

### 4.4 Appendix D: Calculated Parameters

Calculated parameters are determined by using algorithms within QWDATA. Option 6 in the Support Files menu can be used to view the algorithms for these parameters. The table below contains additional information about the calculated parameters.

[NA, Not applicable]

Calculated parameter	Parameters preferred for calculation	Additional parameters			Result from special cases for parameters used in calculation		
		Parameters used in calculation, if available	Missing parameters	Replacement parameters used in calculation, if available	Missing values	Remark codes	Negative result
00301--Dissolved oxygen, water, unfiltered, percent of saturation	00300--Dissolved oxygen 00025--Barometric pressure 00010--Water temperature 00095--Specific cond at 25C	---	---	---	missing	missing	NA
00405--Carbon dioxide, water, unfiltered, milligrams per liter	99440--Bicarbonate, wu, icr, f 00400-- pH 99430--Carbonate, water, unfiltered, incremental titration, field, milligrams per liter as calcium carbonate	---	<sup>1</sup> ---	<sup>1</sup> ---	<sup>2</sup> ---	<sup>3</sup> ---	NA
00435--Acidity, water, unfiltered, milligrams per liter as calcium carbonate	71825--Acidity, heated, wu	---	---	---	missing	missing	NA
00540--Residue, fixed nonfilterable, milligrams per liter	00530--Residue, total 00535--Residue, volatile	---	---	---	missing	missing	0
00600--Total nitrogen, wu	00625--Ammonia plus organic nitrogen, water, unfiltered, milligrams per liter as nitrogen 00630--Nitrite plus nitrate, water, unfiltered, milligrams per liter as nitrogen	---	00630	00631--Nitrite plus nitrate, dissolved	missing	missing	NA
00602--Total nitrogen, wf	00623--Ammonia plus organic nitrogen, water, filtered, milligrams per liter as nitrogen 00631--Nitrite plus nitrate, water, filtered, milligrams per liter as nitrogen	---	---	---	missing	missing	NA

Calculated parameter	Parameters preferred for calculation	Parameters used in calculation, if available	Missing parameters	Replacement parameters used in calculation, if available	Missing values	Remark codes	Negative result
<b>00605</b> --Organic nitrogen, water, unfiltered, milligrams per liter	<b>00625</b> --Ammonia plus organic nitrogen, water, unfiltered, milligrams per liter as nitrogen <b>00610</b> --Ammonia, water, unfiltered, milligrams per liter as nitrogen	---	<b>00610</b>	<b>00608</b> --Ammonia, water, filtered, milligrams per liter as nitrogen	missing	missing	missing
<b>00607</b> --Organic nitrogen, water, filtered, milligrams per liter	<b>00623</b> --Ammonia plus organic nitrogen, water, filtered, milligrams per liter as nitrogen <b>00608</b> --Ammonia, water, filtered, milligrams per liter as nitrogen	---	---	---	missing	missing	missing
<b>00618</b> --Nitrate, water, filtered, milligrams per liter as nitrogen	<b>00631</b> --Nitrite plus nitrate, water, filtered, milligrams per liter as nitrogen <b>00613</b> --Nitrite, water, filtered, milligrams per liter as nitrogen	---	---	---	missing	missing	missing
<b>00620</b> --Nitrate, water, unfiltered, milligrams per liter as nitrogen	<b>00630</b> --Nitrite plus nitrate, water, unfiltered, milligrams per liter as nitrogen <b>00615</b> --Nitrite, water, unfiltered, milligrams per liter as nitrogen	---	---	---	missing	missing	missing
<b>00621</b> --Nitrate, bed sediment, total, dry weight, milligrams per kilogram as nitrogen	<b>00633</b> --Nitrite plus nitrate, bed sediment, total, dry weight, milligrams per kilogram as nitrogen <b>00616</b> --Nitrite, bed sediment, total, dry weight, milligrams per kilogram as nitrogen	---	---	---	missing	missing	missing
<b>00650</b> --Phosphate, water, unfiltered, milligrams per liter	<b>70507</b> --Orthophosphate, water, unfiltered, milligrams per liter as phosphorus	---	---	---	missing	missing	Negative results not likely
<b>00660</b> --Orthophosphate, water, filtered, milligrams per liter	<b>00671</b> --Orthophosphate, water, filtered, milligrams per liter as phosphorus	---	---	---	missing	missing	Negative results not likely
<b>00669</b> --Hydrolyzable phosphorus, water, unfiltered, milligrams per liter	<b>00678</b> --Hydrolyzable phosphorus plus orthophosphate, water, unfiltered, milligrams per liter as phosphorus <b>70507</b> --Orthophosphate, water, unfiltered, milligrams per liter as phosphorus	---	---	---	missing	missing	If result is negative, the final result is 0

