•CZ21

•No positive Dye Tests
•Soil core warm
•Screened 146-156 ft bgs

•UWBZ34

•Positive Dye Tests at 175 and 180 ft bgs (UWBZ)
•No indication of warm soil core
•Screened 167-182

•UWBZ29

•Positive Dye Test at 165 ft bgs (UWBZ)
•Soil core warm
•Screened 170-190 ft bgs

•UWBZ30

•Positive Dye Test at 190 ft bgs (UWBZ)
•Soil core warm
•Screened 170-190 ft bgs (sand pack to 193 ft bgs)

•UWBZ31

•Positive dye test at 190 ft bgs
•Soil core warm
•Screened 170-190 ft bgs

•LSZ49

•No positive Dye Tests in UWBZ
•Positive Dye Test at 228 ft bgs (LSZ)
•No indications of warm soil core
•Screened 210-230

•LSZ46

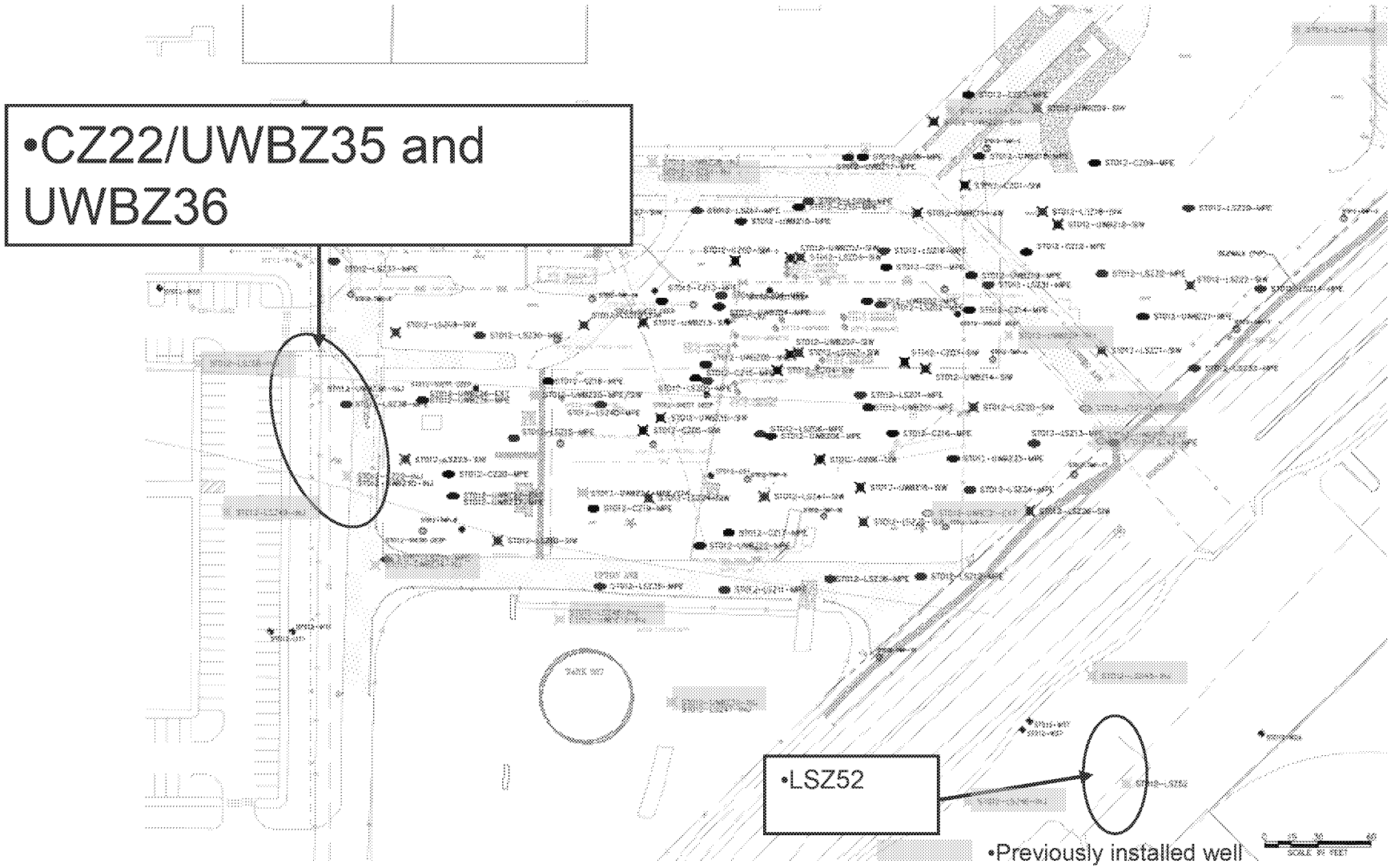
•No positive Dye Tests in UWBZ
•Positive Dye Tests at 211 ft bgs (LSZ)
•No indication of warm soil core

•Previously installed well

•LSZ45

•No positive Dye Tests in UWBZ
•Positive Dye Tests at 211 ft bgs (LSZ)
•No indication of warm soil core

