

MERCURY CONTAMINATION CHARACTERIZATION AT GAS PIPELINE SITES



SCOPE OF WORK JULY 1993

This scope of work (SOW) outlines the Kansas Department of Health and Environment (KDHE) minimum requirements for the characterization of gas pipeline mercury manometer sites. Characterization of a mercury manometer site is necessary to fully and accurately determine the need for remediation at each site. This SOW is a flexible process that can be tailored to specific characteristics and needs at individual sites. The requirements of this SOW have been empirically determined by KDHE to be the most effective for determining the nature and extent of mercury contamination at the sites in a consistent and cost effective manner. The specific investigative parameters included in this SOW must be incorporated into site characterization work plans submitted to KDHE for KDHE to consider the work plans as candidates for approval.

The overall goal of the site characterization is to identify those metering stations at which mercury is present in or around the facility and to determine the approximate concentrations of mercury present in soils at the sites. The results of soil sampling will be used to determine the need for corrective action at the sites. The Scope of Work must at a minimum include the following activities:

1. Historical Evaluation

File reviews should be conducted to determine the age and nature of operations at each metering station. Information should be available in the form of company records or personal narratives from current or former employees as to whether mercury manometers were employed at specific metering stations. A comprehensive list of active and inactive mercury manometer metering stations must be provided to KDHE. At a minimum the list should include the station number, name or other unique identifier, legal description, county, and status (active/inactive). A map indicating the approximate locations of the sites is also recommended.

2. Visual Inspections

A visual inspection of those sites that historically employed mercury manometers should be conducted to document existing conditions (building construction, condition of building, nature of the building floor, site drainage, etc.) and to determine the actual locations of all mercury meters that may have been employed at the sites. At a minimum the following conditions must be documented: note whether mercury may have migrated away from the metering station via surface drainage; determine the nature of land use in the vicinity of each site (i.e. are adjacent properties used for residential or recreational purposes, and if so, what is the linear distance to the nearest residence or recreational facility); evaluate shelves, ledges, floors, and other surfaces to determine whether any elemental mercury is present in and/or around the metering stations.

3. Mercury Vapor Survey

A Mercury Vapor Analyzer (MVA) should be employed to characterize the concentration of mercury vapor in the breathing zone and near ground level in and around metering stations, adjacent to the chart box, and along the joint between the walls and the footings of the metering stations. At a minimum the following conditions must be documented: calibration procedures and calibration times; and detections of mercury vapors including concentrations, locations, and height above the ground surface of the detections.

Note that if the MVA is properly calibrated, any detection of mercury vapors should be regarded as qualitative only, and usually indicates the presence of much higher concentrations in soils on site than are indicated by the MVA. The detection of mercury vapors in the ambient air on site indicates that the site is a probable candidate for corrective action; further characterization of soils should be performed to determine whether and how much excavation of soils must be performed in order to remediate the site.

4. Soil Characterization

Surface and subsurface soil samples should be collected and submitted to a KDHE approved analytical laboratory to characterize the approximate lateral and vertical extent of mercury contamination at the sites. KDHE has determined that a minimum of three samples must be collected and submitted for laboratory analysis at a meter house with one meter run, whether the site is active or inactive. Approved laboratory methods for total mercury analysis include: 245.5 (Contract Laboratory Program or CLP) and 7471. The TCLP test is described in 40 CFR Part 261 Appendix II - Method 1311. A site at which a mercury meter was historically present cannot be removed from consideration for corrective action unless the minimum three samples have been collected in accordance with KDHE guidance. Additional characterization of metering station sites may expedite the excavation phase of the remedial process; it may be to the facility owner/operator's advantage to collect additional samples above and beyond the required minimum.

The total number and location of soil samples to be collected at each site is based on several specific factors. For the purposes of mercury contamination characterization, metering stations may be grouped into two categories: those with concrete floors, and those with floors composed of dirt, gravel, or other porous materials. All samples should be collected with stainless steel spoons or hand augers and should be collected, handled, and packaged in accordance with appropriate United States Environmental Protection Agency (EPA) guidance.

4a. In the case of a metering station with a concrete floor, a minimum of three samples should be collected outside each building entrance in the following configuration: 1) one grab sample collected at a depth of zero to six inches below grade from a location one foot perpendicular to the center of the door frame; 2) one grab sample collected at a depth of 18-24 inches at the same location; and 3) one composite sample composed of three or more aliquots collected from depths of zero to six inches at radial distances of three to four feet from the building entrance. The aliquots should be combined in a stainless steel or aluminum pan and blended with a stainless steel spoon prior to packaging.

4b. In the case of a metering station with a floor composed of materials other than concrete, a minimum of three samples should be collected in conjunction with each mercury manometer that was located in the building. The samples should be collected in the following configuration: 1) one grab sample collected at a depth of zero to six inches underneath the former location of each mercury manometer;

2) one grab sample collected at a depth of 18-24 inches at the same location; and 3) one composite sample composed of four aliquots collected from depths of zero to six inches at radial distances of approximately three feet from the grab sample location.

Sampling locations may be adjusted if existing conditions prevent the collection of the samples at the specified locations.

5. Ground Water Characterization

If ground water is encountered during site characterization, a shallow borehole or monitoring well must be emplaced at the metering facility. Two shallow ground water samples (filtered and unfiltered) must be collected and submitted for laboratory analysis for total mercury content using laboratory methods 245.1 (CLP), 245.2 (CLP), or 7470. KDHE should be notified of the presence of shallow ground water prior to the commencement of drilling or sampling activities at any site.

6. Mercury Characterization Report

At the conclusion of the characterization phase an abbreviated characterization report must be submitted to KDHE. The characterization report should include: a summary of findings including analytical data, site setting, and a list of corrective action candidate sites; county maps with marked and labeled metering station locations; copies of field assessment sheets (including sketches of the stations indicating dimensions, features, mercury manometer locations, and sampling locations); copies of laboratory analytical reports; and quality assurance/quality control results and interpretation.

A natural gas pipeline mercury manometer site owner/operator may formulate a mercury site characterization plan using a sampling strategy other than that outlined above; however, any such variance must be justified to and approved by KDHE prior to implementation. Failure to meet or exceed KDHE standards in the implementation of site characterization may result in the invalidation of site characterization efforts.

For additional information or questions concerning this SOW or other aspects of natural gas pipeline mercury manometer characterization or cleanup, please call or write:

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