

Technical Procedure for Sampling

1.0 Purpose - This procedure specifies the required elements for the sampling of suspected controlled substance exhibits.

2.0 Scope - This procedure applies to items of evidence containing multiple packages, units or tablets in Drug Chemistry at the Raleigh, Triad, and Western locations of the State Crime Laboratory.

3.0 Definitions

- **Administrative Sample Selection** - A sampling plan used for all exhibits containing pharmaceutical preparations. This plan is also used for non-pharmaceutical exhibits when a statutory threshold does not apply. No inferences about unanalyzed material are made.
- **Threshold Sample Selection** - A sampling plan used when the material, dosage units or tablets present meet a statutory threshold and the individual analysis of the packages, units or tablets is practicable. The practicability of analysis is determined by the Forensic Scientist based on his/her training and experience. No inferences about unanalyzed material shall be made.
- **Hypergeometric Sampling Plan** - A statistically-based sampling plan that allows the Forensic Scientist to analyze a portion of a population and make a statistical inference about the whole population stating that the material was analyzed with a statistical sampling plan that demonstrates with 95 % confidence that at least 90 % of the material contains the identified controlled substance(s). The hypergeometric sampling plan shall be used when there are ten or more packages, units or tablets and the threshold sampling plan is not practicable.
- **Homogenous** – Uniform.
- **Population** - A carefully inspected group of packages, units or tablets found to be homogenous and are to be subjected to sampling.
- **Sample Selection** - A practice of selecting items to test, or portions of items to test, based on the Forensic Scientist's training, experience and competence. In sample selection, there is no assumption about homogeneity.
- **Sampling Plan** - For an item that consists of a multi-unit population (e.g., tablets, baggies, bindles), a sampling plan is a statistically valid approach to determine the number of sub-items that must be tested in order to make an inference about the whole population.
- **Sampling Procedure** - A defined procedure used to collect a sample or samples from the larger whole to ensure that the value obtained in the analysis is representative of the whole. The sampling procedure may include details about size and number of sample(s) to be collected, locations from which to collect the sample(s), and a method to ensure the homogeneity of the larger whole (or to make it so.)
- **Sampling** - Taking a part of a substance, material or product, for testing in order to reach a conclusion, make an inference about, and report on the whole. Sampling shall only be used when there is a reasonable assumption of homogeneity of the whole.

4.0 Equipment, Materials and Reagents - N/A

5.0 Procedure

5.1 The Forensic Scientist shall have this procedure readily available at the location of sampling.

5.2 Material from individual packages, units or tablets shall not be combined for analysis.

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- 5.3** Upon completion of the analysis, material from individual units shall not be combined when repackaged for return to the submitting agency.
- 5.4** Analyzed individual packages, units or tablets and data generated will be labeled to ensure that analysis data can be matched with the material it represents.
- 5.5 Standards and Controls - N/A**
- 5.6 Calibrations - N/A**
- 5.7 Population Determination**
- 5.7.1** Evaluate the number of packages, units or tablets present in an exhibit carefully. If there is only one package, unit or tablet present in an exhibit, the Technical Procedure for Sampling shall not be used. (See [Drug Chemistry Technical Procedure for Drug Chemistry Analysis](#).)
- 5.7.2** Visually inspect each of the packages, units or tablets in the exhibit carefully as well as any contents for homogeneity in size, weight, color, packaging, markings, labeling, indications of tampering and other characteristics. For analysis purposes, each intact piece of blotter paper shall be considered a unit. The Forensic Scientist shall document any perforations or indications of dosage units.
- 5.7.3** If after careful visual inspection it is determined that the contents of the packages, units or tablets are homogenous, the population shall consist of all of the packages, units or tablets.
- 5.7.4** If there are differences, segregate the packages, units or tablets into individual groups, based upon such observed differences. Each group shall be analyzed as separate populations.
- 5.7.5** If in the course of analysis it becomes apparent that the population is not homogenous, new populations may be formed based upon individual chemical test results. Samples which are no longer available for indiscriminate selection may not be considered a part of the new population.
- 5.7.6** If no groups can be formed based upon visual examination, then sampling shall not be performed.
- 5.8 Sampling Plan Selection**
- 5.8.1** If the population contains pharmaceutical preparations, Administrative Sample Selection shall be used.
- 5.8.2** If the amount of material, dosage units or tablets present does not meet a statutory threshold, Administrative Sample Selection shall be used.
- 5.8.3** If there is material, dosage units or tablets present in a population to meet a statutory threshold and the individual analysis of the packages, dosage units or tablets is practicable, Threshold Sample Selection shall be used.
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- 5.8.4** If there is material, dosage units or tablets present in a population to meet a statutory threshold and the individual analysis of the packages, dosage units or tablets is not practicable, then the Hypergeometric Sampling Plan shall be used.
- 5.8.5** The Forensic Scientist shall document the sample selection method or plan being used in the FA case record.

