Method Detection Limits

For Total Residual Chlorine

Wastewater Operator Training

August 3, 2001

Arizona Department of Health Services

What are method detection limits(MDL'S)?

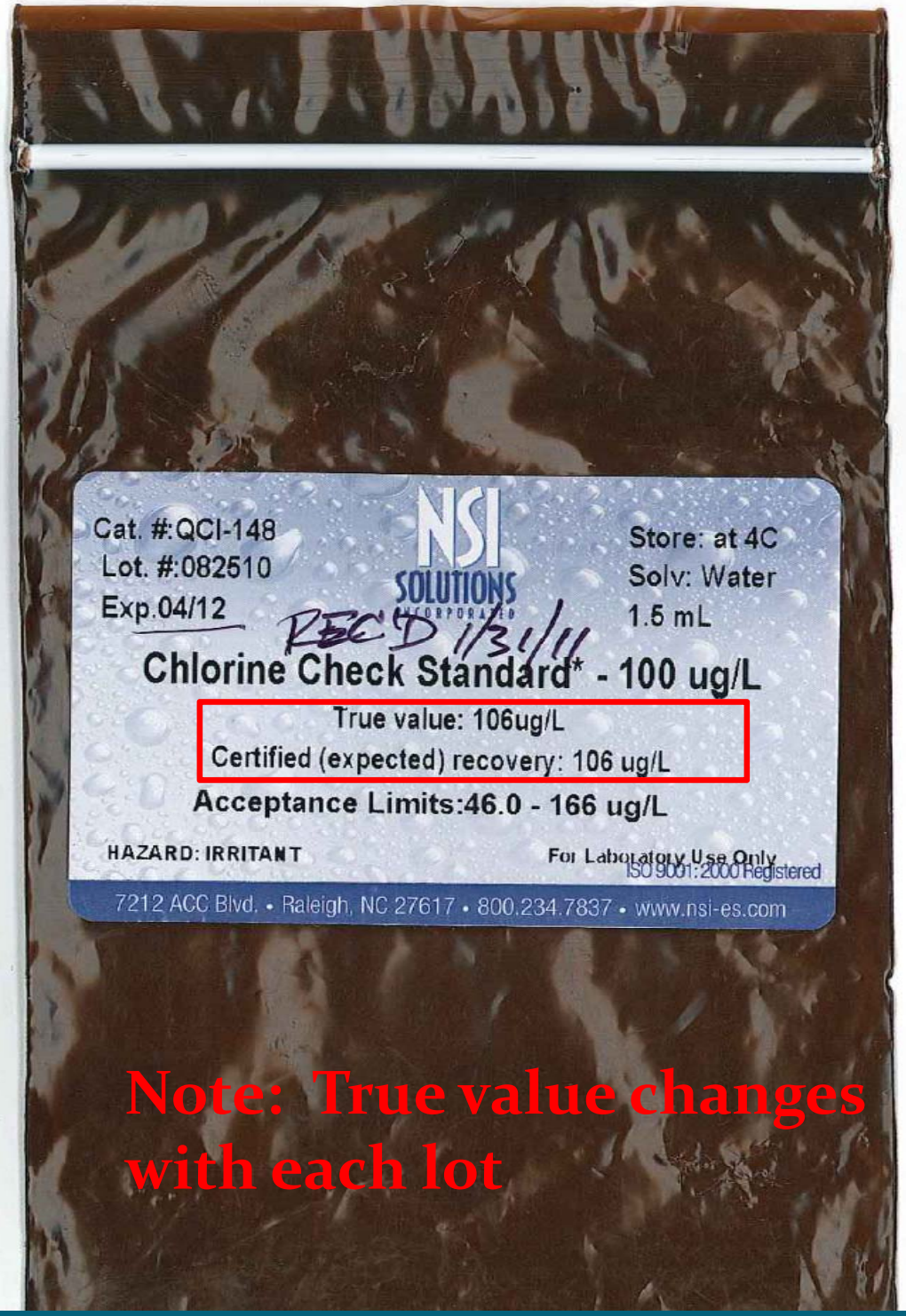
- Defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

Why do we need MDL'S?

- Method detection limits are a relative measure of the performance of a particular lab, method or analyst.
- The calculated MDL will become each plant's lowest reporting level to ADEQ.

MDL Determination

- Ideally MDL should be determined in matrix. However, if the Wastewater Treatment Plant is using chemicals to de-chlorinate, then the MDL's can be determined in reagent (DI) water.
- Determine MDL by using a certified 100 ug/L standard.
- An example of a commercial standard is from NSI Solutions, 7212 ACC Blvd. Raleigh, NC 27617. 800-234-7837. www.nsi-es.com



Note: True value changes with each lot

Procedure

- 1) Make 7 standard replicates around 100 µg/L in the sample matrix or reagent water if system dechlorinates.
- 2) Process each through the entire analytical method (Preferably on 3 separate days).
- 3) Take the 7 sample results and calculate the method detection limit with the ADHS spreadsheet.

Technique Is Important

- Low level determination of chlorine residual requires careful attention to technique.
- Properly prepared apparatus and glassware
- Careful sample collection
- High purity reagents

Analyst: Jane Doe

Total Residual Chlorine

	Date	Raw Amount (ug/L)	Average	% Rel Std Dev	Std Dev	MDL (ug/L)	True Value (ug/L)		Student's "t" values		
1	4/9/2010	90.0000	98.000	0.056	5.447	17.1190	106.000		# of Replicates	Degrees of Freedom	t(n-1,0.99)
2	4/9/2010	95.0000							(n)	(n-1)	
3	4/9/2010	94.0000									
4	4/12/2010	102.0000									
5	4/12/2010	106.0000									
6	4/13/2010	101.0000									
7	4/13/2010	98.0000									
									7	6	3.143

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How Do I Report My Results to ADEQ?

- If the sample result is less than 17.1, then you would report NODI(B). Part II.B.2 of your permit then requires that you submit with the DMR a report of your LOD = 17.0.
- If the sample result is 17.1 or higher, then the actual result is reported.

Questions?