Site ST012 EBR Drilling Fourth Shift Plan

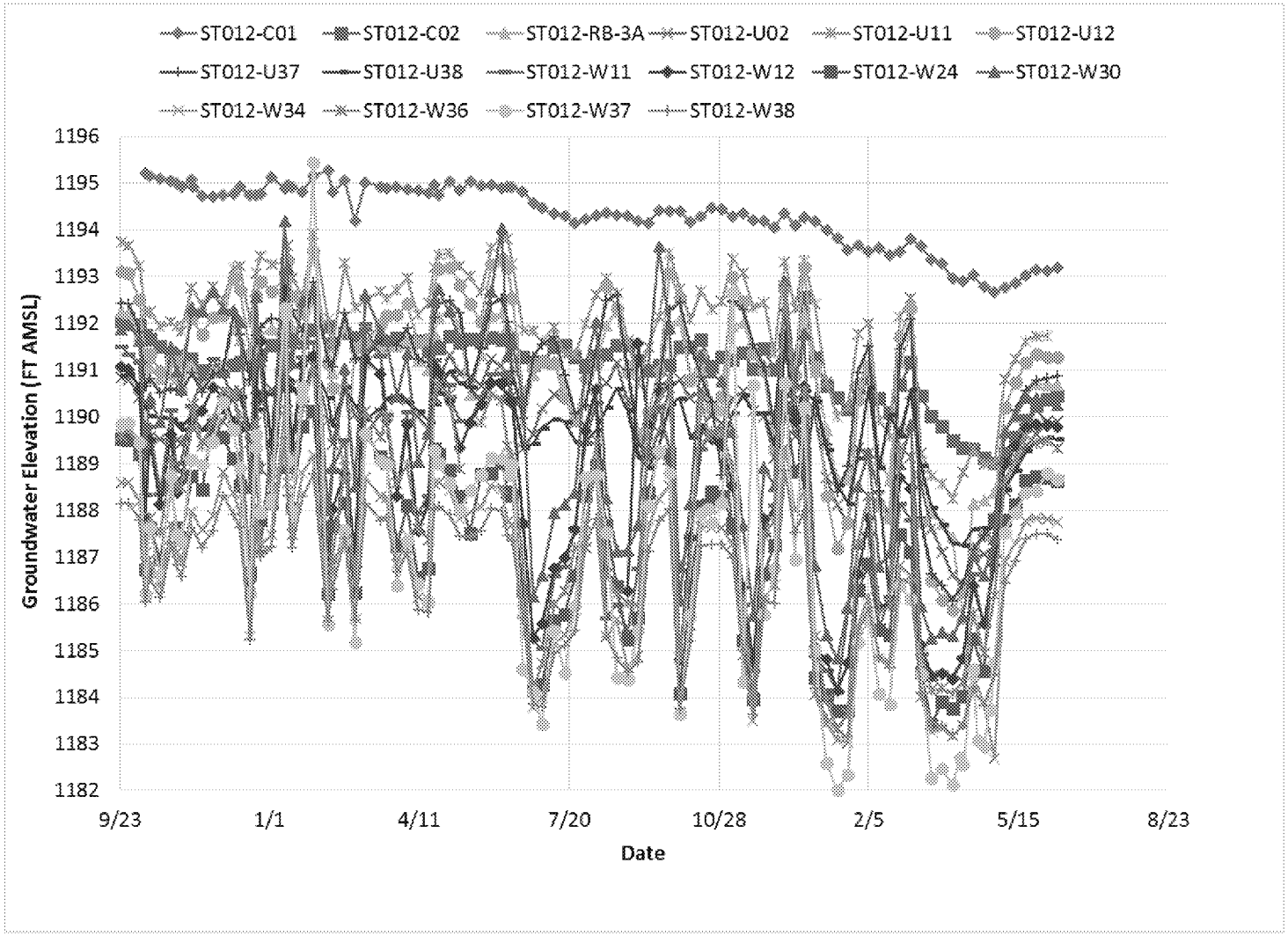


Monitoring During SEE to EBR Transition

Site ST012 Transition Period Monitoring

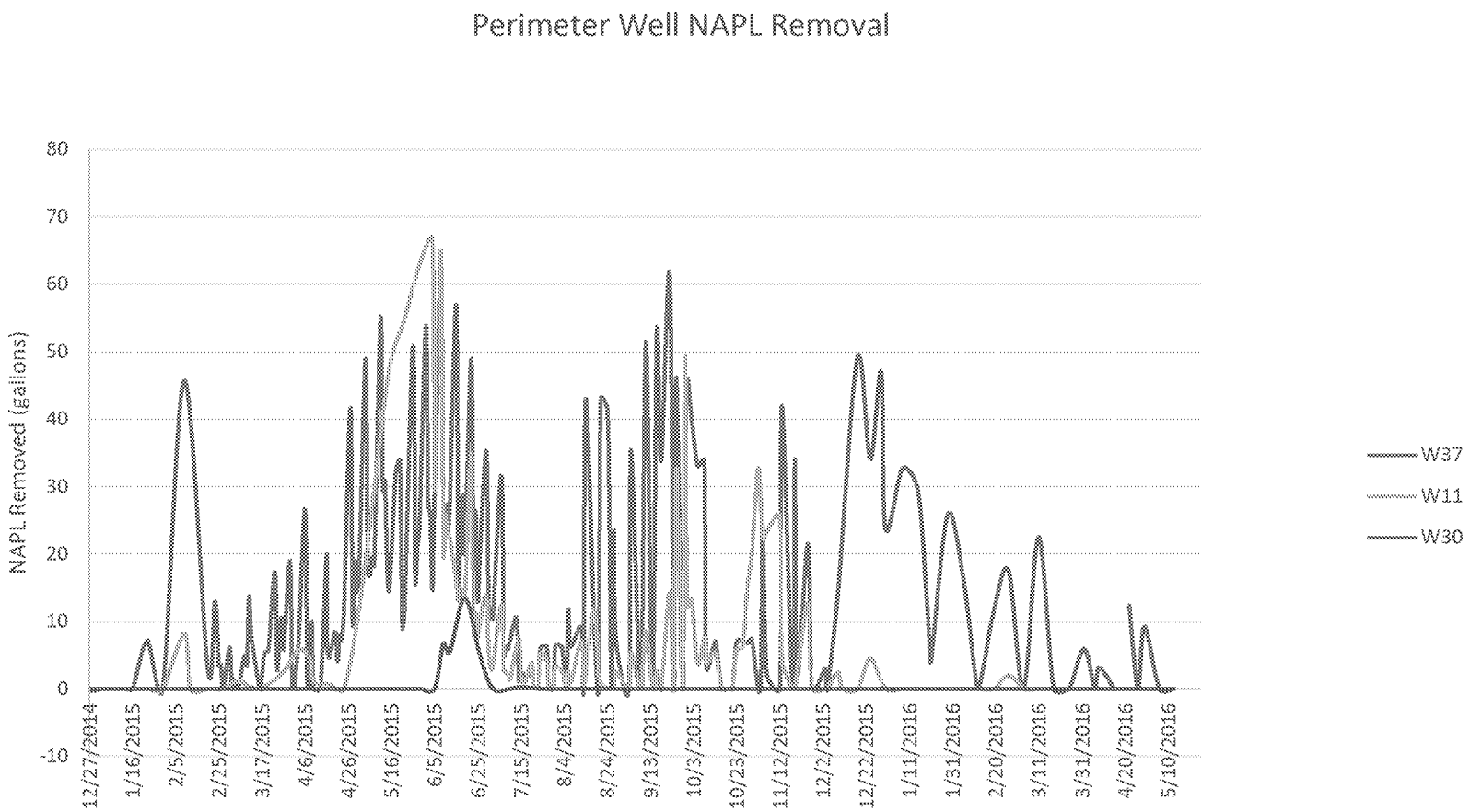
- Weekly perimeter water levels, product level measurements, and temperatures
- Temperature screening of SEE wells
- SEE wells assessed and monitored for NAPL following SEE component removal
- Perimeter well baseline sampling complete
- Baseline groundwater sampling of SEE wells (25) 50% complete
- Select CZ wells screened for vapor concentrations
- Calculated benzene concentrations for Apr available
- Newly installed (17) EBR well development 50% complete
- Baseline sampling of new EBR well in Jul 2016

Site ST012 SEE Perimeter Groundwater Elevations



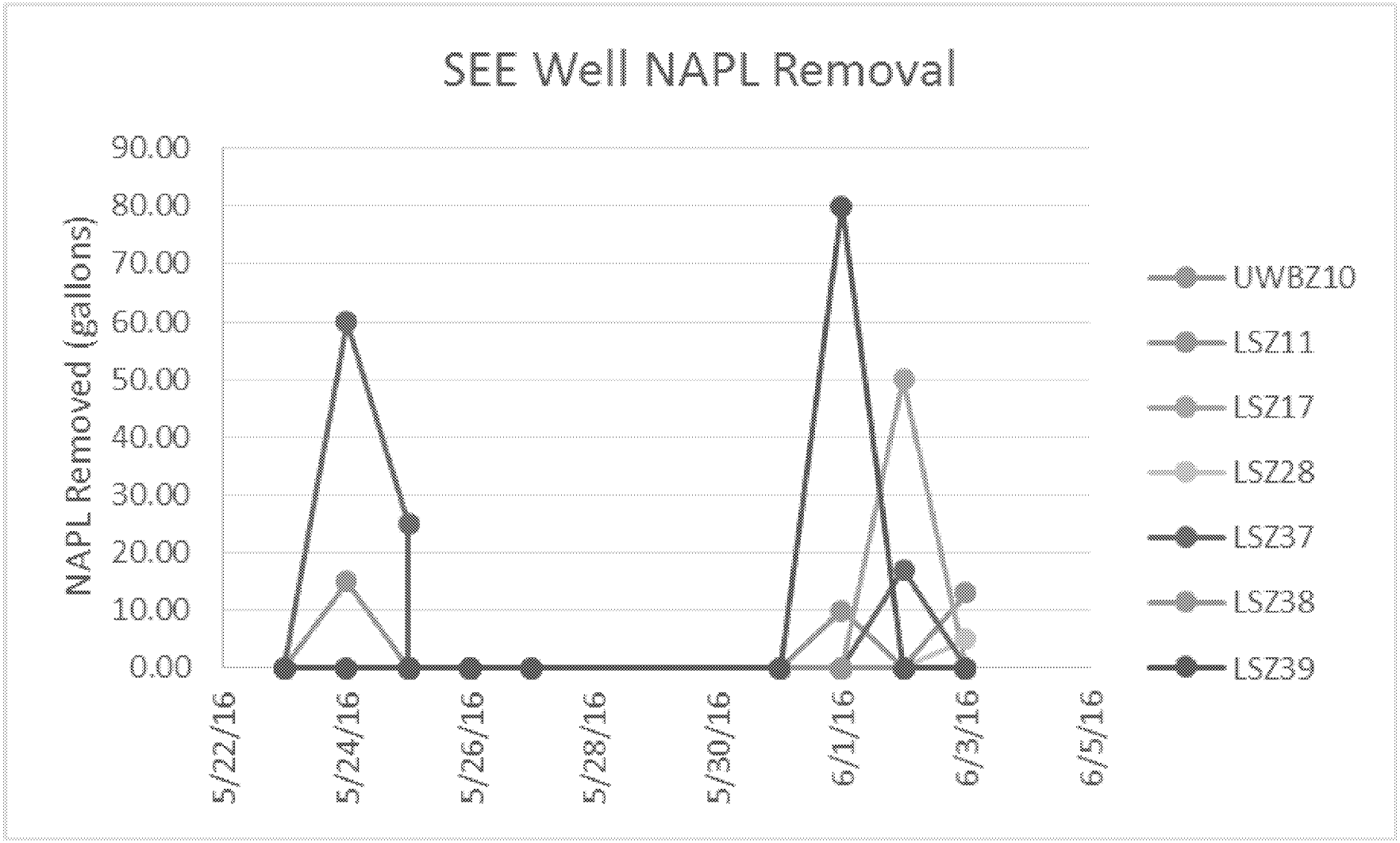
ED_005025_00005605-00012

Site ST012 Perimeter LNAPL



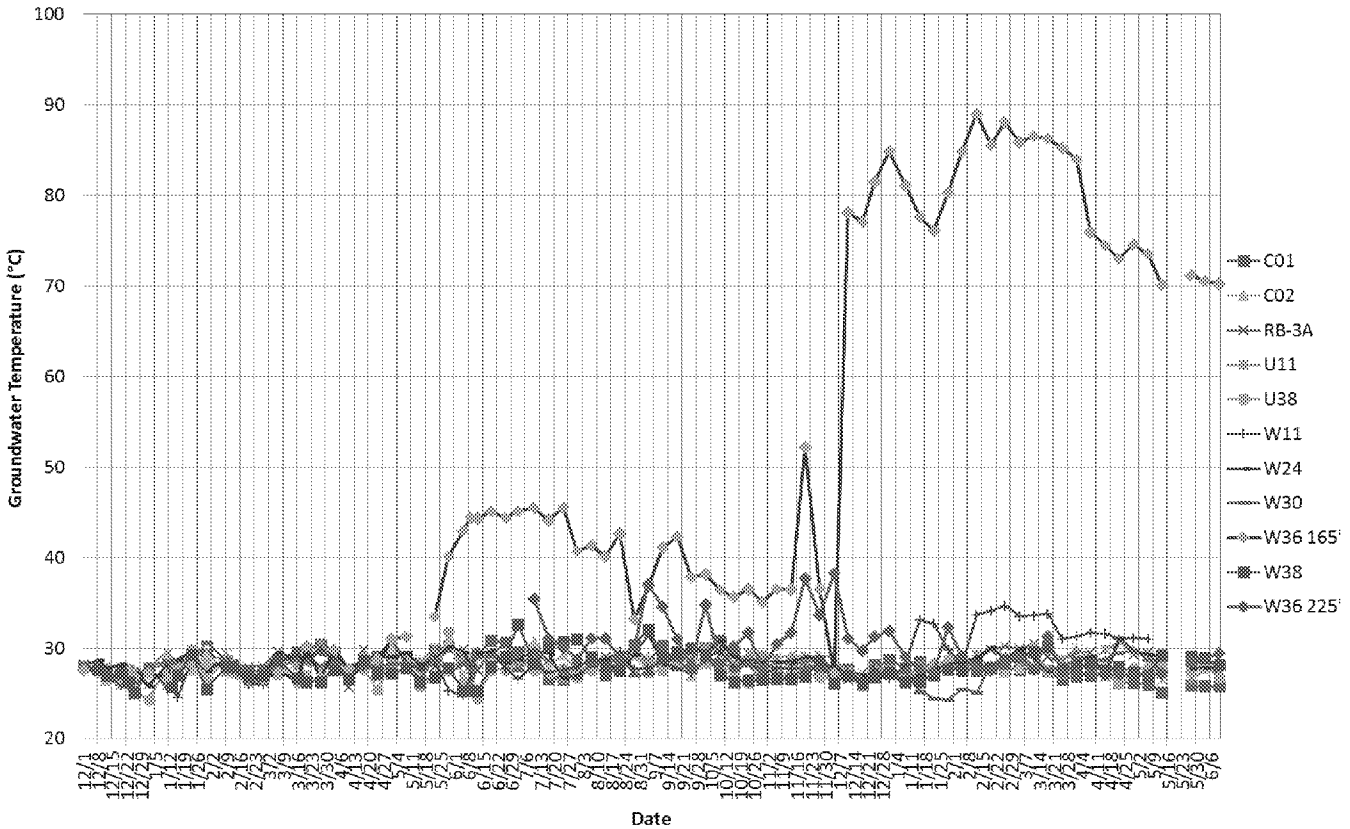
- No additional LNAPL removal recorded for perimeter wells
- Some LNAPL was removed from ST012-W37 during redeveloped but not quantified

