

Shell 797-03A and 03B Cuttings Management Area

(Location ID: 427315, 335482)

Closure Sampling Narrative

This sampling narrative outlines the closure of the Cuttings Management Area located on the Shell 797-03A, and Shell 797-03B pads. This narrative is being provided in support of Oxy's Shell 797-03A and 03B CMA closure documentation. The narrative details what closure, and background samples were taken, where they were taken, and for what purpose.

Staged and Mixed Cuttings 08/05/2013 (L646651)

- As described in the drill cuttings materials management plan, Oxy transported drill cuttings stabilized with absorbent material (sawdust) via truck from the Shell 797-03A well pad to the cuttings disposal area. The cuttings were transported to the receiving/mixing area on the location and further mixed and stabilized with native material. The disposal area at the Shell 797-03B pad did not reach capacity (approximately 3,365 cubic yards), so the backup location located on the Shell 797-03A pad was never utilized. Eight grab samples were collected from various depths to represent the mixed contents as a whole and were analyzed for complete COGCC table 910-1 standards. The staged and mixed cuttings samples are represented on the Shell 797-03B Cuttings Management Area tabulated data spreadsheet in columns 3-10. They are labeled as *E-Low 4'*, *E-High 6'*, *E-Center-Low 5'*, *Center-High 6'*, *W-Center-Low 4'*, *W-Center-High 10'*, *W-Low 7'*, and *W-High 10.5'* respectively in the Sample Name Row. Sample Type for the above mentioned samples is defined as *Staged and Mixed Cuttings*. The staged and mixed cutting samples were collected on 08/05/2013. The sample values can be found on lab report L650144 and the Sample IDs from the lab report are *E-Low 4'* found on pages 2-3, *E-High 6'* found on pages 4-5, *E-Center-Low 5'* found on pages 6-7, *Center-High 6'* found on pages 8-9, *W-Center-Low 4'* found on pages 10-11, *W-Center-High 10'* found on pages 12-13, *W-Low 7'* found on pages 14-15, and *W-High 10.5'* found on pages 16-17. The lab data reports for these samples are attached. The staged and mixed cuttings samples are represented on the attached Shell 797-03B CMA sampling location map.

- The staged and mixed cuttings samples were tested for complete COGCC table 910-1 standards. All analytes were found to be below COGCC table 910-1 standards with the exception of SAR, pH, and As. To address elevated concentrations of SAR and pH, oxy capped the cuttings with at least 3' of native material. Native background soil samples within the area showed elevated concentrations of naturally occurring As to be present, reference Background Samples section below.

Cap Sample 05/6/2013 (L634381)

- Oxy backfilled the pit with mixed and stabilized pit contents and then capped the mixed pit contents with at least three feet of native material. Two randomly placed grab samples were taken of the cap material and analyzed for complete COGCC table 910-1 standards. The cap material will serve as a cap for the elevated value of pH found in the mixed pit contents. The cap sample is represented on the Shell 797-03A Pit Closure Sampling tabulated data spreadsheet in columns 14-15. They are labeled as *Cap 1*, and *Cap 2* respectively in the Sample Name Row. Sample Type for the above mentioned samples is defined as *Native Cap Material*. The cap samples were collected on 05/06/2013. The sample values can be found on lab report L634381 and the Sample IDs from the lab report are *BG 1* found on pages 2-3, and *BG 2* found on pages 4-5. The cap samples are not shown on the Sampling Locations Map because they were collected from the stockpiled cap material prior to placement. The lab data report for this sample is attached.

- The cap samples were tested for complete COGCC table 910-1 standards. The analyte exceedances found in the cutting samples were SAR, pH, and As. All cap samples were found to be below the COGCC's table 910-1 allowable analyte concentrations, with the exception of As, which were found to be below undisturbed background samples. Please reference Background Samples section below.

Background Samples 05/19/2010 (L460352), 11/11/2011 (L546596), 04/17/2012 (L571155), 04/05/2012 (L568883)

- In an effort to identify naturally occurring concentrations of As similar to that which was previously identified in the staged and mixed cuttings samples, Oxy collected background samples from native undisturbed locations around the area, and one from the Shell 797-03A reserve pit bottom before liner installation. Oxy collected four background grab samples on 05/19/2010, 11/11/2011, 04/17/2012, and 04/05/2012 from various undisturbed locations around the valley and from the pit bottom before liner installation and use. The background samples were collected on 05/19/2010, 11/11/2011, 04/17/2012, and 04/05/2012 and can be found on the Shell 797-03B Cuttings Management Area tabulated data in columns 11-14. The Sample Names from the data tabulation are *BG-WW 0-6 IN*, *BG-NE 13 IN*, *BG-AREA PT 74 6 IN*, and *PB-W 17-20 FT*. Sample Type for the above mentioned samples is defined as BG Sample. The sample values can be found on lab reports L460352, L546596, L571155, and L568883. The sample IDs from the lab reports are *BG-WW 0-6 IN* found on page 5 of lab report L460352, *BG-NE 13 IN* found on pages 8 and 9 of lab report L546596, *697-08A PB-NE 3 IN* found on pages 6 and 7, *697-08A-PW-WEST 6-8 IN* found on pages 8 and 9, *BG-AREA PT 74 6 IN* found on page 16 of lab report L571155, and *PB-W 17-20 FT* found on pages 4-5 of lab report L568883. These samples are shown on the Arsenic Background Sample Locations Map as Green dots and are referenced in the legend as Background Sample Location Well Pad.

- The sampling effort yielded background As concentrations above those found in the staged and mixed cuttings samples.

In conclusion, this CMA has been closed and meets both the COGCC 900 series and 1000 series rules for CMA closure. All analyte concentrations were found to be below COGCC table 910-1 allowable concentrations, below native background levels, or have been capped to ensure a sufficient agronomic zone. Oxy will continue to monitor this site for stormwater compliance until final pad reclamation has occurred.