5.9 Administrative Sample Selection

5.9.1 Pharmaceutical Preparations

- 5.9.1.1** If the physical characteristics indicate a controlled substance, the complete analysis of one indiscriminately selected unit is required. If the physical characteristics indicate a non-controlled substance, a chemical analysis is not required.

- 5.9.1.1.1** The selection of samples shall be conducted in a manner that prevents the Forensic Scientist from consciously selecting a specific item from the population.

- 5.9.1.2** For preparations that are weighed, separate weights shall be recorded for the analyzed portion and the unanalyzed portion. Gross weights may be used for the unanalyzed portion.

- 5.9.1.2.1** The unanalyzed portion shall be left intact in the event further analysis is required.

5.9.1.3 Reporting Identified Substances

- 5.9.1.3.1** Each population shall be thoroughly described in the “Items Submitted” section of the Laboratory Report to substantiate the grouping of the preparations into the population.

The analyzed portion shall be identified in the “Results of Examination” section of the Laboratory Report with the statement “(insert number of packages, units or tablets) (was/were) analyzed and found to contain” followed by the results of the analysis and the statement “Weight of tablet” (or other description) – (insert weight of the analyzed portion, if weighed).

- 5.9.1.3.2** The unanalyzed portion of the population shall be identified in the “Results of Examination” section of the Laboratory Report with the statement “(insert number of packages, units or tablets) (was/were) visually examined; however, no chemical analysis was performed,” followed by “Weight of tablet (or other description) – (insert weight of that portion, if weighed). The statement “The physical characteristics, including shape, color and manufacturer’s markings of all units

were visually examined and found to be consistent with a pharmaceutical preparation containing (insert substance(s) indicated). There were no visual indications of tampering.” shall be included in the “Results of Examination” section of the Laboratory Report on the line directly below the line generated in 5.9.1.3.3.

5.9.1.4 Reporting Non-Controlled Substances

5.9.1.4.1 Each population shall be thoroughly described in the “Items Submitted” section of the Laboratory Report to substantiate the grouping of the preparations into the population.

5.9.1.4.2 The population shall be identified in the “Results of Examination” section of the Laboratory Report with the statement “The physical characteristics, including shape, color and manufacturer’s markings of all units were visually examined and found to be consistent with a pharmaceutical preparation that does not contain a controlled substance. There were no visual indications of tampering. No chemical analysis.”

5.9.2 Non-pharmaceutical Exhibits

5.9.2.1 For populations consisting of three or less packages, units or tablets, preliminary analyses of each package, unit or tablet shall be required.

5.9.2.2 For populations consisting of more than three packages, units or tablets, preliminary analyses of three packages, units or tablets shall be required.

5.9.2.3 In the event that preliminary testing selected to screen for controlled substances does not indicate the presence of a controlled substance, separate and complete analysis of a single unit shall be required.

