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ADMINISTRATION OF JUSTICE MEMORANDA

PROBLEMS IN METRIC LIQUOR CONVERSIONS

by Michael Crowell

Last January the Insitute of Government distributed an Administration
of Justice Memorandum entitled "Conversion of Liquor Offenses to Metric
Measurements," summarizing legislation enacted by the 1977 General As-
sembly which converted all of North Carolina's liquor offenses to metric
terms as of January 1, 1978. Some problems have arisen in applying the
new law, namely in using total ounces as a means of determining whether
the legal limits have been violated. The difficulty arises from the use
of rounded numbers in several tables, but before the problem can be explained
a brief review of the metric liquor offense law is necessary.

The new law. The federal government is requiring all distillers
to convert to metric size bottles by 1980. Thus, the half-gallon bottles
have been replaced by 1.75 liter bottles, fifths are now being replaced
by 750-milliliter bottles and next year pints will give way to 500-milliliter
bottles. In anticipation of this change, the North Carolina legislature
has restated all of Chapter 18A's liquor offenses in metric terms; that
is, instead of buying and transporting one gallon of spirituous liquor,
a person may buy and transport four liters; and instead of buying five
gallons of unfortified wine without a permit, he may buy 20 liters; and
so on. The January memorandum summarized these changes.

The tables. Included in that memorandum were several tables for
ABC stores, officers, prosecutors, and judges to use in determining whether
various combinations of old and new size bottles were within the new limits
of the law. Each of those tables gave the number of ounces in the different
size bottles and suggested that if the bottles were of mixed sizes, ounces
should be used to determine whether the liquor sold or possessed or transported
was within the amounts now allowed. The number of ounces in each of

the bottle sizes was taken from a chart distributed by the federal government.
In preparing that chart, some of the ounce totals were rounded off, which
is now creating problems in making accurate conversions to determine
whether North Carolina's liquor statutes have been violated. That is,
if a person has several different size bottles of liquor, some metric and
some not, using the charts to add up the number of ounces may result
in totals which appear to be a tenth of an ounce or so above the legal limit.
Actually the excess amount is only an inaccuracy caused by the rounded
numbers provided by the federal government. Presumably no one is being
prosecuted for such minor infractions, but neatness requires some elaboration
of the information in the last memo.

Making conversions. Some examples might help in explaining the
problem. Consider the question of whether a person has bought and is
transporting more than the four liters of spirituous liquor now allowed
by Chapter 18A. The January memorandum included the following information
in its tables:

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1 liter = 33.8 ounces   4 liters = 135.2 ounces

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Also listed were the number of ounces in each of the old size bottles and
the new metric bottles, including these:

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pint = 16 ounces	500 milliliters = 16.9 oz.
fifth = 25.6 oz.	750 milliliters = 25.4 oz.
half-gallon = 64 oz.	1.75 liters = 59.2 oz.

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First, let us review an example where there is no problem with
rounded numbers. Say a person has two 1.75 liter bottles of whiskey
and a fifth of gin. Does he have more or less than the four-liter limit?
Because not all the bottles are in metric sizes, the answer cannot be deter-
mined by adding the number of milliliters. The easiest way to make the
determination is by computing ounces. One 1.75 liter bottle has 59.2 ounces,
so two of those bottles equals 118.4 ounces. Add to that the 25.6 ounces
in a fifth and one sees that the person has 144 ounces, or more than the
135.2 ounces in the four-liter limit.

The problem. Now we are ready for an example of the problem created
by the rounding off of the ounce totals in the tables. Does a person with
one 1.75 liter bottle and three 750-milliliter bottles of whiskey have more
or less than four liters? If the total is computed by ounces the answer
appears to be that he has more than four liters. A 1.75 liter bottle has
59.2 ounces and the three 750-milliliter bottles total 76.2 ounces (3 x 25.4),
adding together to 135.4 ounces, or .2 ounce more than the 135.2 ounces
in four liters. But that cannot be correct, for if one simply adds together
the number of liters in the example (1.75 liter + .75 liter + .75 liter + .75
liter), the total comes to exactly four liters. The discrepancy arises from
the fact that the actual number of ounces in a 1.75 liter bottle is 59.175,
not 59.2, and the ounces in a 750-milliliter bottle is 25.36, not 25.4.
Also, the number of ounces in the four-liter legal limit is really 135.256
rather than 135.2. When those more precise numbers are used, the total
number of ounces does match the legal limit rather than exceeding it.

Another example of this problem may be found in the January memorandum. There the question was raised whether a person with two 1.75 liter bottles and a 500-milliliter bottle of spirituous liquor was within the four-liter limit. In an embarassing mistake, the answer was said to be that he was over the limit since two 1.75 liter bottles is 118.4 ounces (2 x 59.2) and a 500-milliliter bottle contains 16.9 ounces, totaling 135.3 ounces, or .1 ounce more than the limit. That answer is obviously wrong, however, if one recognizes that two 1.75 liter bottles equals 3.5 liters, which added with the .5 liter of a 500-milliliter bottle is exactly four liters. Again, if rounded numbers were not used, the number of ounces would also match up correctly.

How to avoid these problems. How can mistakes such as these be avoided? First, if all the bottles are in metric sizes, as in the examples just given, simply compute the number of liters and ignore the ounces. There are 1000 milliliters in a liter, which means a 750-milliliter bottle is 3/4 or .75 liter and a 500-milliliter bottle is 1/2 or .5 liter. The statutes are written in terms of liters; the information on ounces was provided only as an aid to be used when the bottles are a mixture of non-metric and metric sizes. If the bottles are mixed, some metric and some not, use the tables in the January memorandum, with the rounded numbers, to make the initial computation. If the result is a total which is within the legal limit, nothing else is necessary. If, however, the total is one or two tenths of an ounce over the limit, compute the total again using these more precise numbers for bottle sizes and legal limits:

Bottle Sizes

500 milliliters	=	16.907 ounces
750 milliliters	=	25.36 ounces
one liter	=	33.814 ounces
1.75 liters	=	59.175 ounces

Legal Limits

One liter	=	33.814 ounces
Four liters	=	135.256 ounces
12 liters	=	405.768 ounces
20 liters	=	676.28 ounces
80 liters	=	2705.12 ounces

I hope that this takes care of any problem and most definitely hope that this is the last you will ever hear from me on this subject.