APPENDIX C

USAEHA INSTRUMENTATION QA/QC SHEET

1. All steps in the Fort Ord Scoping Survey Protocol will be followed; this document is to provide guidance on the completion of the instrumentation sheet.

* NOTE: ALL BLANKS ON THE INSTRUMENTATION SHEET WILL BE FILLED IN, IF IT DOES NOT APPLY TO A PARTICULAR INSTRUMENT PLACE N/A (NOT APPLICABLE) IN THE BLANK SO THAT IT IS CLEAR THAT IT WAS NOT FORGOTTEN!

2. INSTRUMENTATION SHEET.

a. Fill in the blanks as stated below:

(1) Areas: Fort Ord (what post the survey is performed on).

(2) Building: Place the first building number of the sampling day in the blank. If a new building is started that day, add that building number here also.

(3) Date: Place today's date in this blank. This is the MOST IMPORTANT blank to fill in. This information is crucial in correlating the sampling forms with the correct instrumentation QA/QC.

(4) Surveyor: Enter the name of the team leader and team ID in this blank, e.g Hays (A).

(5) Page-of-: Enter 1 in the first blank and count up all the sampling forms for that day and add 1 for the QA/QC sheet. Place that number in the second blank.

(6) Make of instrument: Place the name brand (e.g. Eberline, Ludlum) of the instrument in the blank.

(7) Model of instrument: Enter the model number of the instrument in the blank.

(8) Serial Number (SN): Insert the serial number of the instrument in the blank.

(9) Calibration Date: Place the date of the last time the instrument was calibrated in the blank.

(10) Source: Each survey meter will be calibrated with a

radioisotope traceable to National Institute of Standards and Technology (NIST). Place the type of source and also the activity of the source in the blank.

(11) Source date: Place the date that the source was calibrated and its serial number in the blank.

(12) Reading: Enter the reading of the source from the instrument in the blank.

(13) Instrument efficiency: An efficiency factor will be developed for alpha and beta instruments to correlate the meter reading to the actual radioactivity present. The efficiency will be calculated by using the following formula:

$$\text{EFFICIENCY} = \frac{\text{(CPM-BACKGROUND)}}{\text{DPM}}$$

CPM = Reading of the NIST source
DPM = Calculated activity of the NIST source

(14) Flags: The flag is a value that warrants possible investigation. The formula to calculate the flag is as follows:

$$\text{FLAG} = N * .7 * E * (A/100\ \text{cm}^2) + (B)$$

N = NRC guideline value for certain emitters
* Alpha emitters- 100 dpm/100 cm^2
* Beta emitters- 5000 dpm/100 cm^2
* Tritium- 2000 dpm/100 cm^2

** Gamma emitters- 5 μR/hr above background is the flag
E = Detector efficiency
A = Active probe area in cm^2
B = Background rate in cpm

(15) Probe make: Place the name brand (e.g. Eberline, Ludlum) of the probe in the blank.

(16) Probe model: Enter the model number of the probe in the blank.

(17) Probe serial number: Insert the serial number of the probe in the blank.

(18) Background: At a minimum five background radiation readings will be averaged over a two minute period for each instrument to be used. These readings should be taken in an area that is known to be an unaffected area.

(19) Midday reading: After returning back to work from lunch each day, a reading should be taken from the appropriate NIST source so to ensure that the instrument is reading correctly and has not been damaged earlier in the day. The value that is recorded should be very similar to the reading taken at the beginning of each day. This will insure that the data is dependable.

(20) Evening reading: At the end of each working day, a reading should be taken from the appropriate NIST source so to ensure that the instrument has not been damaged or changed during the sampling day. The value should be similar to the midday and the beginning day readings.

3. Minimum Detectable Activity.

a. MDA is the minimum level of radiation or radioactivity that can be measured by a specific instrument and technique. The MDA is usually established on the basis of assuring false positive and false negative rates of less than 5%. MDA on the instruments will be performed monthly at a minimum and/or after calibration of the instrument. The MDA of a ratemeter instrument for surface activity measurements can be approximated by taking twice the time constant of the meter as the counting time and using the relationship :

$$MDA = \frac{4.65\sqrt{B/(2 \times T)}}{E \times (A/100)}$$

MDA = activity level in disintegrations/minute/100 cm^2
B = background rate in counts/minute
T = meter time constant in minutes
E = detector efficiency in counts/disintegrations
A = active probe area in cm^2

NOTES

AREAS: _____

Building: _____

Date: _____

page___of___

Surveyer_____

INSTRUMENTATION

	ALPHA OR H^3	BETA	GAMMA
MAKE			
MODEL			
SN			
CAL. DATE			
SOURCE			
SOURCE DATE			
READING			
INSTR. EFF.			
FLAGS			
PROBES			
MAKE			
MODEL			
SN			
CAL. DATE			
MIDDAY READING			
EVENING READING			

NOTES: