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### DUTY HONOR SERVICE

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### **Subject: Measurement Uncertainty in Drug Weights, Toxicology and Firearms**

Beginning January 1<sup>st</sup>, 2014, Controlled Substance, Toxicology and Firearm reports will include measurement uncertainty values when drug weight, blood alcohol concentration or firearm length values are reported. Per our accrediting body, we are required to begin calculating and providing measurement uncertainty for these reported values. *At this time, no other laboratory reports will be affected.*

- What is 'Measurement Uncertainty'?
- How is it calculated?
- What will the reports look like?

### **WHAT IS 'MEASUREMENT UNCERTAINTY'?**

Measurement uncertainty is not error and does not imply doubt about the validity of a measurement. A measurement uncertainty allows an analyst to state with a given confidence that the true value of a measurement lies within a given range. Therefore, this value might more aptly be called the "certainty of measurement" as it actually provides a level of confidence in the reported result. Depending on the calculations used, *this means an analyst will be able to state with either 95.45% or 99.73% confidence that the true value lies within the given range.*

The concept of measurement uncertainty *does not apply* to those situations where the results are non-numerical (e.g. pass/fail, positive/negative, or qualitative examinations).

### **HOW IS IT CALCULATED?**

The laboratory used nationally and internationally accepted guidelines and practices in calculating our measurement uncertainty values. This included an exhaustive 8-step process whereby all identified sources of uncertainty in our measurement process were evaluated and quantified. All these potential sources of uncertainty were combined using statistically valid and accepted calculations to produce a final value that leads to the value(s) you will see on your reports.

### **WHAT WILL THE REPORTS LOOK LIKE?**

The new measurement uncertainty text appears in the examples in **bold**, but will not normally appear any differently from the rest of the report text.

### Sample Drug Report Statement

Lab Item 1 (112456): Vegetation, 2.31 g  $\pm$  0.01 g net

Confirmed MARIJUANA

**“Measurement uncertainty values are expressed as an expanded uncertainty, and are calculated at the 95.45% confidence level (k=2).”**

### Sample Toxicology Report Statement

Lab Item 1 (112457): Blood sample

Ethyl Alcohol 0.12 (**0.126  $\pm$  0.007**) grams per 100 milliliters of blood

**“Measurement uncertainty values are expressed as an expanded uncertainty, and are calculated at the 99.73% confidence level (k=3).”**

### Sample Firearms Report Statement

Lab Item 1 (112458): 12 Gauge Remington model 870, blue and black pump-action shotgun, S/N: V883348V. Manufactured by Remington Arms in Ilion, NY.

Function Test: Lab item 1 meets the definition of a “Firearm” as defined in Kansas State Statute where a “Firearm” means any weapon designed or having the capacity to propel a projectile by force of an explosion or combustion. Lab Item 1 is so designed and will fire.

The barrel length of Lab Item 1 was measured to be 15 3/8 inches  $\pm$  1/8 inch. The overall length of Lab Item 1 was measured to be 25 5/8 inches  $\pm$  1/8 inch.

**“Measurement uncertainty values are expressed as an expanded uncertainty, and are calculated at the 95.45% confidence level (k=2).”**

Beginning January 1<sup>st</sup>, 2014, Controlled Substance, Toxicology and Firearm reports will include measurement uncertainty values when drug weights, blood alcohol concentration or firearm length values are reported. Feel free to address any questions you may have to myself, or to any of the following people:

Controlled Substances: Malinda Spangler, 913-826-3270, [Malinda.Spangler@jocogov.org](mailto:Malinda.Spangler@jocogov.org)

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