Calculated parameter	Parameters preferred for calculation	Parameters used in calculation, if available	Missing parameters	Replacement parameters used in calculation, if available	Missing values	Remark codes	Negative result
00670--Organic phosphorus, water, unfiltered, milligrams per liter	00665--Phosphorus, water, unfiltered, milligrams per liter 00678--Hydrolyzable phosphorus plus orthophosphate, water, unfiltered, milligrams per liter as phosphorus	---	00678	70507--Orthophosphate, water, unfiltered, milligrams per liter as phosphorus 00669--Hydrolyzable phosphorus, water, unfiltered, milligrams per liter	missing	missing	missing
00672--Hydrolyzable phosphorus, water, filtered, milligrams per liter	00677--Hydrolyzable phosphorus plus orthophosphate, water, filtered, milligrams per liter as phosphorus 00671--Orthophosphate, water, filtered, milligrams per liter as phosphorus	---	---	---	missing	missing	missing
00673--Organic phosphorus, water, filtered, milligrams per liter	00666--Phosphorus, water, filtered, milligrams per liter 00677--Hydrolyzable phosphorus plus orthophosphate, water, filtered, milligrams per liter as phosphorus	---	00677	00672--Hydrolyzable phosphorus, water, filtered, milligrams per liter 00671--Orthophosphate, water, filtered, milligrams per liter as phosphorus	missing	missing	missing
00687--Organic carbon, bed sediment, total, dry weight, grams per kilogram	00693--Carbon (inorganic plus organic), bed sediment, total, dry weight, grams per kilogram 00686--Inorganic carbon, bed sediment, total, dry weight, grams per kilogram	---	---	---	missing	missing	missing
00690--Carbon (inorganic plus organic), water, unfiltered, milligrams per liter	00685--Inorganic carbon, water, unfiltered, milligrams per liter 00680--Organic carbon, water, unfiltered, milligrams per liter	---	---	---	missing	missing	NA
00900--Hardness, water, unfiltered, milligrams per liter as calcium carbonate	00915--Calcium, water, filtered, milligrams per liter 00925-- Magnesium, water, filtered, milligrams per liter	01005-- Barium, water, filtered, micrograms per liter 01080-- Strontium, water, filtered, micrograms per liter	---	---	If 00915 or 00925 are missing, the result is missing	If 00915 or 00925 have a remarked result, the result is missing	Negative result not likely

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Calculated parameter	Parameters preferred for calculation	Parameters used in calculation, if available	Missing parameters	Replacement parameters used in calculation, if available	Missing values	Remark codes	Negative result
<b>00902</b> -- Noncarbonate hardness, water, unfiltered, field, milligrams per liter as calcium carbonate	<b>00916</b> -- Calcium, water, unfiltered, recoverable, milligrams per liter <b>00927</b> -- Magnesium, water, unfiltered, recoverable, milligrams per liter <b>00450</b> -- Bicarbonate, water, unfiltered, incremental titration, field, milligrams per liter	4 ---	4 ---	4 ---	5 ---	6 ---	NA
<b>00903</b> --Noncarbonate hardness, water, unfiltered, lab, milligrams per liter as calcium carbonate	<b>00916</b> --Calcium, water, unfiltered, recoverable, milligrams per liter <b>00927</b> --Magnesium, water, unfiltered, recoverable, milligrams per liter <b>00449</b> --Bicarbonate, water, unfiltered, incremental titration, laboratory, milligrams per liter	7 ---	7 ---	7 ---	8 ---	9 ---	NA
<b>00904</b> --Noncarbonate hardness, water, filtered, field, milligrams per liter as calcium carbonate	<b>00915</b> --Calcium, water, filtered, milligrams per liter <b>00925</b> --Magnesium, water, filtered, milligrams per liter <b>00453</b> --Bicarbonate, water, filtered, incremental titration, field, milligrams per liter	10 ---	10 ---	10 ---	11 ---	12 ---	NA
<b>00905</b> --Noncarbonate hardness, water, filtered, lab, milligrams per liter as calcium carbonate	<b>00915</b> --Calcium, water, filtered, milligrams per liter <b>00925</b> --Magnesium, water, filtered, milligrams per liter <b>29806</b> --Bicarbonate, water, filtered, incremental titration, laboratory, milligrams per liter	13 ---	13 ---	13 ---	14 ---	15 ---	NA
<b>00931</b> --Sodium adsorption ratio, water, number	<b>00930</b> --Sodium, water, filtered, milligrams per liter <b>00915</b> --Calcium, water, filtered, milligrams per liter <b>00925</b> --Magnesium, water, filtered, milligrams per liter	---	---	---	missing	missing	NA