Site ST012 SEE Wells LNAPL



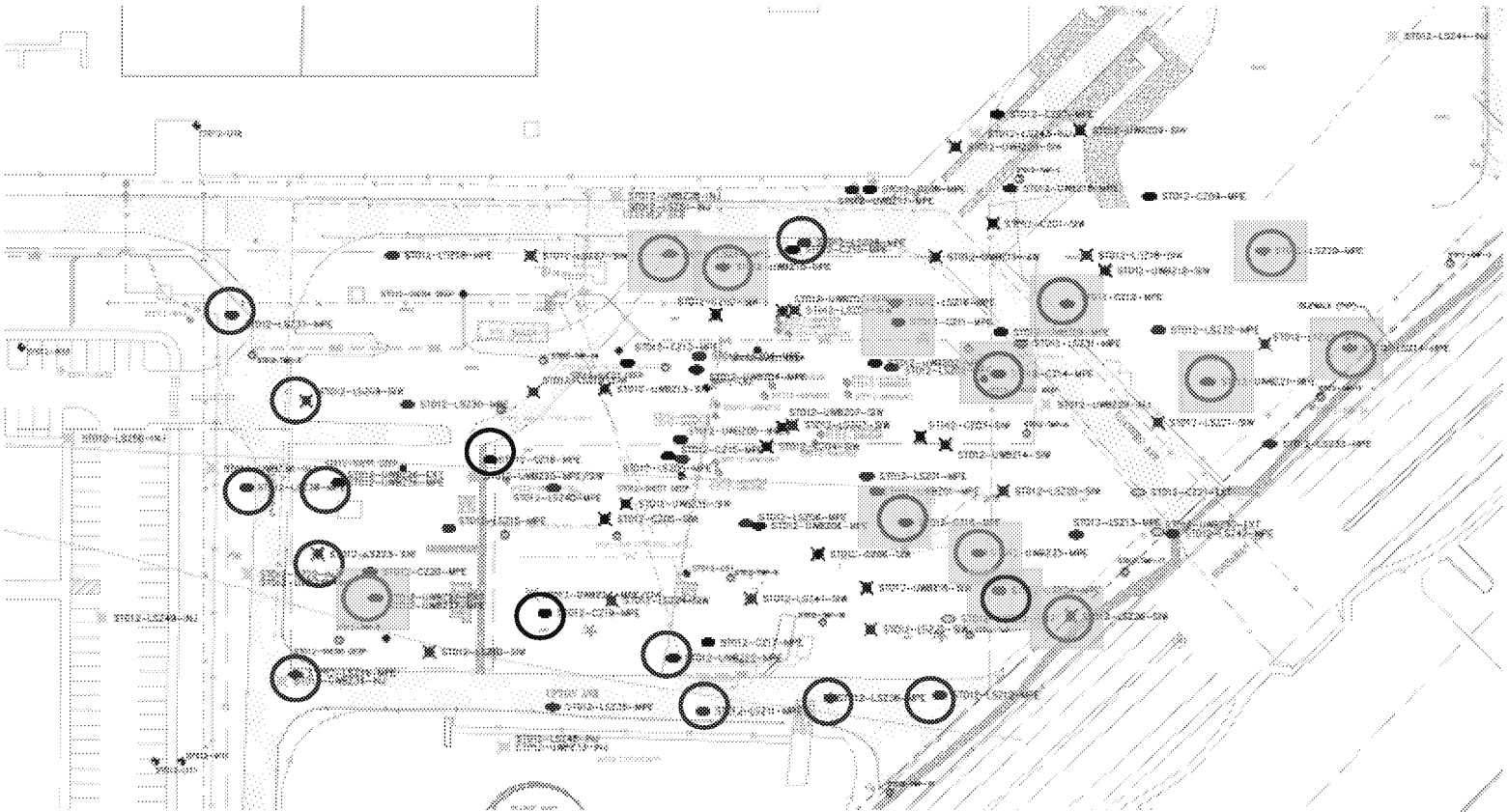
ED_005025_00005605-00014

Site ST012 SEE Perimeter Temperatures



ED_005025_00005605-00015

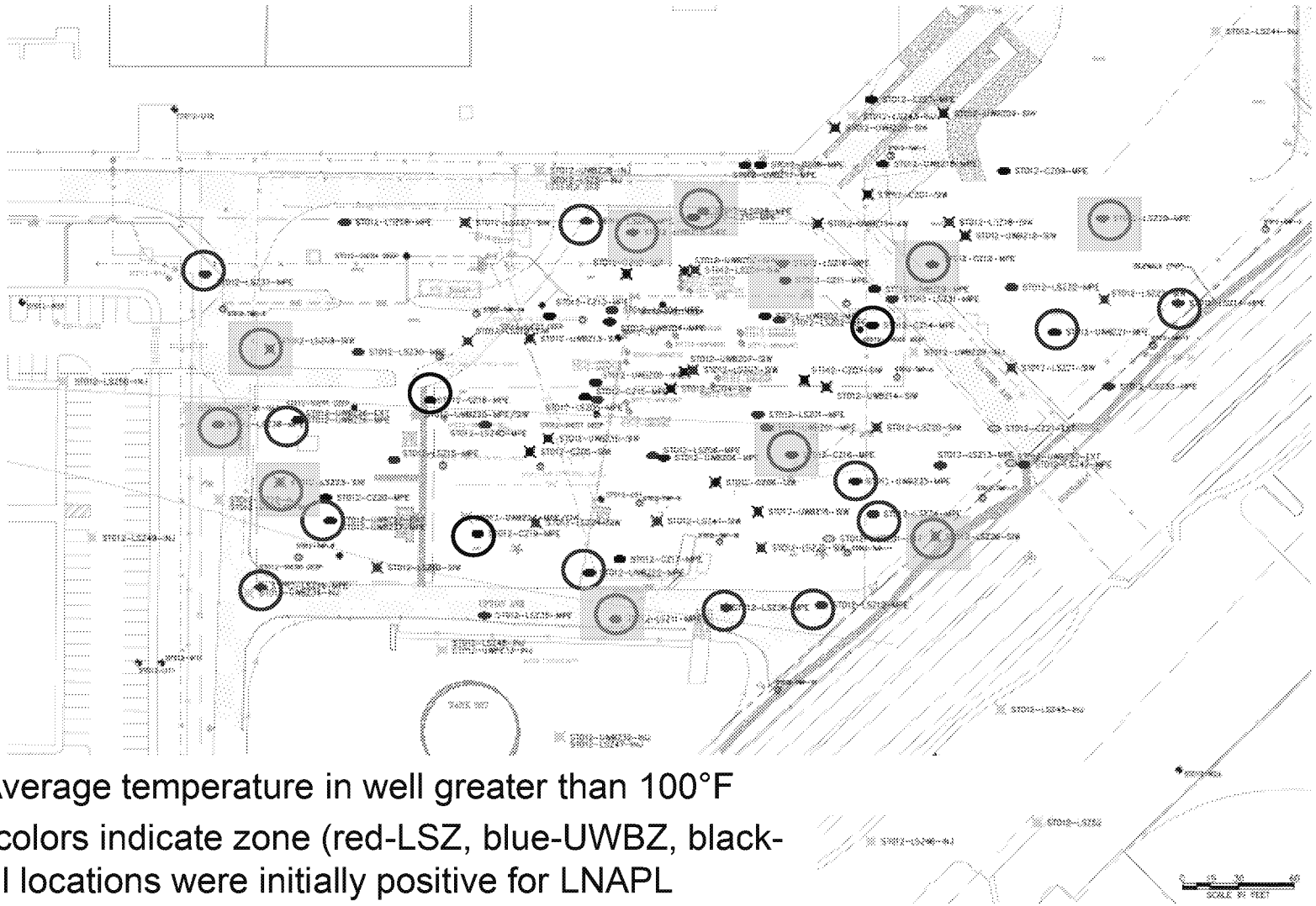
Site ST012
June EBR SEE Baseline Sampling Locations (peak temperature)



Peak temperature in well greater than 180°F All locations were initially positive for LNAPL

Circle colors indicate zone (red-LSZ, blue-UWBZ, black-CZ)