5.9.2.4 In the event that preliminary testing does indicate the presence of a controlled substance, separate and complete analysis of each of these samples shall be required.

5.9.2.5 For weighed material, separate weights shall be recorded for the analyzed portion and the unanalyzed portion of the population. Gross weights may be used for the unanalyzed portion of the population. The unanalyzed portion shall be left intact in the event further analysis is required.

5.9.2.6 Reporting Identified Substances

5.9.2.6.1 Each population shall be thoroughly described in the “Items Submitted” section of the Laboratory Report to substantiate the grouping of the packages, units or tablets into the population.

5.9.2.6.2 For each portion of the population with identical results, the analyzed portion shall be identified in the “Results of Examination” section of the Laboratory Report utilizing the statement “(insert number of packages, units or tablets) were individually analyzed and were each found to contain” followed by the results of the analysis and the weight of the analyzed portion, if weighed.

5.9.2.6.3 The unanalyzed portion shall be identified in the “Results of Examination” section of the Laboratory Report with the weight of that portion, if weighed, and the statement “No chemical analysis.”

5.9.2.7 Reporting Non-controlled Substances

5.9.2.7.1 Each population shall be thoroughly described in the “Items Submitted” section of the Laboratory Report to substantiate the grouping of the packages, units or tablets into the population.

5.9.2.7.2 The portion subjected to complete analysis shall be identified in the “Results of Examination” section of the Laboratory Report utilizing the statement “(insert number of packages, units or tablets) (was / were) individually analyzed and (was / were) not found to contain a controlled substance” followed by the weight of the analyzed portion, if weighed.

5.9.2.7.3 The portion subjected to preliminary testing shall be identified in the “Results of Examination” section of the Laboratory Report utilizing the statement “(insert number of packages, units or tablets) were individually subjected to preliminary testing that did not indicate the presence of a controlled substance.”

5.9.2.7.4 The unanalyzed portion shall be identified in the “Results of Examination” section of the Laboratory Report with the weight of that portion and the statement “No chemical analysis.” If the unanalyzed portion contains un-weighed material, it will be listed separately from the weighed material.

5.10 Threshold Sample Selection

5.10.1 See the North Carolina Controlled Substances Act for North Carolina Statutory Thresholds.

5.10.2 Preliminary testing of the number of indiscriminately selected packages, dosage units or tablets to satisfy the statutory threshold shall be required.

5.10.2.1 The selection of samples shall be conducted in a manner that prevents the Forensic Scientist from consciously selecting a specific item from the population.

5.10.2.2 In the event that preliminary testing does not indicate the presence of a controlled substance in the required number of indiscriminately selected samples, separate and complete analysis of a single unit shall be required.

5.10.2.3 In the event that preliminary testing does indicate the presence of a controlled substance in the required number of indiscriminately selected samples, separate and complete analysis of each of these samples shall be required.

5.10.3 For weighed material, separate weights shall be recorded for the analyzed portion and the unanalyzed portion of the population. Gross weights may be used for the unanalyzed portion of the population. The unanalyzed portion shall be left intact in the event further analysis is required.

5.10.4 Reporting Identified Substances

5.10.4.1 Each population shall be thoroughly described in the “Items Submitted” section of the Laboratory Report to substantiate the grouping of the packages, units or tablets into the population.

5.10.4.2 For each portion of the population with identical results, the analyzed portion shall be identified in the “Results of Examination” section of the Laboratory Report utilizing the statement “(insert number of packages, units or tablets) were individually analyzed and were each found to contain” followed by the results of the analysis and the weight of the analyzed portion, if weighed.

5.10.4.3 The unanalyzed portion shall be identified in the “Results of Examination” section of the Laboratory Report with the weight of that portion, if weighed, and the statement “No chemical analysis.”

5.10.5 Reporting Non-controlled Substances

5.10.5.1 Each population shall be thoroughly described in the “Items Submitted” section of the Laboratory Report to substantiate the grouping of the packages, units or tablets into the population.