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Calculated parameter	Parameters preferred for calculation	Parameters used in calculation, if available	Missing parameters	Replacement parameters used in calculation, if available	Missing values	Remark codes	Negative result
00932-Sodium, water, percent in equivalents of major cations	00930-Sodium, water, filtered, milligrams per liter 00915-Calcium, water, filtered, milligrams per liter 00925-Magnesium, water, filtered, milligrams per liter 00935-Potassium, water, filtered, milligrams per liter	---	---	---	missing	missing	NA
30207-Gage height, above datum, meters	00065-Gage height, feet	---	---	---	missing	missing	NA
30208-Discharge, cubic meters per second	00060-Discharge, cubic feet per second	---	---	---	missing	missing	NA
30209-Discharge, instantaneous, cubic meters per second	00061-Discharge, instantaneous, cubic feet per second	---	---	---	missing	missing	NA
30210-Depth to water level, below land surface datum (LSD), meters	72019-Depth to water level, feet below land surface	---	---	---	missing	missing	NA
30211-Elevation above NGVD 1929, meters	72020-Elevation above NGVD 1929, feet	---	---	---	missing	missing	NA
49954-Biomass, periphyton, ash free dry mass, grams per square meter	00573-Biomass, periphyton, dry weight, grams per square meter 00572-Biomass, periphyton, ash weight, grams per square meter	---	---	---	missing	missing	missing
70301-Residue, water, filtered, sum of constituents, milligrams per liter	00453-Bicarbonate, water, filtered, incremental titration, field, milligrams per liter 00915-Calcium, water, filtered, milligrams per liter 00925-Magnesium, water, filtered, milligrams per liter 00930-Sodium, water, filtered, milligrams per liter 00940-Chloride, water, filtered, milligrams per liter 00945-Sulfate, water, filtered, milligrams per liter 00935-Potassium, water, filtered, milligrams per liter	<sup>16</sup> ---	<sup>16</sup> ---	<sup>16</sup> ---	<sup>17</sup> ---	<sup>17</sup> ---	NA

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Calculated parameter	Parameters preferred for calculation	Parameters used in calculation, if available	Missing parameters	Replacement parameters used in calculation, if available	Missing values	Remark codes	Negative result
<b>70302</b> -Residue, water, filtered, tons per day	<b>70300</b> -Residue on evaporation, dried at 180 degrees Celsius, water, filtered, milligrams per liter <b>00061</b> --Discharge, instantaneous, cubic feet per second	---	<b>70300</b> <b>00061</b>	<b>70301</b> -Residue, water, filtered, sum of constituents, milligrams per liter <b>00060</b> -Discharge, cubic feet per second	If <b>70300</b> and <b>70301</b> or <b>00061</b> and <b>00060</b> are missing, the result is missing	If <b>70300</b> and <b>70301</b> or <b>00061</b> and <b>00060</b> have remark codes, the result is missing	NA
<b>70303</b> -Residue, water, filtered, tons per acre-foot	<b>70300</b> -Residue on evaporation, dried at 180 degrees Celsius, water, filtered, milligrams per liter	---	<b>70300</b>	<b>70301</b> (see above)-Residue, water, filtered, sum of constituents, milligrams per liter	If <b>70300</b> and <b>70301</b> are missing, the result is missing	If <b>70300</b> and <b>70301</b> have remark values, the result is missing	NA
<b>70949</b> -Biomass-chlorophyll ratio, plankton	<b>81354</b> - Biomass, plankton, dry weight, milligrams per liter <b>81353</b> - Biomass, plankton, ash weight, milligrams per liter <b>70953</b> - Chlorophyll a, phytoplankton, chromatographic-fluorometric method, micrograms per liter	---	---	---	missing	missing	missing
<b>70950</b> - Biomass/chlorophyll ratio, periphyton, number	<b>00573</b> - Biomass, periphyton, dry weight, grams per square meter <b>00572</b> - Biomass, periphyton, ash weight, grams per square meter <b>70957</b> - Chlorophyll a, periphyton, chromatographic-fluorometric method, milligrams per square meter	---	---	---	missing	missing	missing
<b>71845</b> - Ammonia, water, unfiltered, milligrams per liter as NH4	<b>00610</b> --- Ammonia, water, unfiltered, milligrams per liter as nitrogen	---	---	---	missing	missing	NA
<b>71846</b> - Ammonia, water, filtered, milligrams per liter as NH4	<b>00608</b> -- Ammonia, water, filtered, milligrams per liter as nitrogen	---	---	---	missing	missing	NA
<b>71851</b> - Nitrate, water, filtered, milligrams per liter	<b>00631</b> -- Nitrite plus nitrate, water, filtered, milligrams per liter as nitrogen <b>00613</b> -- Nitrite, water, filtered, milligrams per liter as nitrogen	---	---	---	missing	missing	0