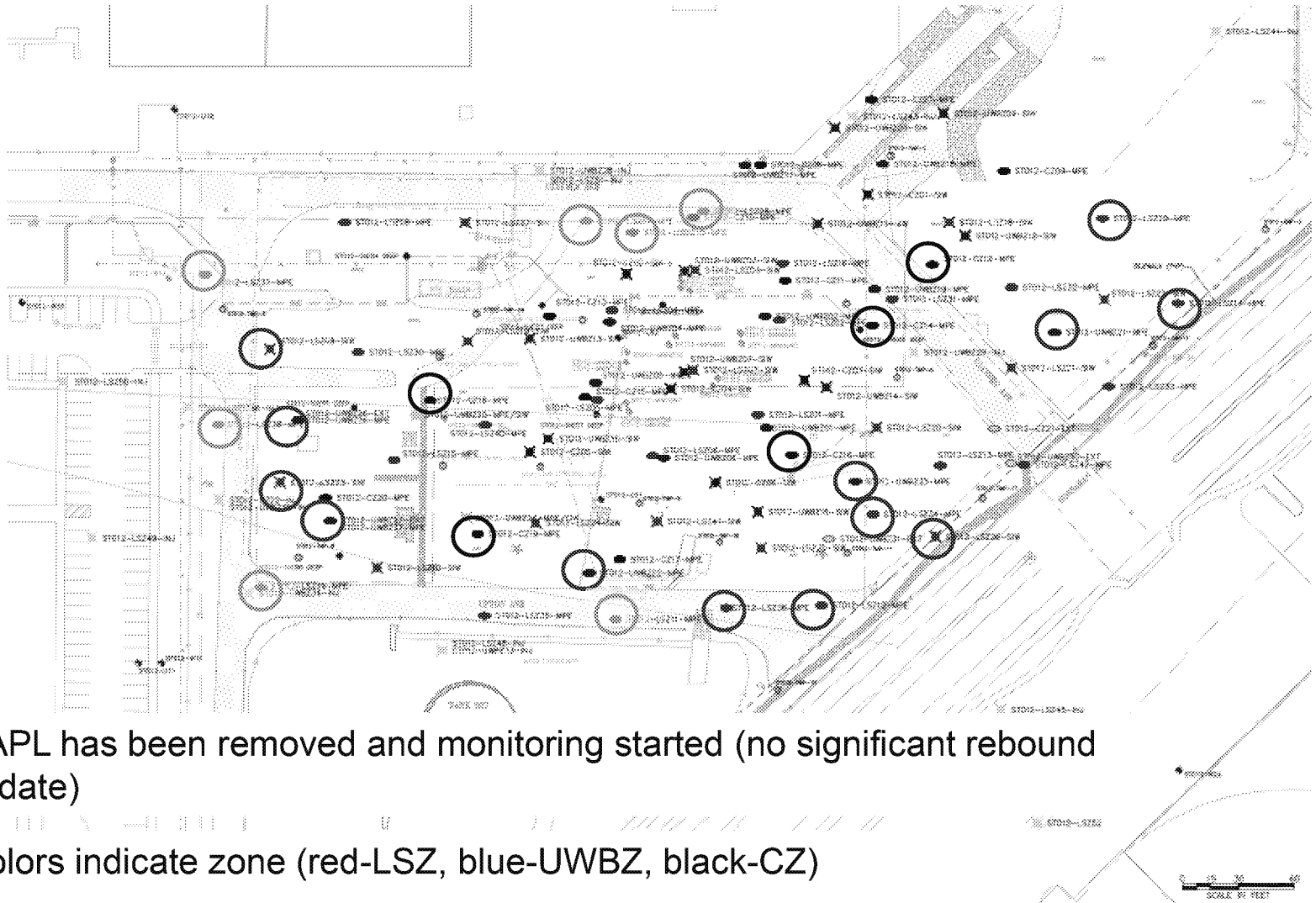
Site ST012
June EBR SEE Baseline Sampling Locations (average temperature)



Average temperature in well greater than 100°F

Circle colors indicate zone (red-LSZ, blue-UWBZ, black-CZ) All locations were initially positive for LNAPL

Site ST012
June EBR SEE Baseline Sampling Locations (LNAPL)



NAPL has been removed and monitoring started (no significant rebound to date)

Circle colors indicate zone (red-LSZ, blue-UWBZ, black-CZ)

Site ST012 SVE Well Connections

Bring flame oxidizer on line to increase off-gas treatment capacity prior to connecting CZ06 and CZ19 to SVE system

High methane results (>100% LEL) in all deep SVE wells (except 6D) indicates high methanogenic activity Individual PID range consistently between 1,000 and 2,000 ppmv.

•CZ16 (PID)
•5/27/16 795 ppmv
•6/9/16 150 ppmv
•6/17/16 8 ppmv

•CZ06 (PID)
•5/27/16 57.4 ppmv
•6/9/16 >15,000 ppmv
•6/17/16 685 ppmv

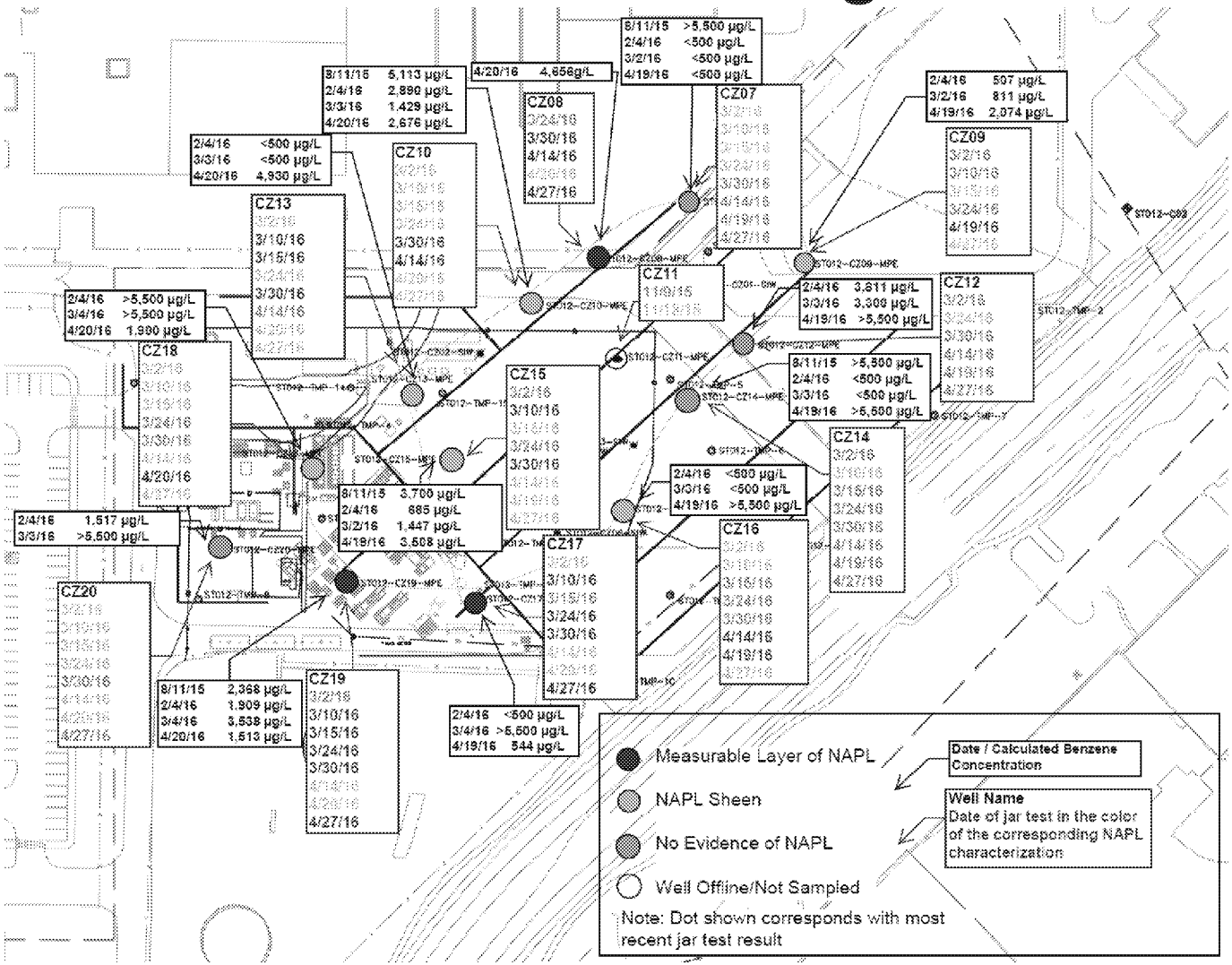
•CZ19 (PID)
•5/31/16 315 ppmv
•6/9/16 >19,000 ppmv
•6/17/16 93 ppmv

•CZ17 (PID)
•5/27/16 908 ppmv
•6/9/16 1,498 ppmv
•6/17/16 820 ppmv

•Location of existing reconnected deep SVE well

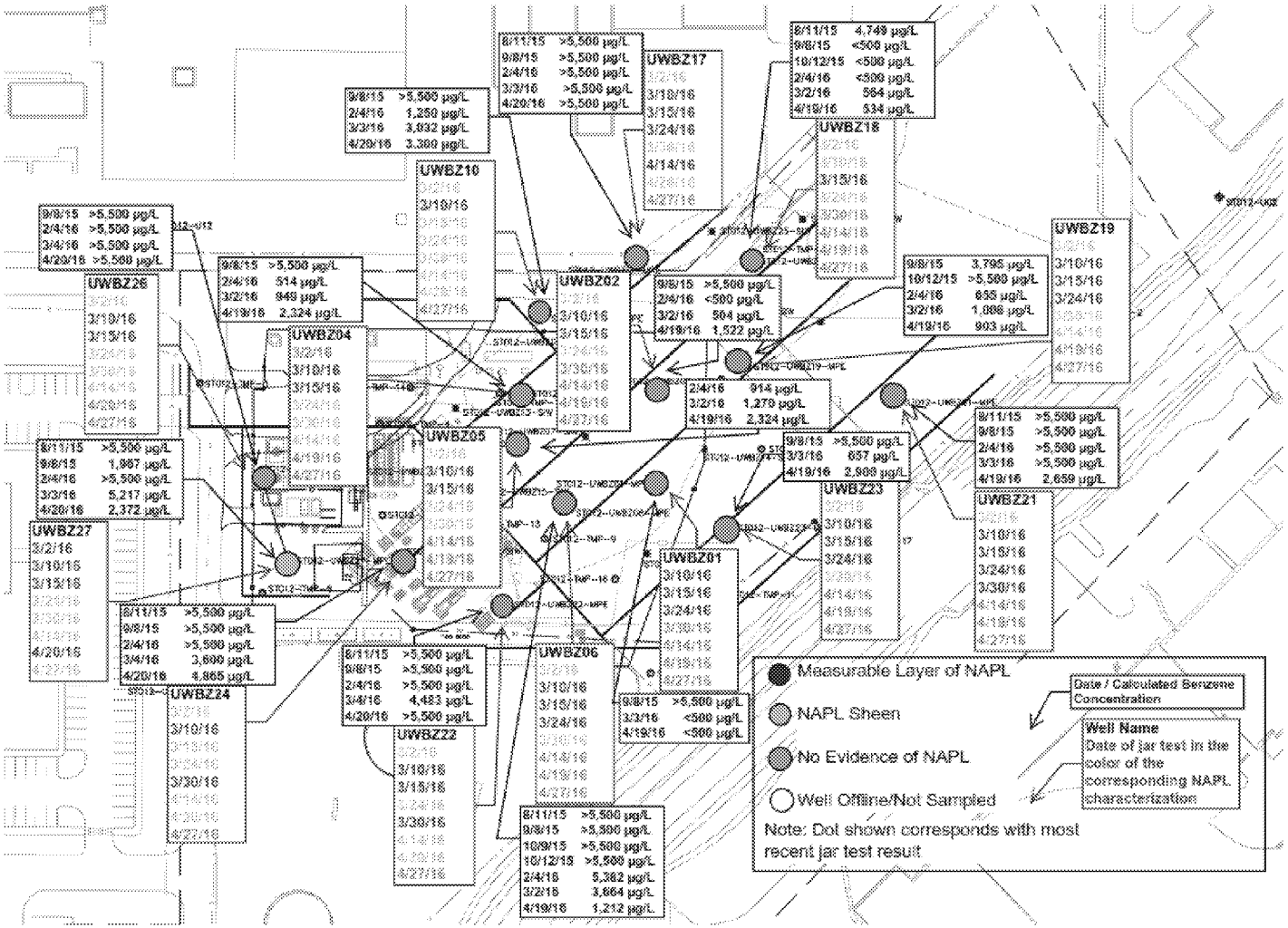
•NAPL Screening Results and Calculated Benzene Concentrations – Cobble Zone

