

RCT/HPT Site Standard OJT Program  
OJE Evaluator Reference

Course Number: **022304**

Course Title: RCT/HPT OJT/OJE Task – Field Air Sampling

Task Title: Field Air Sampling

Form(s) Air Sample Envelope

Terminal Objective: Demonstrate use of Field Air Sampling Equipment

<b>Objectives – Part A</b>	
<b>Method</b>	<b>Task</b>
D	<p>Grab Air Samplers</p> <p>Identify minimum volume for low and high volume air samplers and what criteria these volumes are based on.</p> <ul style="list-style-type: none"> <li>• Personal air samplers have low flow rate capabilities (0.07 CFM) and should be used with caution as the total collected volume may not satisfy the intended air sample function.</li> <li>• Sampling times for infrequently occupied areas vary according to the nuclide(s) of concern, job duration, and the reason for collecting the air sample.</li> <li>• Sample volume affects analytical instrument sensitivity by lowering the minimum detectable concentration (MDC) as collected volume increases.</li> </ul>
D	<p>Identify the pre-sampling considerations for all grab samplers</p> <p style="padding-left: 40px;"><i>Perform pre-use checks</i></p> <ul style="list-style-type: none"> <li>• <i>Verify current calibration for sampler</i></li> <li>• <i>Rotameter free to move</i></li> <li>• <i>Cord in good shape</i></li> <li>• <i>Switches, knobs, etc</i></li> <li>• <i>Runs w/o sparking or excessive noise</i></li> </ul> <p style="padding-left: 40px;"><i>Identify proper media / filter</i></p> <p style="padding-left: 40px;"><i>Identify proper location for the sampler</i></p> <ul style="list-style-type: none"> <li>• <i>Within 1 foot of worker (breathing zone sample) without creating safety concern</i></li> <li>• <i>Attempt to place at a height of 1-2 meters</i></li> </ul>

Objectives – Part A	
Method	Task
	<ul style="list-style-type: none"> <li>• <i>Representative sample ( i.e.: downwind; between worker &amp; room exhauster)</i></li> </ul> <p><i>Identify actions to take if unable to place sampler within 1 foot of worker for breathing zone sample.</i></p> <ul style="list-style-type: none"> <li>• <i>Consider use of lapel sampling</i></li> <li>• <i>If unable to place sampler within 1 foot of worker or use lapel sampling, the RCT shall place sampler as close as practical to the most exposed worker (without interfering with the work and notify supervisor.</i></li> </ul>
D	<p>Identify associated precautions / limitations for the following</p> <p><i>Confined spaces</i></p> <ul style="list-style-type: none"> <li>• <i>No sampling until the area has been cleared by applicable safety representative</i></li> </ul> <p><i>Dusty or dirty conditions</i></p> <ul style="list-style-type: none"> <li>• <i>Dust or dirt may cause masking or interfere with counting sample for alpha activity</i></li> </ul> <p><i>High contamination or alpha contamination</i></p> <ul style="list-style-type: none"> <li>• <i>High exhaust from the sampler may create or worsen a current airborne situation</i></li> </ul>
D	<p>Annular Kinetic Impactor Air Sampler (AKI)</p> <p>Identify precautions/limitations when sampling with the annular kinetic impactor</p> <ul style="list-style-type: none"> <li>• <i>Ensure appropriate oil is used (SF200)</i></li> <li>• <i>Excessive oil placed on planchet may cause worsen self-absorption of sample</i></li> <li>• <i>Ensure planchet is stored so that oil does not transfer to other surfaces</i></li> <li>• <i>Verify dust loading is not visible on planchet after collection</i></li> </ul>