5.10.5.2 The portion subjected to complete analysis shall be identified in the “Results of Examination” section of the Laboratory Report utilizing the statement “(insert number of packages, units or tablets) were individually analyzed and were not found to contain a controlled substance” followed by the weight of the analyzed portion, if weighed.

5.10.5.3 The portion subjected to preliminary testing shall be identified in the “Results of Examination” section of the Laboratory Report utilizing the statement “(insert number of packages, units or tablets) were individually subjected to preliminary testing that did not indicate the presence of a controlled substance.”

- 5.10.5.4** The unanalyzed portion shall be identified in the “Results of Examination” section of the Laboratory Report with the weight of that portion and the statement “No chemical analysis was performed.” If the unanalyzed portion contains un-weighed material, it shall be listed separately from the weighed material.

5.11 Hypergeometric Sampling Plan

- 5.11.1** Preliminary testing of the number of indiscriminately selected packages, dosage units or tablets as determined from the table below shall be required.

- 5.11.1.1** The selection of samples shall be conducted in a manner that prevents the Forensic Scientist from consciously selecting a specific item from the population.

Population Size	Samples
10-11	8
12-13	9
14-15	10
16-17	11
18-20	12
21-23	13
24-26	14
27-30	15
31-34	16
35-39	17
40-45	18
46-52	19
53-61	20
62-73	21
74-88	22
89-108	23
109-138	24
139-184	25
185-270	26
271-474	27
475-1619	28
1620-10000	29

- 5.11.2** In the event that preliminary testing selected to screen for controlled substances does not indicate the presence of a controlled substance in the required number of indiscriminately selected samples, separate and complete analysis of a single unit shall be required.

- 5.11.3** In the event that preliminary testing selected to screen for controlled substances does indicate the presence of a controlled substance in the required number of indiscriminately selected samples, separate and complete analysis of each of these samples shall be required.
- 5.11.4** For weighed material, separate weights shall be recorded for the analyzed portion and the unanalyzed portion of the population. Gross weights may be used for the unanalyzed portion of the population. The unanalyzed material shall be left intact in the event further analysis is required.
- 5.11.5** If there is material present to satisfy a weight threshold that is not met by the weight of the analyzed portion, then the Forensic Scientist shall obtain individual weights of enough additional indiscriminately chosen samples to meet the weight threshold. These samples do not require chemical analysis and shall be reported per the Reporting guidelines in **5.11.7**.
- 5.11.5.1** When the Forensic Scientist determines, based on his/her training and experience, that it is impracticable to obtain individual weights of enough additional indiscriminately chosen samples to meet the weight threshold, the weight of the additional indiscriminately chosen samples shall be extrapolated.
- 5.11.5.1.1** Determine the number of units used for extrapolation to 90 % of the population.
- Multiply the total number of units in the entire population by 0.9.
 - If this number is not a whole number, round up to the next whole number.
 - Subtract from this number the number of units in the analyzed portion.
- 5.11.5.1.2** Determine the average weight of a unit.
- Divide the total weight of the analyzed portion by the number of units analyzed.
- 5.11.5.1.3** Determine the extrapolated weight.
- Multiply the average weight of a unit by the number of units in the extrapolated portion.
- 5.11.5.1.4** Record the gross weight of the units in the remaining 10 % of the total population.
- 5.11.5.1.5** The following information shall be reported according to Reporting guidelines in **5.11.6**:
- Number of units analyzed and net weight of the analyzed portion.

- Number of units analyzed and the weight of the extrapolated portion, with a notation that it is an Extrapolated weight.
- Number of units and the gross weight of the remaining 10% of the total population, with a notation that it is a Gross weight of contents and packaging.