•August 2015 – April 2016



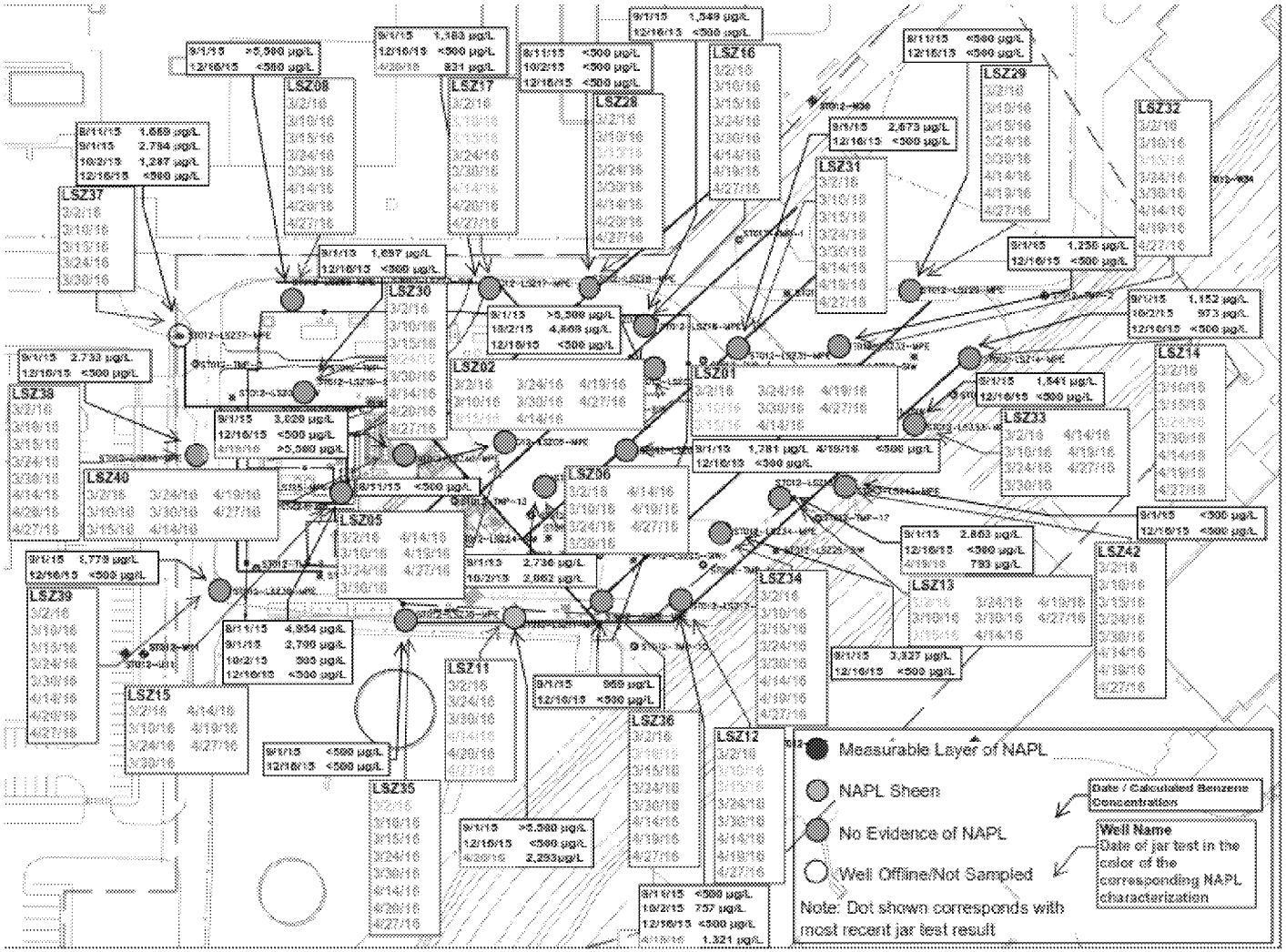
- Updated for calculated benzene results (4/19/16 and 4/20/16) only
- All operating MPE wells sampled
- Results ranged from low (<500 µg/L) to high (>5,500 µg/L)

NAPL Screening Results and Calculated Benzene Concentrations – Upper Water Bearing Zone August 2015 – April 2016



- Updated for calculated benzene results (4/19/16 and 4/20/16) only
- All operating MPE wells sampled
- Results ranged from low (<500 µg/L) to high (>5,500 µg/L)

NAPL Screening Results and Calculated Benzene Concentrations – Lower Saturated Zone August 2015 – April 2016



- Updated for calculated benzene results (4/19/16 and 4/20/16) only
- Select locations samples during post-steam extraction
- Results ranged from low (793 µg/L) to high (>5,500 µg/L)

Summary of Data Available for July BCT Meeting

- Weekly water levels, product level measurements, and temperatures in perimeter wells
- Temperature data in SEE wells
- NAPL monitoring data in SEE wells
- Perimeter well and SEE baseline groundwater sampling results
- Dye test and temperature data for newly installed EBR wells
- Vapor concentrations in selected CZ wells (screening for adding to current SVE system operation)
- SVE performance data

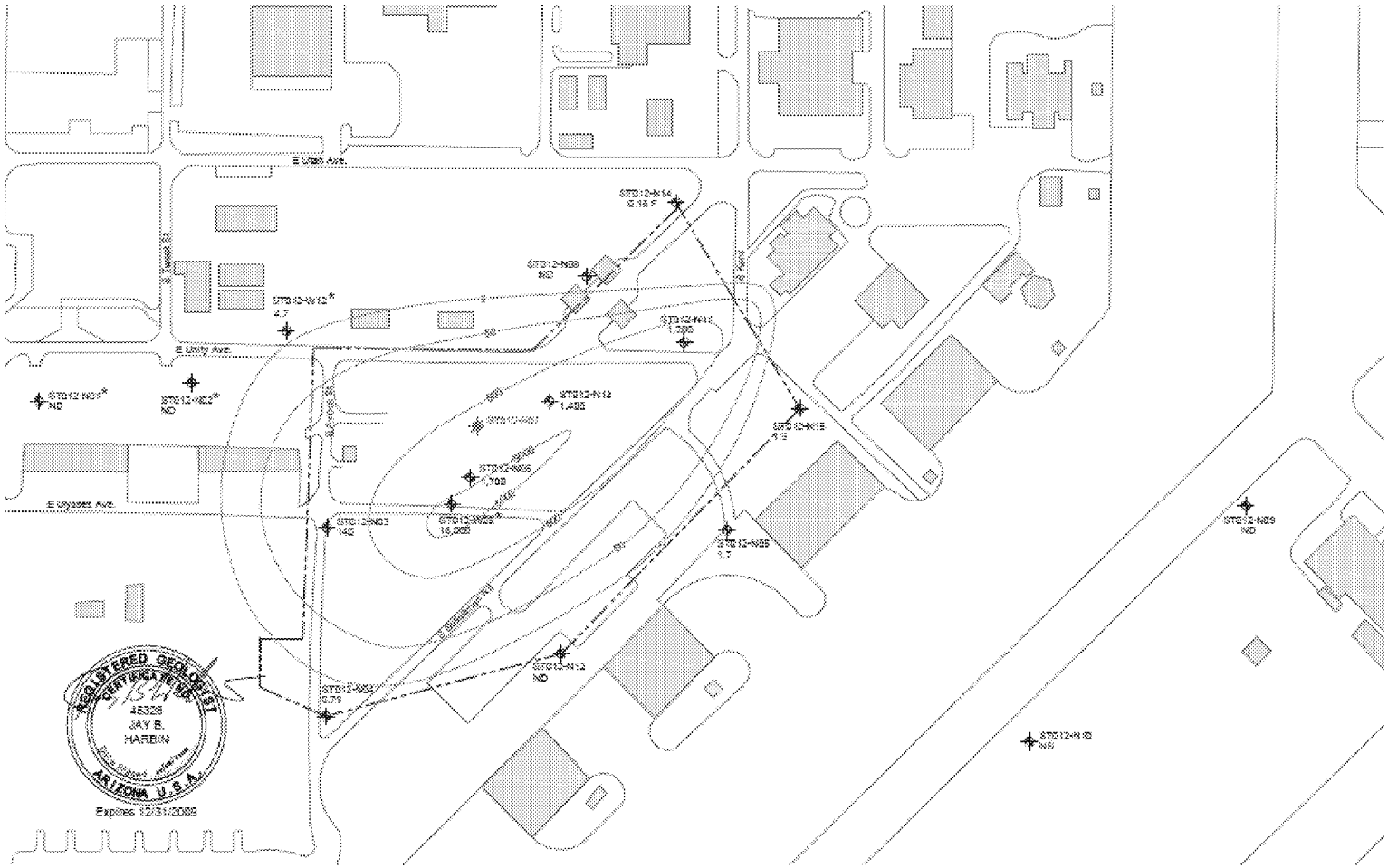
Response to Regulatory Comments on Draft Final RD/RAWP Addendum 2

- Currently under AF review
- Combine draft final responses for RD/RAWP Addendum 2 with recent Jun 17, 2016 EPA letters