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Calculated parameter	Parameters preferred for calculation	Parameters used in calculation, if available	Missing parameters	Replacement parameters used in calculation, if available	Missing values	Remark codes	Negative result
71856-Nitrite, water, filtered, milligrams per liter	00613--Nitrite, water, filtered, milligrams per liter as nitrogen		---	---	missing	missing	NA
71887-Total nitrogen, water, unfiltered, milligrams per liter as nitrate	00625---Ammonia plus organic nitrogen, water, unfiltered, milligrams per liter as nitrogen 00630--Nitrite plus nitrate, water, unfiltered, milligrams per liter as nitrogen	---	---	---	missing	missing	NA
80155-Suspended sediment load, tons per day	80154-Suspended sediment concentration, milligrams per liter 00061-Discharge, instantaneous, cubic feet per second	---	00061	00060-Discharge, cubic feet per second	missing	missing	NA
80156-Total sediment load, tons per day	80180-Total sediment concentration, milligrams per liter 00061-Discharge, instantaneous, cubic feet per second	---	00061	00060-Discharge, cubic feet per second	missing	missing	NA
90851-- Trihalomethanes, water, unfiltered, calculated, micrograms per liter	32106--Trichloromethane, water, unfiltered, recoverable, micrograms per liter 32105--Dibromochloromethane, water, unfiltered, recoverable, micrograms per liter 32101--Bromodichloromethane, water, unfiltered, recoverable, micrograms per liter 32104--Tribromomethane, water, unfiltered, recoverable, micrograms per liter	---	---	---	If 32106, 32105, 32101, and 32104 are missing the result is 0	If any parameter has a remark code, it is not used	NA
90852--DDT plus degradates, bed sediment smaller than 2 millimeters, wet sieved (native water), field, recoverable, dry weight, micrograms per kilogram	49325--o,p'-DDD, bed sediment smaller than 2 millimeters, wet sieved (native water), field, recoverable, dry weight, micrograms per kilogram 49326--p,p'-DDD, bed sediment smaller than 2 millimeters, wet sieved (native water), field, recoverable, dry weight, micrograms per kilogram	---	---	---	If 49325, 49326, 49327, 49329, 49330, and 49328 are missing, the result is 0	If any parameter has a remark code, it is not used	NA

Calculated parameter	Parameters preferred for calculation	Parameters used in calculation, if available	Missing parameters	Replacement parameters used in calculation, if available	Missing values	Remark codes	Negative result
<p><b>90852</b> --continued --DDT plus degradates, bed sediment smaller than 2 millimeters, wet sieved (native water), recoverable, calculated, dry weight, micrograms per kilogram</p>	<p><b>49327</b>--o,p'-DDE, bed sediment smaller than 2 millimeters, wet sieved (native water), field, recoverable, dry weight, micrograms per kilogram  <b>49329</b>--o,p'-DDT, sediment, bed material wet sieved, field, &lt; 2mm, recoverable  <b>49330</b>--p,p'-DDT, sediment, bed material wet sieved, field, &lt; 2mm, recoverable  <b>49328</b>--p,p'-DDE, sediment, bed material wet sieved, field, &lt; 2mm, recoverable</p>	---	---	---	<p>If <b>49325, 49326, 49327, 49329, 49330, and 49328</b> are missing, the result is 0</p>	<p>If any parameter has a remark code, it is not used</p>	NA
<p><b>90853</b>-- Chlordane plus degradates, bed sediment, recoverable, calculated, dry weight, micrograms per kilogram</p>	<p><b>49320</b>--cis-Chlordane, bed sediment smaller than 2 millimeters, wet sieved (native water), field, recoverable, dry weight, micrograms per kilogram  <b>49321</b>--trans-Chlordane, bed sediment smaller than 2 millimeters, wet sieved (native water), field, recoverable, dry weight, micrograms per kilogram  <b>49316</b>--cis-Nonachlor, bed sediment smaller than 2 millimeters, wet sieved (native water), field, recoverable, dry weight, micrograms per kilogram  <b>49317</b>--trans-Nonachlor, bed sediment smaller than 2 millimeters, wet sieved (native water), field, recoverable, dry weight, micrograms per kilogram  <b>49318</b>-Oxychlordane, bed sediment smaller than 2 millimeters, wet sieved (native water), field, recoverable, dry weight, micrograms per kilogram</p>	---	---	---	<p>If <b>49320, 49321, 49316, 49317, and 49318</b> are missing, the result is 0</p>	<p>If any parameter has a remark code, it is not used</p>	NA



