ADMINISTRATOR'S MEMORANDUM

TO: Water Allocation Bureau
Regional Offices

Application Processing No. 6

FROM: Jeff Peppersack

DATE: January 31, 2018

RE: Significant Figures for Numeric Values
(Replaces prior memo dated May 8, 1980)

Recognizing that the accuracy and precision of our measured and calculated values have practical limits, the Department should establish and follow standards for reporting water right information. Standards for reporting are necessary to ensure the values do not imply unwarranted accuracy or misleading results. For example, while arithmetic enables us to represent a flow rate to the thousandths of a cfs, our measuring equipment is not that accurate, and reporting it misleads the water users and puts unrealistic expectations on watermasters. The standards established in this memo do not strictly enforce common practices for applying significant figures, but instead accepts limits of precision that have become familiar to the Department and the water user community. The following will be adopted as standard procedures in the preparation of water right applications, legal notices, permits, licenses, transfers, orders, adjudication claims and recommendations, and most other water right documents:

1. Rate of Flow

   All rates of flow should be input or recorded[1] in cubic feet per second (cfs) with a maximum of three significant figures and no more precision than hundredths.

   Examples: 0.01 (rounded from measured value of 0.006); 0.05 (rounded from measured value of 0.049); 0.51 (rounded from measured value of 0.514); 0.60[2] (rounded from measured value of 0.595); 2.39 (rounded from measured value of 2.394); 3.00 (rounded from measured value of 2.995); 13.5 (rounded from measured value of 13.45); 60.0 (rounded from measured value of 59.95); 134 (rounded from measured value of 134.26); 200. (rounded from measured value of 199.50); 3450 (rounded from measured value of 3446.40); 4000 (rounded from measured value of 3996.67).

2. Volume

   Volumes should be input or recorded in acre-feet (af) with a maximum of three significant figures, and no more precision than tenths.

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[1] Note that the Department's workflow applications currently allow display of a greater number of significant figures than those adopted as standards in this memo. This memo applies to values input or recorded in workflow applications and water right documents regardless of the output displayed by automated reports.

[2] Note that the trailing zero is significant and should be shown.

Examples: 0.1 (rounded from calculated value of 0.09); 0.7 (rounded from calculated value of 0.65); 2.0 (rounded from calculated value of 2.04); 2.4 (rounded from calculated value of 2.35); 13.5 (rounded from calculated value of 13.53); 13.0 (rounded from calculated value of 12.95); 128 (rounded from calculated value of 127.6); 3230 (rounded from calculated value of 3225); 45500 (rounded from calculated value of 45498).

3. Area

The Department's Beneficial Use Examination Rule 35.01.h (IDAPA 37.03.02.035.01.h) says:

> Irrigated acreage shall be shown on the field report to the nearest whole acre in a legal subdivision except the acreage shall be shown to the nearest one-tenth (0.10) acre for permits covering land of less than ten (10) acres.

The rule generally complies with the use of two significant figures per legal subdivision with no more precision than tenths. Today IDWR staff and certified field examiners use advanced methods, including use of GIS software and high-resolution imagery, to measure acreage. These methods allow measurement of the entire place of use, and then automated calculation of acreage per legal subdivision. The use of these advanced tools justifies reporting acreage per legal subdivision to two significant figures with no more precision than tenths, regardless of the number of total acres in the place of use. While the rule applies to each legal subdivision, total acres should be reported as the sum of all reported legal subdivisions without regard to significant figures or additional rounding (no more precision than tenths). This standard will accommodate a place-of-use with multiple legal subdivisions that include a combination of tracts containing ten or more irrigated acres with tracts containing fewer than ten acres. This standard is appropriate to determine and report acreage in water right licensing. It is also appropriate to determine and report acreage when approving a change in place-of-use for irrigation in a water right transfer because the acreage must be measured or confirmed by the Department.

Example:	NWSW	12 acres	(rounded from GIS output value of 12.2)
	SWSW	2.1 acres	(rounded from GIS output value of 2.08)
	Lot 2	143 acres	(rounded from GIS output value of 143.0)
	NWSE	40 acres	(rounded from GIS output value of 39.9)
	SWSE	0.6 acre	(rounded from GIS output value of 0.55)
	Total	197.7 acres	

Splitting a Water Right

Applying the standard above when splitting a water right due to an ownership change, transfer or amendment of permit could create some problems because the sum of the split water rights, after rounding, could result in more acreage than the original water right authorizes. In many cases, the resultant inflation of acres would not be significant. However, in multiple splits of the same water right, the resultant inflation of acres could lead to significant increases in

consumptive use. For example, in the Big Wood River Valley, water right transfers or some form of mitigation is often necessary to resolve unlawful water use on small parcels. If a single large water right were split multiple times in amounts less than ½ acre each time, the parent right might not show a reduction in acreage if rounded up to the nearest whole acre after each split.

When splitting water rights, the Department should attempt to maintain the integrity of the original decree, permit or license. To address the problem described above, acreage determined for a water right split should be input or reported to no more precision than tenths, regardless of the number of significant figures. The rate and volume for each split portion should be input or recorded consistent with the standards adopted in items 1 and 2 above.

Example: If 0.75 acres are to be split from a 30-acre water right located in the NWSW of Section 12, the resultant acreage would be reported as 0.8 acres with a remainder of 29.2 acres (do not round to 29 acres). If the rate and volume authorized for the 30 acres is 0.60 cfs and 135 af, the split values would be calculated as follows:

Split Portion	
0.75 acres to be split	rounded to 0.8 acres
0.75/30 * 0.60 cfs = 0.015 cfs	rounded to 0.02 cfs
0.75/30 * 135 af = 3.375 af	rounded to 3.4 af
Remainder Portion	
30 – 0.75 = 29.25 acres	reported as 29.2 acres[3]
0.60 - 0.015 = 0.585 cfs	rounded to 0.58 cfs
alternatively, 29.25/30 * 0.60 = 0.585 cfs	rounded to 0.58 cfs
135 – 3.375 = 131.625 af	rounded to 132 af
alternatively, 29.25/30 * 135 = 131.625 af	rounded to 132 af

Note that all calculations should be carried out without rounding until the final value is reported.

A condition or remark noting the "actual" authorized amount by displaying extra precision is not necessary in most cases and should be avoided. The only exception would be a split resulting in a rate less than 0.01 cfs, a volume less than 0.1 af or acreage less than 0.1 acres (if a split is appropriate).[4] Those values should be input or recorded as 0.01 cfs, 0.1 af, or 0.1 acres respectively with a condition or remark noting the calculated value with extra precision for future accounting.

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[3] This memo generally rounds the number "5" upward; however, when splitting water rights it may be necessary to round the number "5" downward for some split portions in order to maintain the integrity of the original water right. In those cases, rounding the larger portion downward and the smaller portion upward will avoid any negative impacts of rounding on the smaller portion.

[4] See Administrator's Memorandum – Records No. 9 for guidance on processing an ownership change requiring a split that may result in a minimum rate of flow, volume or area to be reported in a condition with precision beyond the standards discussed in this memo.