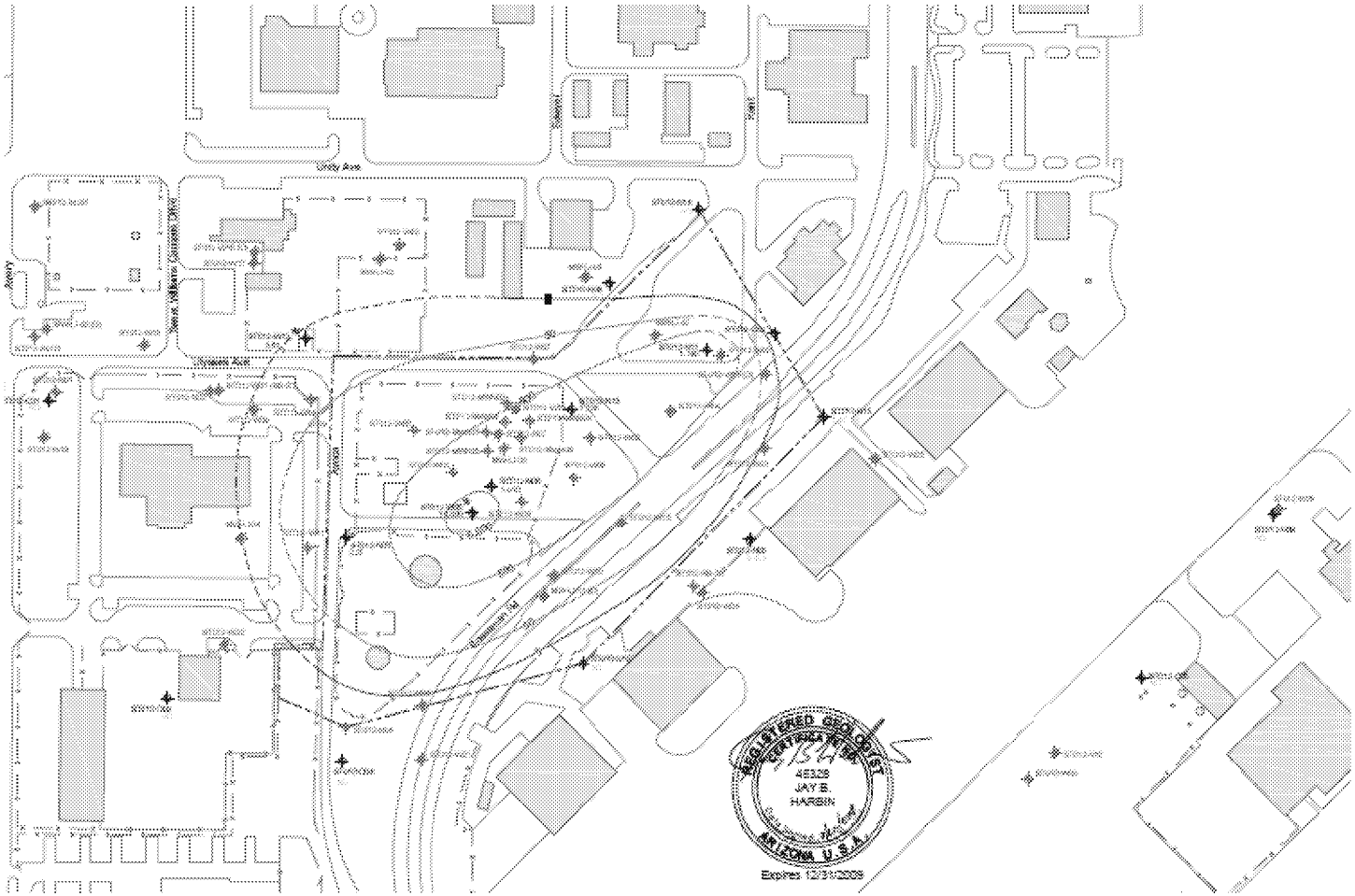
EPA Comment Categories from Jun 17,2016 letters

- EBR Amendment
  - Arsenic content
  - Salinity
  - Hydrogen Sulfide
- LNAPL mass outside TTZ
- Plume Stability/Potential Migration