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Calculated parameter	Parameters preferred for calculation	Parameters used in calculation, if available	Missing parameters	Replacement parameters used in calculation, if available	Missing values	Remark codes	Negative result
<b>90854</b> -- DDT plus degradates, biota, whole organism, wet weight, calculated, dry weight, micrograms per kilogram	<b>49374</b> --o,p'-DDD, biota, whole organism, recoverable, wet weight, micrograms per kilogram <b>49375</b> --p,p'-DDD, biota, whole organism, recoverable, wet weight, micrograms per kilogram <b>49373</b> -o,p'-DDE, biota, whole organism, recoverable, wet weight, micrograms per kilogram <b>49377</b> --o,p'-DDT, biota, whole organism, recoverable, wet weight, micrograms per kilogram <b>49376</b> --p,p'-DDT, biota, whole organism, recoverable, wet weight, micrograms per kilogram <b>49372</b> --p,p'-DDE, biota, whole organism, recoverable, wet weight, micrograms per kilogram	---	---	---	If <b>49374</b> , <b>49375</b> , <b>49373</b> , <b>49377</b> , <b>49376</b> , and <b>49372</b> are missing, the result is 0	If any parameter has a remark code, it is not used	NA
<b>90855</b> -- Chlordane plus degradates, biota, whole organism, calculated, wet weight, micrograms per kilogram	<b>49380</b> --cis-Chlordane, biota, whole organism, recoverable, wet weight, micrograms per kilogram <b>49379</b> --trans-Chlordane, biota, whole organism, recoverable, wet weight, micrograms per kilogram <b>49359</b> --cis-Nonachlor, biota, whole organism, recoverable, wet weight, micrograms per kilogram <b>49358</b> --trans-Nonachlor, biota, whole organism, recoverable, wet weight, micrograms per kilogram <b>49357</b> --Oxychlordane, biota, whole organism, recoverable, wet weight, micrograms per kilogram	---	---	---	If <b>49380</b> , <b>49379</b> , <b>49359</b> , <b>49358</b> , and <b>49357</b> are missing, the result is 0	If any parameter has a remark code, it is not used	NA
<b>99019</b> --Water level, depth below land surface, meters	<b>72019</b> --Depth to water level, feet below land surface		These were deleted from use as of 8/25/00.				
<b>99020</b> --Elevation above NGVD 1929, meters	<b>72020</b> --Elevation above NGVD 1929, feet						
<b>99060</b> --Discharge, cubic meters per second	<b>00060</b> -Discharge, cubic feet per second						

Calculated parameter	Parameters preferred for calculation	Parameters used in calculation, if available	These were deleted from use as of 8/25/00.
99061-Discharge, instantaneous, cubic meters per second	00061-Discharge, instantaneous, cubic feet per second		
99065-Gage height, above datum, meters	00065-Gage height, feet		

**Footnote #1--**

If 99440 is missing then 00440-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, field, as  $\text{HCO}_3$  or 90440-Bicarbonate, incremental titration, laboratory as  $\text{HCO}_3$  or 95440-Bicarbonate, titration to pH 4.5, laboratory as  $\text{HCO}_3$  will be used, if available.  
 If 99430 is missing then 00410-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, field, as  $\text{CaCO}_3$  or 00430-Acid neutralizing capacity (ANC), unfiltered, carbonate as  $\text{CaCO}_3$  or 90430-Acid neutralizing capacity (ANC), unfiltered, incremental titration, laboratory, as  $\text{CaCO}_3$  or 90410-Acid neutralizing capacity (ANC), unfiltered, titration to pH 4.5, laboratory, as  $\text{CaCO}_3$  or 95430-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, laboratory, as  $\text{CaCO}_3$  will be used if available.

**Footnote #2--**

If 99440 and 00440 and 90440 and 95440 are missing then the result is missing.  
 If 00400 is missing, the result is missing.  
 If 99430 and 00410 and 00430 and 90430 and 95430 are missing, then the result is calculated.

**Footnote #3--**

If 99440 and 00440 and 90440 and 95440 have remark codes, the result is calculated.  
 If 00440 has a remark code, the result is missing.  
 If 99430 and 00410 and 00430 and 90430 and 95430 have remark codes, then the result is calculated.