<b>Objectives – Part A</b>	
<b>Method</b>	<b>Task</b>
D	<p>Identify advantages / disadvantages with using the annular kinetic impactor</p> <p><i>Discriminates out large portion of radon/thoron isotopes</i></p> <p><i>Allows for quick analysis of sample, w/o waiting for extended decay process</i></p> <p><i>Has to have appropriate oil available</i></p> <p><i>Able to obtain large volume of air in short period of time</i></p> <p><i>Does have alpha shielding issue with oil</i></p> <p><i>Loud, so hearing protection may be needed</i></p> <p><i>Calibrated set (head and blower)</i></p> <p><i>20 min max run time due to potential for damaging unit</i></p>
D	<p>Perform Sampling</p> <p><i>Identify proper method(s) of filter/media placement and removal_</i></p> <p><i>Ensure filter/media is properly placed in sampler head or prepared prior to entering area (filter is in with smooth side out / planchet is oiled and ready)</i></p> <p><i>Remove filter/media with “clean” gloves and tweezers and place into proper container</i></p> <p><i>Return sampler to SOP and remove sample in a manner to avoid cross contamination</i></p>
PD	<p>Document or discuss the minimum information needed for air samples on envelope</p> <p><i>Place location of sample (area; building; room; etc.)</i></p> <p><i>Name of RCT starting and pulling sample</i></p> <p><i>Start and Stop times (military format)</i></p> <p><i>Flow rates at beginning and end of sampling including units</i></p> <p><i>Sampler information (serial #; calibration due date; type)</i></p>

<b>Objectives – Part A</b>	
<b>Method</b>	<b>Task</b>
D	<p>Discuss the set-up of a low / high volume sampler</p> <p><i>Choose proper filter media</i></p> <p><i>Place filter in sampler head “smooth” side out</i></p> <p><i>Verify proper flow rate for sampler</i></p> <p><i>Verify proper sampler placement within area</i></p> <p><i>Verify sampler has a current calibration</i></p>
D	<p>Discuss the set-up of an annular kinetic impactor</p> <p><i>Place a small drop of approved oil in center of planchet</i></p> <p><i>Carefully smear oil around to completely cover the planchet with finger</i></p> <p><i>While turning on the sampler place the planchet on the end of AKI</i></p> <p><i>Verify proper flow rate</i></p> <p><i>(WCH)</i></p> <p><i>Recommended flow rate of 30 cfm for a low-profile AKI</i></p> <p><i>Minimum of 40 cfm for a conical AKI, not to exceed 50 cfm</i></p> <p><i>Verify proper sampler placement within area</i></p>
D	<p>Identify how the appropriate count times for the grab samples are determined</p> <p><i>Will be based upon the required MDC for the sample which is typically 10% to 30% of a DAC.</i></p>
D	<p>Discuss the limitations of using hand held meters to count air samples</p> <p><i>Hand held instruments may be used to determine airborne levels prior to counting with bench counter. Field instruments are typically lower in efficiency and higher in background which can affect readings.</i></p> <p><i>Field formula does not factor in some parameters such as filter efficiency and such.</i></p>

Objectives – Part A	
Method	Task
	<i>Final count should be completed on a bench top scaler</i>
D	<p>Discuss the requirements for verifying flow rates for lapel samplers.</p> <p><i>The lapel must be <math>\geq 4</math> lpm prior to use.</i></p> <p><i>The flow rate shall be obtained by calibrated flow check meter.</i></p> <p><i>The final flow rate verification shall be completed prior to turning off the lapel sampler.</i></p> <p><i>If the initial and final flow rates vary more than <math>\pm 20\%</math>, notify RadCon Supervisor for further instructions.</i></p>
D	<p>Identify the proper location of the lapel sampler on the worker.</p> <p><i>Within 12 inches of the workers face, which is considered the breathing zone.</i></p>
D	<p>Identify who determines to use a lapel instead of a grab sample.</p> <p><i>Must contact the supervisor or Radiological Engineer for review and approval prior to use.</i></p>

Objectives – Part B	
Method	Task
P	Document the minimum information needed on envelopes
P	Perform the set-up of a low / high volume sampler
P	Perform the set-up of an annular kinetic impactor
P	Analyze samples using portable contamination survey instrument (NK/VE)