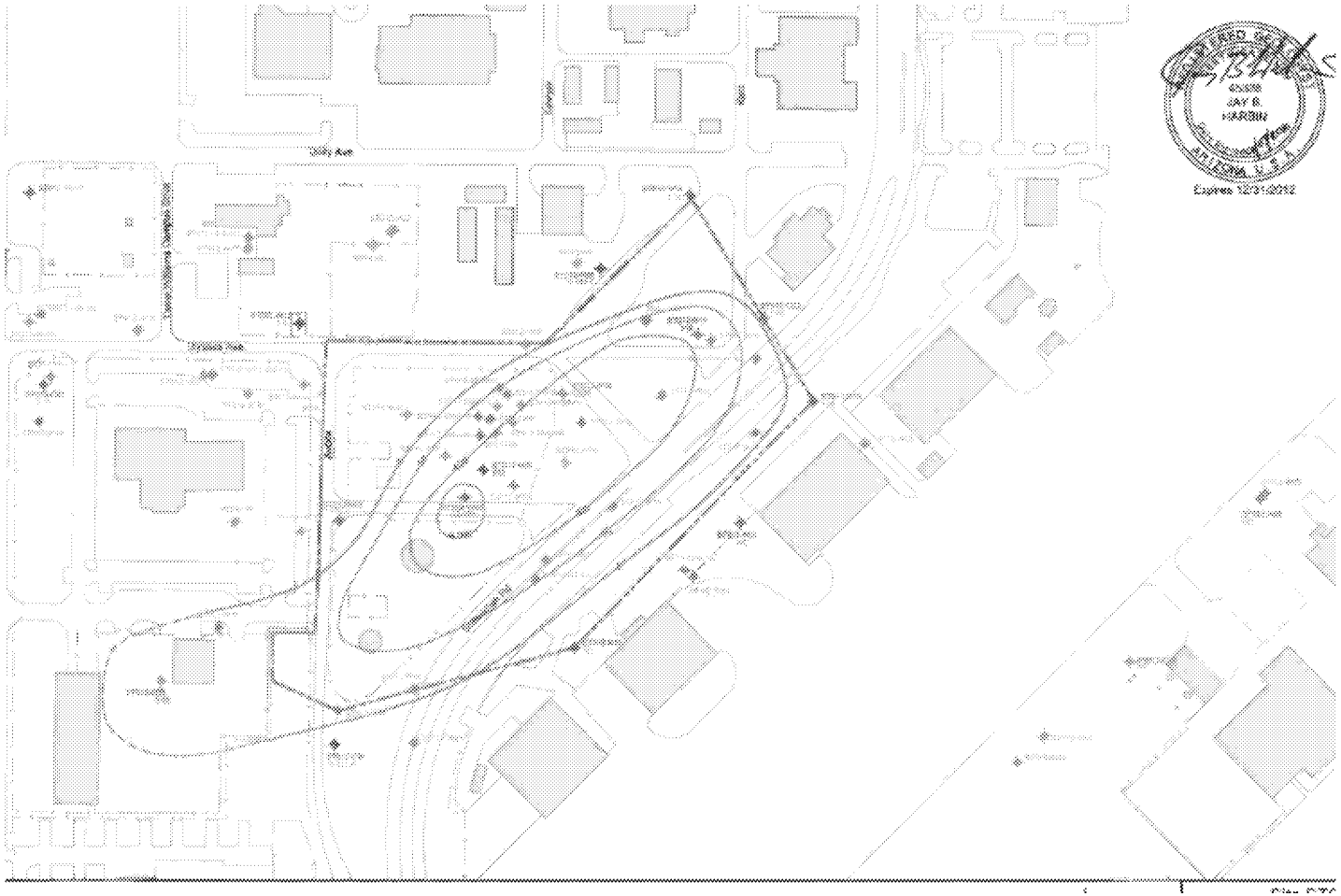
LSZ Benzene Concentrations Jan 2008



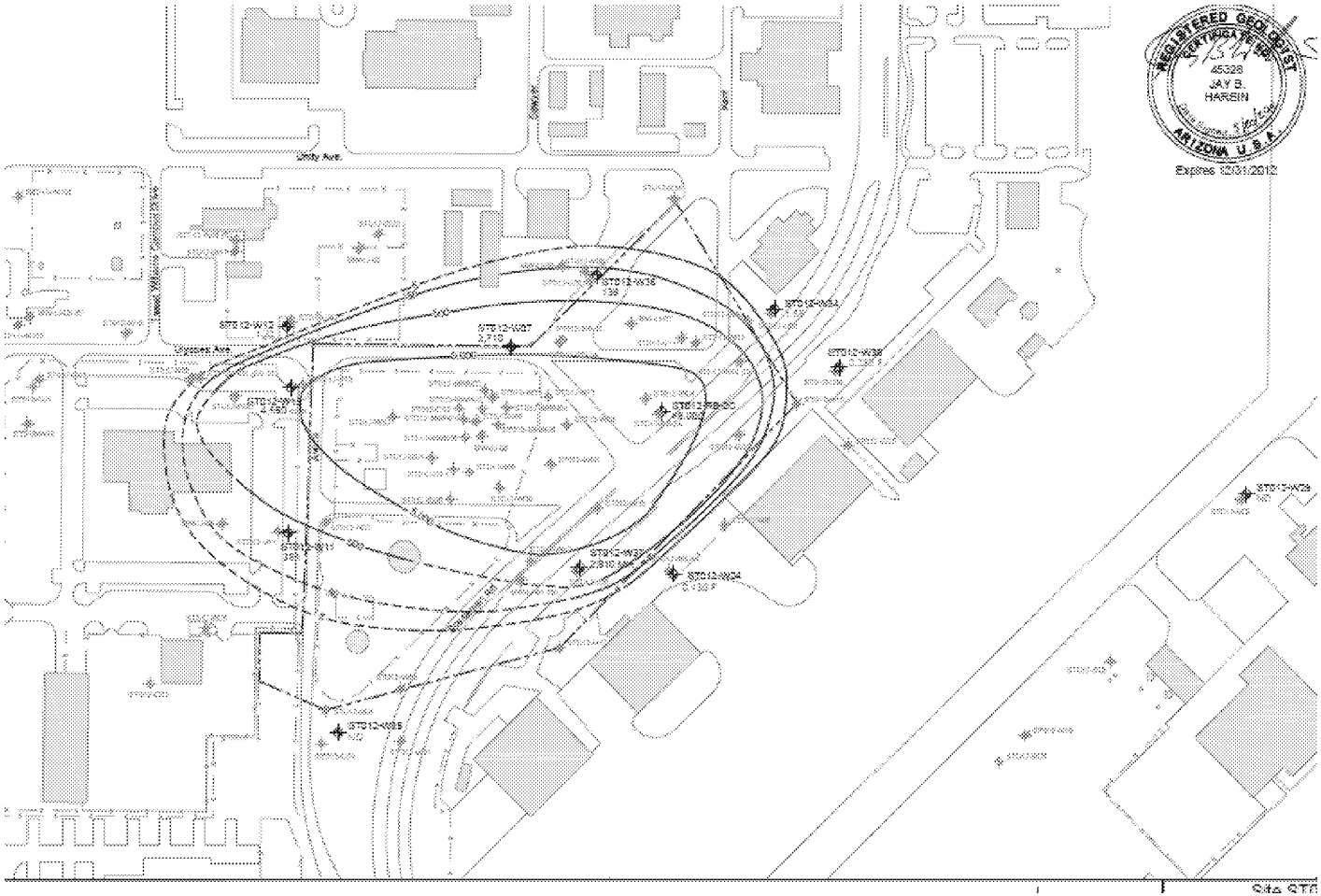
LSZ Benzene Concentrations Nov 2008



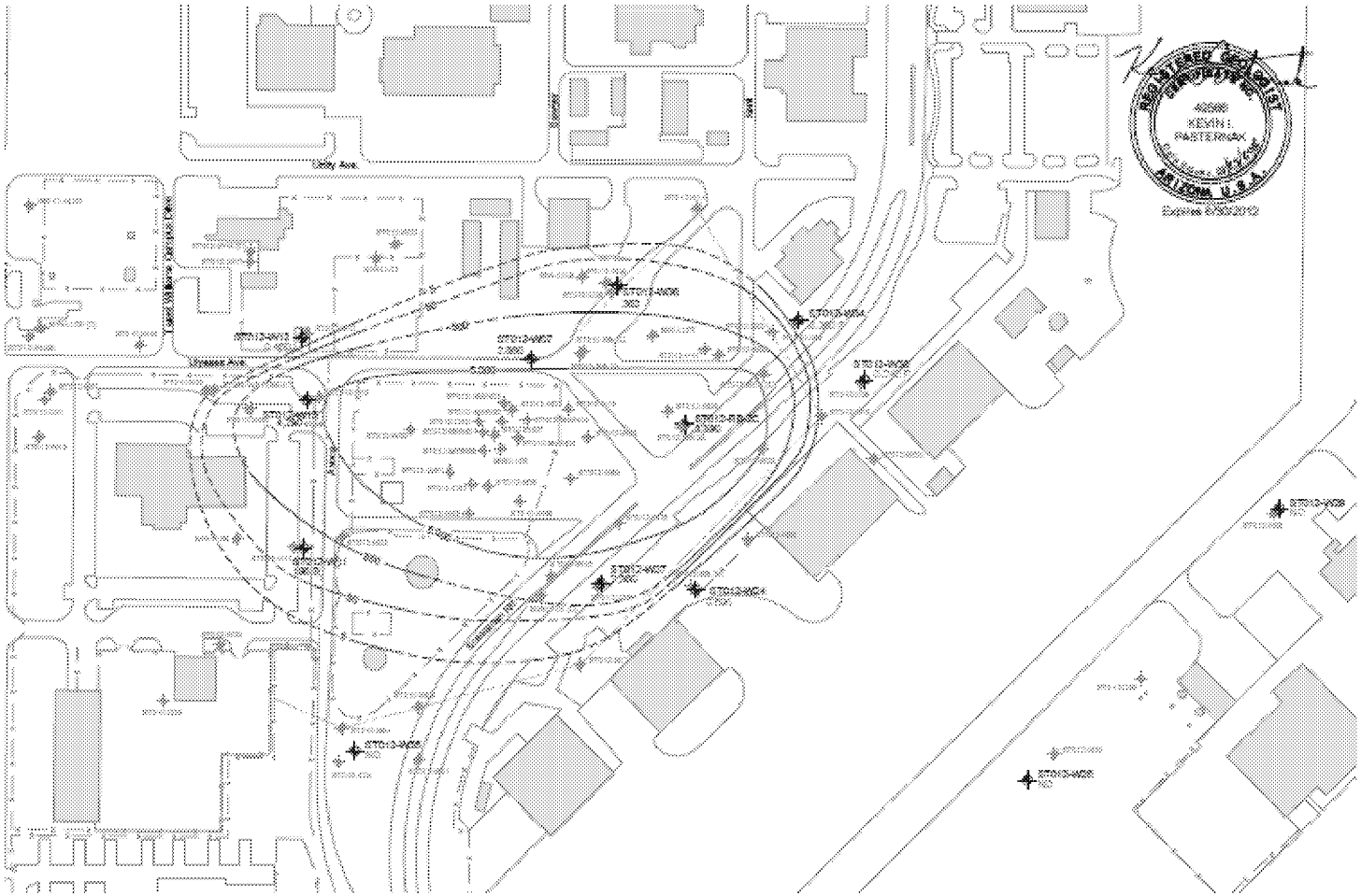
LSZ Benzene Concentrations Nov 2009



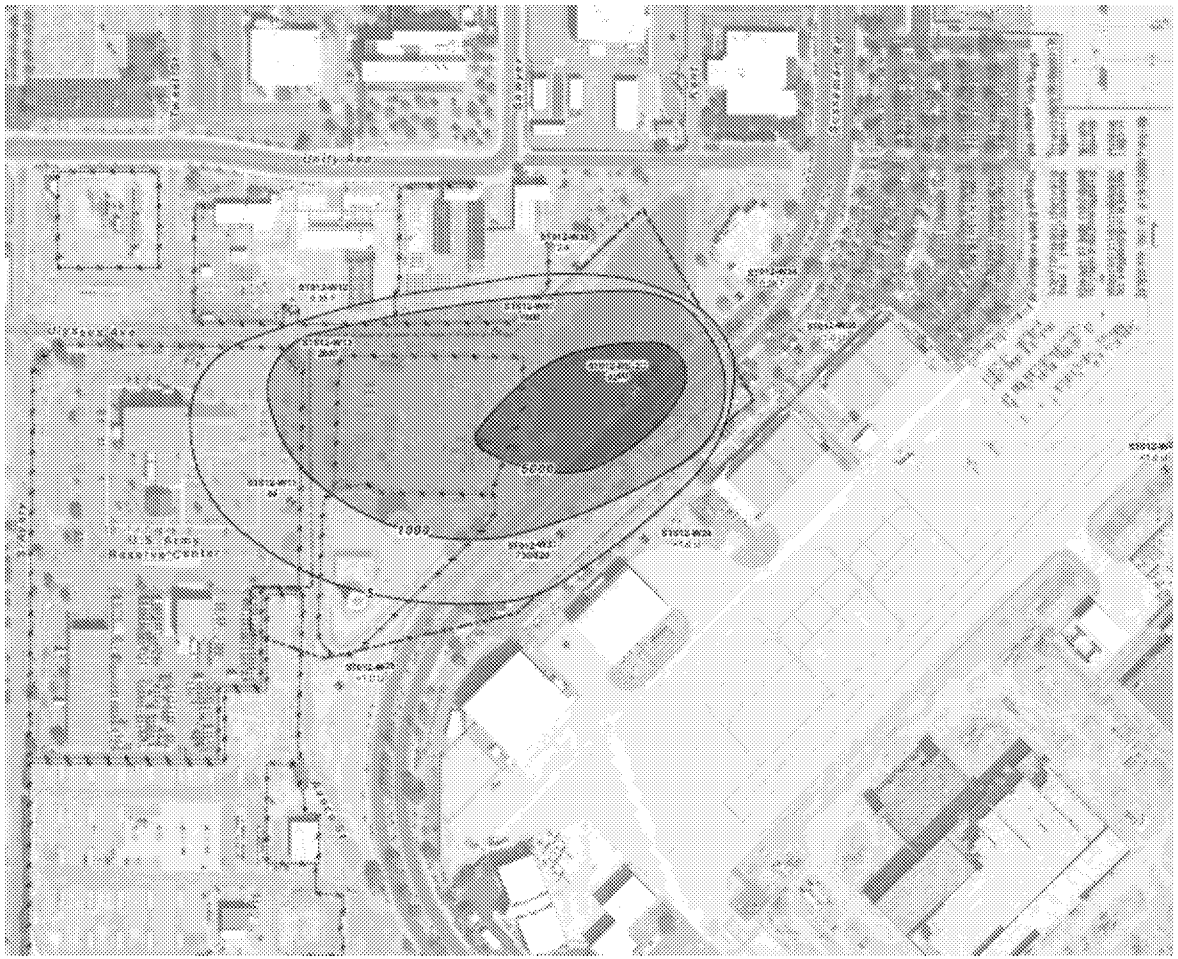
LSZ Benzene Concentrations Nov 2010