**Footnote #4--**

If 00916 is missing then 00918-Calcium, total can be used  
 If 00927 is missing then 00921-Magnesium, total can be used  
 If 00450 is missing then 00440-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, field, as  $\text{HCO}_3$  or 99440-Bicarbonate, incremental titration, field will be used, if available  
 If 00447-Acid neutralizing capacity (ANC), unfiltered, incremental titration, field, as  $\text{CO}_3$  -is present then it is added to 00450 or 00440 or 99440  
 If 00447 is missing then 00445-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, field, as  $\text{CO}_3$  or 99445-Carbonate, incremental titration, field as  $\text{CO}_3$  will be used, if available  
 If 00450, 00440, and 99440 are missing then 00419-Acid neutralizing capacity (ANC), unfiltered, incremental titration, field, as  $\text{CaCO}_3$  or 00410-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, field, as  $\text{CaCO}_3$  or 29813-Acid neutralizing capacity (ANC), unfiltered, gran titration, field, as  $\text{CaCO}_3$  or 99430-Acid neutralizing capacity (ANC), unfiltered, incremental titration, field, as  $\text{CaCO}_3$

**Footnote #4--(Continued)**

or 00431-Acid neutralizing capacity (ANC), unfiltered, as  $\text{CaCO}_3$  will be used, if available.  
01082-Strontium, total or 01084-Strontium, total recoverable-will be used, if available.  
01007-Barium, total or 01009-Barium, total recoverable-will be used if available.

**Footnote #5--**

If 00916 and 00918; or 00927 and 00921; or 00450 and 00440 and 99440 and 00419 and 00410 and 29813 and 99430 and 00431 are missing then the result is missing.

**Footnote #6--**

If 00916 or 00918; or 00927 or 00921; or 00450 or 00440 or 99440 or 00419 or 00410 or 29813 or 99430 or 00431 are used and have a remark code then the result is missing.

**Footnote #7--**

If 00916 is missing then 00918-Calcium, total will be used, if available.  
If 00927 is missing then 00921-Magnesium, total will be used, if available.  
If 00449 is missing then 00451-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, laboratory as  $\text{HCO}_3$  or 90440-Bicarbonate, incremental titration, laboratory as  $\text{HCO}_3$  or 95440-Bicarbonate, titration to pH 4.5, laboratory as  $\text{HCO}_3$  will be used, if available.  
If 00446-Acid neutralizing capacity (ANC), unfiltered, incremental titration, laboratory, as  $\text{CO}_3$  -is present then it is added to 00449, 00451, 90440, or 95440.  
If 00446 is missing 00448-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, laboratory as  $\text{CO}_3$  or 90445-Carbonate, incremental titration, laboratory as  $\text{CO}_3$  or 95445-Carbonate, titration to pH 8.3, laboratory as  $\text{CO}_3$  will be used, if available.  
If 00449 and 00451 and 90440 and 95440 are missing then 00416-Acid neutralizing capacity (ANC), unfiltered, incremental titration, laboratory, as  $\text{CaCO}_3$   
or 00417-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, laboratory, as  $\text{CaCO}_3$   
or 00413-Acid neutralizing capacity (ANC), unfiltered, gran titration, laboratory, as  $\text{CaCO}_3$   
or 00418-Alkalinity, filtered, fixed endpoint titration, field, as  $\text{CaCO}_3$   
or 00421-Alkalinity, unfiltered, fixed endpoint titration, laboratory as  $\text{CaCO}_3$   
or 90410-Acid neutralizing capacity (ANC), unfiltered, titration to pH 4.5, laboratory, as  $\text{CaCO}_3$   
or 90430-Acid neutralizing capacity (ANC), unfiltered, incremental titration, laboratory, as  $\text{CaCO}_3$   
or 95410-Acid neutralizing capacity (ANC), unfiltered, titration to pH 4.5, laboratory, as  $\text{CaCO}_3$   
or 95430-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, laboratory, as  $\text{CaCO}_3$   
will be used, if available.  
01082-Strontium, total or 01084-Strontium, total recoverable-will be used, if available.  
01007-Barium, total or 01009-Barium, total recoverable-will be used, if available.

**Footnote #8**

If 00916 and 00918; or 00927 and 00921; or 00449 and 00451 and 90440 and 95440 and 00416 and 00417 and 00413 and 00418 and 00421 and 90410 and 90430 and 95410 and 95430 are missing then the result is missing

**Footnote #9**

If 00916 or 00918; or 00927 or 00921; or 00449 or 00451 or 90440 or 95440 or 00416 or 00417 or 00413 or 00418 or 00421 or 90410 or 90430 or 95410 or 95430 are used and have a remark code then the result is missing.

