

**RECOMMENDED SPECIFICATION**

Cogent Environmental OVA-5000 Heavy Metal Analyzer

to Monitor Total Dissolved Arsenic

for

Ion Exchange Process Monitoring

## 1.0 Functional Specifications

An on-line process analysis system for detection of total dissolved Arsenic shall be furnished in strict accordance with these specifications. This specification is based on the OVA-5000 Heavy Metals Analyzer manufactured by Cogent Environmental and distributed in North America by ASA Analytics, in Waukesha, Wisconsin.

### 1.1 Monitoring of Multiple Sample Streams

A single on-line analysis system shall be capable of detecting Total Dissolved Arsenic in samples from five sample lines connected to the analyzer system. Multiple instruments for each sample point and parameter are prohibited. Total Dissolved Arsenic is defined as the free Arsenite dissolved in water following an automatic digestion and sample preparation to reduce arsenate to arsenite as described in EPA publication SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods". The on-line analysis system shall be fully capable of automatically performing all necessary sample digestion, preparation and analysis steps.

### 1.2 Analyte Detection Range and Accuracy

The analyzer shall detect Total Dissolved Arsenic over the following concentration ranges:

Well Samples (3 locations)	3 - 20 µg/l
Process Samples (1 location)	2 - 12 µg/l
Final Effluent (1 location)	2 - 12 µg/l

Detection range and accuracy for Total Dissolved Arsenic analysis must be verified through the submission of data from a test of at least six months duration at Superfund or remediation site where Arsenic is being removed from soil or groundwater. All tests shall be conducted under the supervision of the ETV or ESTCP programs. Comparison samples shall be extracted a minimum of 30 times during the test period and tested in accordance with a method approved by the USEPA and listed in SW-846. The following calculations from the test shall be submitted: average absolute error, variance and standard deviation.

#### 1.2.1 Experience Requirement

The manufacturer of the on-line arsenic analyzer shall have at least one system that has been in continuous operation for analysis of Total Dissolved Arsenic under the supervision of a US government agency or designated remediation contractor for a period of no less than five years.

### 1.3 Multiple Sample Line Capability

The analyzer shall have the capability to monitor up to five discrete sample locations in sequence. All necessary sample line purge and analysis shall be controlled automatically by pumps and valves within the analyzer.

### 1.3.1 Sample Frequency

Each sample point shall be capable of being measured no less frequently than every 60 minutes including flush time. Data averaging shall not be used.

### 1.3.2 Outputs

A dedicated analog output shall be provided for each parameter and sample point specified in paragraph 1.2 above and shall be scaled to the range shown.

### 1.3.3 Sample Lines and Drains

A recirculation or bypass sample line from each sample point that provides a pressurized flow of 5 to 60 psi shall be available in close proximity to the analyzer system. The contractor shall provide a tee connection from the sample line to the analyzer sample inlet and a hand valve after the tee connection on the bypass line to regulate back pressure at the tee. An open drain line shall also be provided in close proximity to the analyzer system.

### 1.4.1 Required Detection Technique

The analyzer shall use SW-846, Method 7063 "Arsenic in Aqueous Samples and Extracts by Anodic Stripping Voltammetry" with the exception that the working electrode shall be solid gold, which eliminates the procedures required for gold plating of a GCE electrode. Reference electrode shall be silver/silver chloride and auxiliary electrode shall be platinum.

### 1.4.2 Prohibited Detection Techniques

The analyzer shall not use colorimetric or Gutzeit derivatives, X-ray or gamma ray irradiation, mercury drop or disposable test strip techniques, ion chromatography, ICP-MS, capillary electrophoresis or any method that produces arsine gas as a byproduct. Submittal data shall specify the detection technique to be provided.

## 1.5 Software Requirements

### 1.5.1 Internal Software

The analyzer shall use LabView® software for internal programming. All operational functions including sample line selection and flushing, acidification/digestion, electrolyte addition, stirring, deposition time, stripping time, analysis of stripping peaks, calculation of results, display of results, data logging and data communication shall be fully automatic and controlled by the internal software.

### 1.5.2 Internal Data Logging Capability

The analyzer shall contain an internal memory capable of retaining a record of analytical values with the corresponding date and time for each measurement. This memory shall be battery protected to avoid loss in the event of a power interruption. The memory shall be capable of being accessed through a built in CD writer. Frequency of data storage shall be user programmable through the operator interface display.

#### 1.5.3 Security Code Capability

The analyzer shall contain the capability to deny operational command or menu access through the use of a security code. The analyzer shall also contain the capability for security codes to be changed by an authorized operator. Operational and supervisory levels of access shall be provided.

#### 1.5.4 Analysis Algorithm

The analyzer shall have the capability to analyze standards, standard additions and sample blanks as a part of the analysis routine. Data process routines for curve smoothing, baseline correction and background subtraction shall be available for use in the analysis routine selected.

### 1.6 Communications Capability

#### 1.6.1 Operator Interface

The analyzer shall be provided with the ability to display and select menu choices, operational commands and diagnostic information necessary for operation and control of the analyzer. The analyzer shall also display operating status and the most recent analysis results for each parameter in graphical format. A 12.1 inch Color LCD display with joystick display control shall be provided

#### 1.6.2 Data Communications

The analyzer system shall contain the ability to transmit a dedicated 4-20 mA signal scaled to the detection range for each analyte to be monitored in each sample line. The 4-20 mA transmitter shall be capable of producing a signal with an error rate of less than 0.5 percent throughout the scale. The analyzer shall also have RS-232 and remote access via LAN communication capabilities.

#### 1.6.3 Alarms

Operator programmable alarms for high or low concentration set points on each sample line shall be provided.

## 2.0 Equipment Specifications

## 2.1 Segregated Cabinet Sections

The analyzer shall be provided in a floor standing metal cabinet divided into three segregated sections.

### 2.1.1 Reagent Cabinet

The section nearest to the floor shall contain a locked cabinet for storage of electrolytes, acid, de-ionized water and standards. A low reagent level sensor shall be provided

### 2.1.2 Wet Chemistry Cabinet

The middle section shall contain a locked cabinet for the wet chemistry functional equipment, including pumps, acrylic sample cell with electrodes and variable speed stirrer and UV digestion apparatus. This compartment shall contain a spill detector with audible local alarm.

### 2.1.3 Electronics Cabinet

The upper section shall consist of a locked cabinet for electronics. This section shall contain the LCD display, joystick control, industrial PC104 with 586 Pentium computer, power supplies, 110V main power connection, data communication, alarms, and CD writer. Electronics and cabinet shall be UL/CSA or CE compliant.

### 2.1.2 Keypad and Display

An externally mounted display shall be provided. The display shall be back illuminated for observation in low ambient light levels. A keypad shall be provided to enter all operator-selected variables and menu options necessary for routine operation of the analyzer.