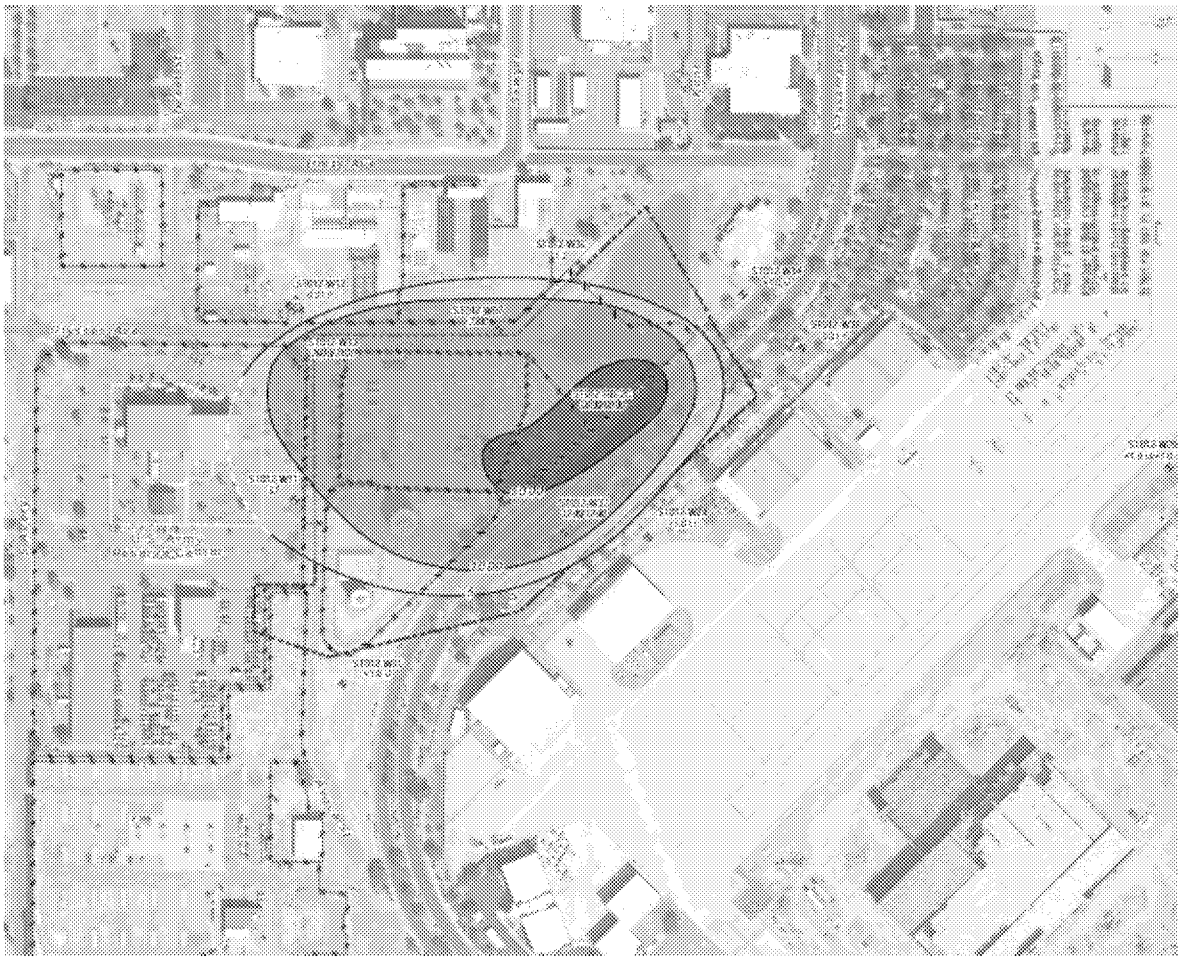
LSZ Benzene Concentrations Nov 2011



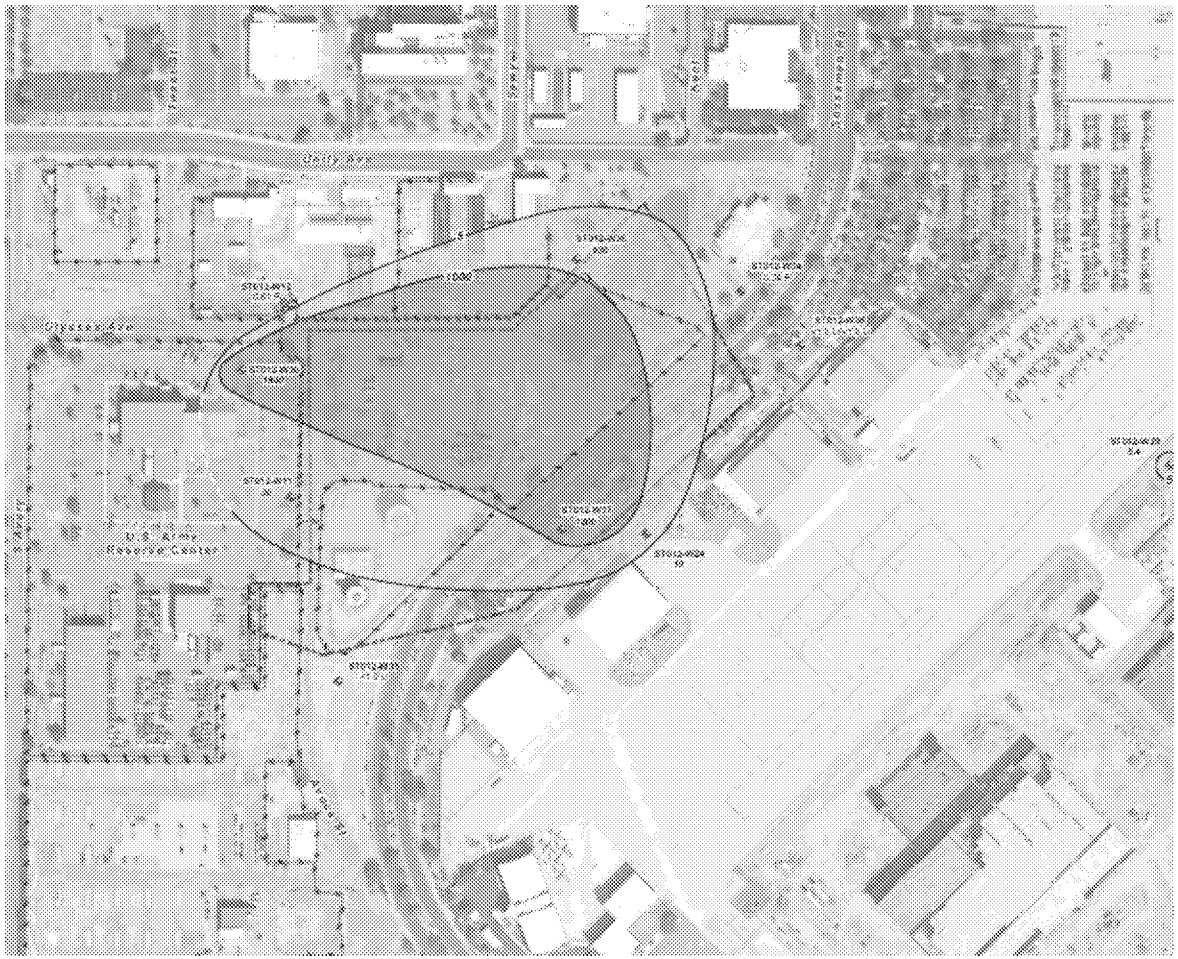
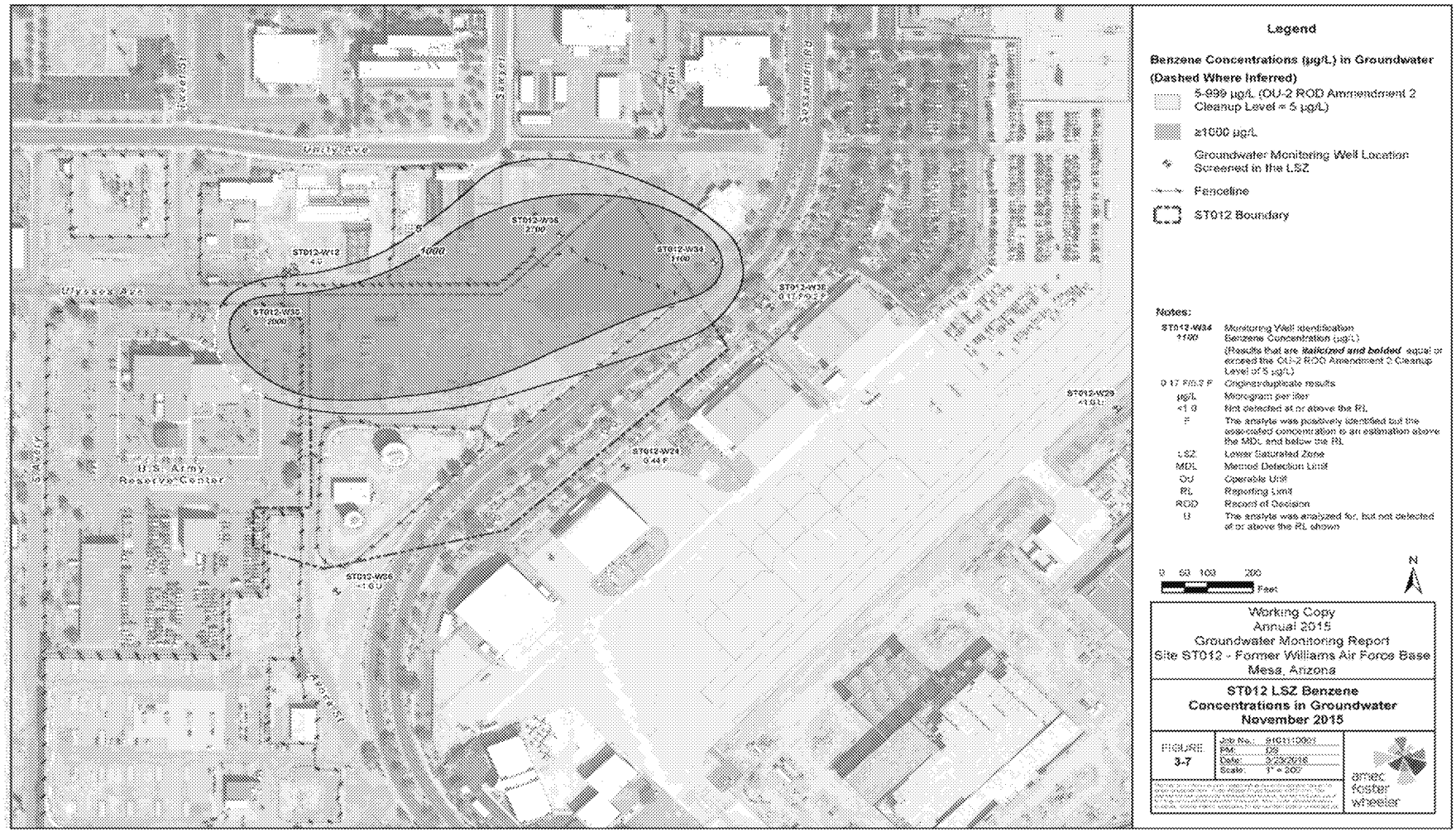
LSZ Benzene Concentrations Nov 2012



LSZ Benzene Concentrations Nov 2013



LSZ Benzene Concentrations Nov 2014



LSZ Benzene Concentrations Nov 2015