**Footnote #10**

If 00453 is missing 29804-Bicarbonate, dissolved, fixed endpoint titration, field as HCO<sub>3</sub> will be used, if available.  
If 00452-Carbonate, dissolved, incremental titration, field, as CO<sub>3</sub> -is present then it is added to 00453 or 29804.  
If 00452 is missing 29807-Carbonate, dissolved, fixed endpoint titration, field, as CO<sub>3</sub> will be used, if available.  
If 00453 and 29804 are missing then 39086-Alkalinity, dissolved, incremental titration, field as CaCO<sub>3</sub>  
or 39036-Alkalinity, dissolved, fixed endpoint, field as CaCO<sub>3</sub>  
or 29802-Alkalinity, dissolved, gran titration, field as CaCO<sub>3</sub> will be used, if available.  
01080-Strontium, dissolved will be used, if available.  
01005-Barium, dissolved will be used, if available.

**Footnote #11**

If 00915; or 00925; or 00453 and 29804 and 39086 and 39036 and 29802 are missing then the result is missing.

**Footnote #12**

If 00915; or 00925; or 00453 or 29804 or 39086 or 39036 or 29802 are used and have a remark code then the result is missing.

**Footnote #13**

If 29806 is missing 29805-Bicarbonate, dissolved, fixed endpoint titration, laboratory as HCO<sub>3</sub> will be used, if available.  
If 29809-Carbonate, dissolved, incremental titration, laboratory, as CO<sub>3</sub> -is present then it is added to 29806 or 29805.  
If 29809 is missing 29808-Carbonate, dissolved, fixed endpoint titration, laboratory as CO<sub>3</sub> will be used, if available.  
If 29806 and 29805 are missing 39087-Alkalinity, dissolved, incremental titration, laboratory as CaCO<sub>3</sub>  
or 29801-Alkalinity, dissolved, fixed endpoint titration, laboratory as CaCO<sub>3</sub>  
or 29803-Alkalinity, dissolved, gran titration, laboratory as CaCO<sub>3</sub> will be used, if available.  
If 01005-Barium, dissolved will be used, if available.  
If 01080--Strontium, dissolved will be used, if available.

**Footnote #14**

If 00915; or 00925; or 29806 and 29805 and 39087 and 29801 and 29803 are missing then the result is missing.

**Footnote #15**

If 00915; or 00925; or 29806 or 29805 or 39087 or 29801 or 29803 are used and have a remark code then the result is missing.

**Footnote #16**

If 00453 is missing 99440-Bicarbonate, incremental titration, field  
or 00450--Acid neutralizing capacity (ANC), unfiltered, incremental titration, field, as HCO<sub>3</sub>  
or 29804-Bicarbonate, dissolved, fixed endpoint titration, field as HCO<sub>3</sub>  
or 00440-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, field, as HCO<sub>3</sub>  
or 29806-Bicarbonate, dissolved, oncremental titration, laboratory as HCO<sub>3</sub>  
or 00449-Acid neutralizing capacity (ANC), unfiltered, incremental titration, laboratory as HCO<sub>3</sub>  
or 90440-Bicarbonate, incremental titration, laboratory as HCO<sub>3</sub>  
or 29805-Bicarbonate, dissolved, fixed endpoint titration, laboratory as HCO<sub>3</sub>  
or 00451-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, laboratory as HCO<sub>3</sub>  
or 95440-Bicarbonate, titration to pH 4.5, laboratory as HCO<sub>3</sub> will be used, if available

**Footnote #16 (Continued)**

If 00452-Carbonate, dissolved, incremental titration, field, as  $\text{CO}_3$  is present then it is added to 00453, 00450, 29804, 00440, 29806, 00449, 90440, 29805, 00451, or 95440.

If 00452 is missing 99445-Carbonate, incremental titration, field as  $\text{CO}_3$   
or 00447-Acid neutralizing capacity (ANC), unfiltered, incremental titration, field, as  $\text{CO}_3$   
or 29807-Carbonate, dissolved, fixed endpoint titration, field, as  $\text{CO}_3$   
or 00445-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, field, as  $\text{CO}_3$   
or 29809-Carbonate, dissolved, incremental titration, laboratory, as  $\text{CO}_3$   
or 00446-Acid neutralizing capacity (ANC), unfiltered, incremental titration, laboratory, as  $\text{CO}_3$   
or 90445-Carbonate, incremental titration, laboratory as  $\text{CO}_3$   
or 29808-Carbonate, dissolved, fixed endpoint titration, laboratory as  $\text{CO}_3$   
or 00448-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, laboratory as  $\text{CO}_3$   
or 95445-Carbonate, titration to pH 8.3, laboratory as  $\text{CO}_3$  *will be used, if available*

