**APPENDIX A**

## Digestion and ICP/MS Analysis

Following a modified NIOSH method 7300,(46) the nylon screens from the NRD samplers and at least two sets of media blanks were placed in individual polytetrafluoroethylene (PTFE) tubes using nonmetallic forceps. Each tube was filled with 10 ml of HNO3 (Nitric Acid Optima, CAS # 7697-37-2; Fisher Scientific, Pittsburgh, PA). A reagent blank was also prepared with 10 ml HNO3 added to a PTFE tube. The tubes were then placed inside a microwave accelerated reaction system (MARS 230/60; CEM Corp, Matthews, NC) for 30 minutes at 200 ˚C and cooled for 20 minutes. The content of the tubes was quantitatively transferred to 25 ml volumetric flasks. The samples were brought to volume with ultra-pure deionized water and a portion of the solution was transferred to 10-ml centrifuge tubes and diluted 5:1. A second portion of the solution was diluted 50:1 to ensure that the resulting concentrations for all metals were below 100 ppb.

The SOLU-SERTTM samples and two media blanks were placed in 10 ml of 20% (vol/vol) HNO3 and heated to 95 ˚C on a hot plate for approximately 30 minutes until all solid material was dissolved. The solution was then quantitatively transferred to 25-ml volumetric flasks and brought to volume with 2% (vol/vol) HNO3. A portion of the solution was then transferred to 10-ml centrifuge tubes and diluted 5:1. A second portion of the solution from the 25-ml flasks was diluted 50:1.

Calibration standards spanning from 0.05 to 100 ppb were prepared for each metal analyzed using ICP/MS standards in 2 % HNO3 solution (Claritas PPT Grade Standards; Spex CertiPrep, Metuchen, NJ), with a minimum of three standards spanning between each order of magnitude. Lastly, 0.1 μg of yttrium certified standard in 2% HNO3 solution (Claritas PPT Grade Standards; Spex CertiPrep, Metuchen, NJ) were added to each centrifuge tube as an internal standard and the tubes were agitated with a vortex shaker for 3-5 seconds.

The samples were analyzed by ICP/MS (NexION 300D; PerkinElmer, Toronto, Canada). For quality control, two additional sets of eight nylon screens were spiked with Cr, Ni and Mn certified standards, digested and analyzed with the samples. For the NRD samplers from each mild and stainless welding replicate, the mean concentration of the analytes in the welding fumes was calculated along with the standard deviation.

## Extraction and IC Analysis

For the analysis of the three NRD samplers randomly selected from each stainless steel welding replicate and dedicated to Cr(VI), we followed NIOSH Method 7605, Hexavalent Chromium by Ion Chromatography.(46) Briefly, using nonmetallic forceps the sets of eight nylon screens, the PVC filters, two media blanks and two solution standard’s spikes for each media type were placed in centrifuge tubes with 5 ml of extraction solution, 2% NaOH/3% Na2CO3. The tubes were placed in an ultrasonic bath for 30 minutes and centrifuged for 15 minutes at 3500 rpm. The solutions were then transferred to 25-ml volumetric flasks and brought to volume with ultrapure deionized water. The flasks were inverted five times and an aliquot of the solution was transferred to sampling vials.

Calibration standards spanning from 0.2 to 4 ppm were prepared using hexavalent chromium standard in H2O solution (Product # 2095-4; Ricca Chemical Company, Arlington, TX). The samples were analyzed by IC (ICS 2500; Dionex Corporation, Sunnyvale, CA).