

Appendix III.A

Quality Control Procedures for Using Hand-held Gamma Radiation Detectors

Thorough quality control (QC) procedures were followed throughout the three-day assessment period. These procedures not only demonstrated a common gamma radiation survey technique, but also served to train local residents, officials and agency representatives in proper use of hand-held gamma detectors. QC procedures were adhered to and documented during data gathering and data recording. These QC procedures are consistent with industry practice and government recommendations. Similar procedures are followed in radiation surveys at laboratories, military bases, and site restoration projects. Because the QC standards were adhered to, it is possible to use the resulting data to identify areas where cleanup actions may be needed.

QC during data collection:

(a) Instrument and operator tracking — Operators were assigned detectors at the beginning of the three-day survey and used the same instrument each day. Notation on the instrument check sheets was made of the serial number and operator for each detector.

(b) Instrument calibration — All devices used were within calibration periods. Five instruments were calibrated within the previous month. Calibration due dates are indicated on the daily detector check sheets.

(c) Detector background checks — The Churchrock Chapter House was selected for daily background checks. Background levels were recorded on the detector check sheets prior to making measurements each day.

(d) Detector stability checks — Cesium-137 check sources were used every day to verify that the detector's response was reproducible. Each detector was assigned the same check source. Jig marks were made on the bottom of the detectors to provide for reproducible results.

(e) Battery checks — Battery levels were checked daily. Low batteries were replaced.

QC during data transfer:

Three categories of QC were used during data recording, transfer, and interpretation.

(a) Data transfer and verification — The transfer of each data point from the field data sheet was checked for accuracy twice. First, when each datum was first entered into the Excel spreadsheet each value was double-checked. Second, each data point was verified on a later day. The name and date of the person conducting both the data entry and the data verification were noted on each field data sheet. Data that were questionable in terms of legibility were not used in the final files. Original data sheets with notations for original operator, first transcriber and QC verifier were filed and are available for future review, if needed.

(b) Operator and detector tracking — Each data point must be associated with the following information to be used in the final report. First, the name of the operator who took the measurement must be known. At the beginning of every grid row or column in the spreadsheet for that survey area the operator is noted in the comment field. This name is associated with a specific detector serial number and stable check source results for that day. In some cases, field data sheets were turned in without names. These results were not used in the report. Second, the operator must have recorded results of their stability checks with the cesium sources on the same day as that survey, and those results must be available and show that the instrument was operating consistently. In the case of one operator, this information was not available and all results from that operator were not used in the final report. In other cases, results from certain days were not used because the instrument check sheet results for that day were not recorded or not available, and these data were also not used.

(c) Internal consistency — Data were checked for internal consistency in two ways. First, the team leader recorded the relative positions of the surveyors at each site. When the data were entered, the surveyors' field data sheets were compared with these positions of each surveyor on the team leader's notes, and data that were inconsistent in terms of location were not used. Second, the internal consistency of results was evaluated. In cases where adjacent results were inconsistent (e.g., more than a 20 uR/hr difference between results one meter away), those data were not used.