5.11.6 Reporting Identified Substances

- 5.11.6.1** To use the Hypergeometric statement in **5.11.5.1.5**, the results of analysis to be reported for each sample shall be identical. If non-identical results are to be reported, the Forensic Scientist shall stop following the Hypergeometric Sampling plan and shall follow the Administrative or Threshold Sampling plans, as applicable.
- 5.11.6.2** Each population shall be thoroughly described in the “Items Submitted” section of the Laboratory Report to substantiate the grouping of the packages, units or tablets into the population.
- 5.11.6.3** The analyzed portion shall be identified in the “Results of Examination” section of the Laboratory Report utilizing the statement “(insert number of packages, units or tablets) were individually analyzed and were each found to contain” followed by the results of the analysis and the weight of the analyzed portion, if weighed utilizing the statement “Weight of material – (insert net weight).
- 5.11.6.4** The extrapolated portion shall be identified in the “Results of Examination” section of the Laboratory Report utilizing the statement “(insert number of packages, units or tablets) – No chemical analysis was performed.” The extrapolated weight shall be reported utilizing the statement “Extrapolated weight (not individually weighed) – (insert extrapolated weight).
- 5.11.6.5** The unanalyzed portion shall be identified in the “Results of Examination” section of the Laboratory Report with the weight of that portion and the statement “No chemical analysis.” If the unanalyzed portion contains unweighed material, it shall be listed separately from the weighed material utilizing the statement “Gross Weight of contents and packaging – (insert gross weight).
- 5.11.6.6** The results for this population shall also contain the statement “This material was analyzed with a statistical sampling plan that demonstrates with 95 % confidence that at least 90 % of the material contains the identified substance(s).”

5.11.7 Reporting Non-controlled Substances

- 5.11.7.1** Each population shall be thoroughly described in the “Items Submitted” section of the Laboratory Report to substantiate the grouping of the packages, units or tablets into the population.

- 5.11.7.2** The portion subjected to complete analysis shall be identified in the “Results of Examination” section of the Laboratory Report utilizing the statement “(insert number of packages, units or tablets) (was/were) individually analyzed and were not found to contain a controlled substance” followed by the weight of the analyzed portion, if weighed.
- 5.11.7.3** The portion subjected to preliminary testing shall be identified in the “Results of Examination” section of the Laboratory Report utilizing the statement “(insert number of packages, units or tablets) were individually subjected to preliminary testing that did not indicate the presence of a controlled substance.”
- 5.11.7.4** The unanalyzed portion shall be identified in the “Results of Examination” section of the Laboratory Report with the weight of that portion and the statement “No chemical analysis.” If the unanalyzed portion contains unweighed material, it shall be listed separately from the weighed material.
- 5.11.7.5** No statistical inferences shall be made.

5.12 Calculations - See **5.11.5.1** for extrapolation calculations.

5.13 Uncertainty of Measurement - N/A

6.0 Limitations – See the [Drug Chemistry Technical Procedure for Drug Analysis](#).

7.0 Safety - N/A

8.0 References

Guidelines on Representative Drug Sampling. United Nations, New York: United Nations Office on Drugs and Crime, 2009.

Frank, Richard S., et. al. "Representative Sampling of Drug Seizures in Multiple Containers." *Journal of Forensic Sciences*, Volume 36, Issue 2 (March 1991), 350-357.

“PART III A - Methods of Analysis/Sampling Seized Drugs for Qualitative Analysis.” *Scientific WorkingGroup for the Analysis of Seized Drugs (SWGDRUG) Recommendations*. 5th ed.: January 29, 2010.

9.0 Records

- Case file worksheets

10.0 Attachments - N/A

Revision History		
Effective Date	Version Number	Reason
12/13/2010	1	Technical procedure K-01 rewritten for conversion to ISO.
9/17/2012	2	Formatting changes to match other ISO documents. Definitions added for sample selection, sampling plan, sampling procedure, sampling. Renamed Administrative and Threshold Sampling Plans to Sample selections Extrapolation option added to Hypergeometric Plan. Threshold weight table removed and replaced with reference to General Statutes. Grammar.