If 00453 and 99440 and 00450 and 29804 and 00440 and 29806 and 00449 and 90440 and 29805 and 00451 and 95440 are missing then 39086-Alkalinity, dissolved, incremental titration, field as  $\text{CaCO}_3$   
or 00419-Acid neutralizing capacity (ANC), unfiltered, incremental titration, field, as  $\text{CaCO}_3$   
or 99430-Acid neutralizing capacity (ANC), unfiltered, incremental titration, field, as  $\text{CaCO}_3$   
or 39036-Alkalinity, dissolved, fixed endpoint, field as  $\text{CaCO}_3$   
or 00410-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, field, as  $\text{CaCO}_3$   
or 00418-Alkalinity, filtered, fixed endpoint titration, field, as  $\text{CaCO}_3$   
or 29802-Alkalinity, dissolved, gran titration, field as  $\text{CaCO}_3$   
or 29813-Acid neutralizing capacity (ANC), unfiltered, gran titration, field, as  $\text{CaCO}_3$   
or 39087-Alkalinity, dissolved, incremental titration, laboratory as  $\text{CaCO}_3$   
or 00416-Acid neutralizing capacity (ANC), unfiltered, incremental titration, laboratory, as  $\text{CaCO}_3$   
or 95410-Acid neutralizing capacity (ANC), unfiltered, titration to pH 4.5, laboratory, as  $\text{CaCO}_3$   
or 90430-Acid neutralizing capacity (ANC), unfiltered, incremental titration, laboratory, as  $\text{CaCO}_3$   
or 00421-Alkalinity, unfiltered, fixed endpoint titration, laboratory as  $\text{CaCO}_3$   
or 29801-Alkalinity, dissolved, fixed endpoint titration, laboratory as  $\text{CaCO}_3$   
or 90410-Acid neutralizing capacity (ANC), unfiltered, titration to pH 4.5, laboratory, as  $\text{CaCO}_3$   
or 00417-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, laboratory, as  $\text{CaCO}_3$   
or 95430-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, laboratory, as  $\text{CaCO}_3$   
or 29803-Alkalinity, dissolved, gran titration, laboratory as  $\text{CaCO}_3$   
or 00413-Acid neutralizing capacity (ANC), unfiltered, gran titration, laboratory, as  $\text{CaCO}_3$   
or 00425-Acid neutralizing capacity (ANC), unfiltered, bicarbonate as  $\text{CaCO}_3$   
or 00430-Acid neutralizing capacity (ANC), unfiltered, carbonate as  $\text{CaCO}_3$   
or 00431-Acid neutralizing capacity (ANC), unfiltered, as  $\text{CaCO}_3$   
will be used, if available.

If any of the following are present they will be used:

00955-Silica, dissolved

00631-Nitrate plus nitrite, dissolved or

**Footnote #16 (Continued)**

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If 00631 is missing 00618-Nitrate, dissolved plus 00613--Nitrite, dissolved will be used, if available.

- 00608-Ammonia, dissolved
- 71870-Bromide, dissolved
- 00746-Sulfide, dissolved
- 00723-Cyanide, dissolved
- 71830-Hydroxide dissolved
- 71865-Iodide, dissolved
- 00950-Fluoride, dissolved
- 00671-Orthophosphate, dissolved
- 01000-Arsenic, dissolved
- 01005-Barium, dissolved
- 01010-Beryllium, dissolved
- 01020-Boron, dissolved
- 01025-Cadmium, dissolved
- 01030-Chromium, dissolved
- 01035-Cobalt, dissolved
- 01040-Copper, dissolved
- 01046-Iron, dissolved
- 01049-Lead, dissolved
- 01056-Manganese, dissolved
- 01060-Molybdenum, dissolved
- 01065-Nickel, dissolved
- 01075-Silver, dissolved
- 01080-Strontium, dissolved
- 01085-Vanadium, dissolved
- 01090-Zinc, dissolved
- 01100-Tin, dissolved
- 01106-Aluminum, dissolved
- 01120-Gallium, dissolved
- 01125-Germanium, dissolved
- 01130-Lithium, dissolved
- 01135-Rubidium, dissolved
- 01145-Selenium, dissolved
- 01150-Titanium, dissolved
- 01160-Zirconium, dissolved
- 71890-Mercury, dissolved

**Footnote #17**

If 00453, 99440, 00450, 29804, 00440, 29806, 00449, 90440, 29805, 00451, 95440, 39086, 00419, 99430, 39036, 00410, 00418, 29802, 29813, 39087, 00416, 95410, 90430, 00421, 29801, 90410, 00417, 95430, 29803, 00413, 00425, 00430, and 00431 or 00915 or 00925 or 00930 or 00940 or 00945 or 00935 are missing or have a remark code, the result is missing