# Overview

LECO Cornerstone software is an integral part of LECO analytical instrumentation. The software allows operators to logon, add samples, initiate analysis sequences, and review results – all through the interactions of a touch screen. Cornerstone software also allows remote computers to logon, add samples, initiate analysis sequences, and review results – all through the interactions of a data stream.

The data stream is initiated by remote computers via an RS-232 serial or a TCP/IP network connection. The serial connection is configurable with respect to the port, baud rate, parity, etc. and the network connection is configurable with respect to the port.

Once connected, the data stream is formatted in XML, using Unicode character set. All correspondence is initiated by the remote computer, which sends a command, followed by the Cornerstone software sending a response. The available commands are grouped into five categories:

1. **Remote Authentication** commands allow the remote computer to logon to Cornerstone software.
2. **Remote Query** commands allow the remote computer to retrieve data regarding the current state of the instrument.
3. **Remote Messaging** commands allow the remote computer to configure the messaging system.
4. **Remote Sample Login** commands allow the remote computer to add new samples for later analysis.
5. **Remote Control** commands allow the remote computer to command the instrument to take actions.

Remote Authentication commands are always accepted by LECO Cornerstone software. Authentication is required before any of the other commands categories are accepted. Once authenticated, Remote Query, Remote Messaging and Remote Sample Login commands are always accepted by LECO Cornerstone software. Remote Control commands, however requires that the operator places the software into a remote control mode.

The handling of Remote Sample Login commands depends on whether or not the software is in remote control mode. When in remote control mode, samples will be added immediately. When not in remote control mode, the Cornerstone operator is visually notified that new samples have been received. Once the operator accepts the notification, the new samples will be added.

*We plan on changing all responses to ensure element and attribute names begin with upper-case letters.*

# Disconnect

This command disconnects the client application from Cornerstone. This command does not require a client application to first perform the Logon command.

## Syntax

<Disconnect/>

## Reply

No reply is sent.

# InstrumentInfo

This command returns information about the Cornerstone instrument, such as machine name, product, and serial number. This command does not require a client application to first perform the Logon command.

## Syntax

<InstrumentInfo/>

## Reply

<InstrumentInfo

<field label="MachineName" width="100">HAUCK3600</field>

<field label="Product" width="100">CS844</field>

<field label="Serial" width="100">3198</field>

<field label="Version" width="100">2.0.2001.0</field>

<field label="Family" width="100">Inorganic44</field>

<field label="CommandVersion" width="100">3.0</field>

<field label="Options" width="100">HEFCI AC ACTR WL IPH IS HFC BPC EFS CH CT HDF GD NQ RC RSL RQ012015</field>

</InstrumentInfo>

# Logoff

This command logs the user off. Sending this command will have no effect if there is not a currently logged on user.

## Syntax

<Logoff/>

## Reply

<Logoff>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</Logoff>

# Logon

This command logs the user on. This is required in order to successfully execute Remote Query, Remote Sample Login and Remote Control commands.

## Syntax

<Logon>

<User>user name</User>

<Password>password</Password>

</Logon>

## Reply

<Logon>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</Logon>

# SupportedCultures

This command returns the supported cultures. This command does not require a client application to first perform the Logon command.

## Syntax

<SupportedCultures/>

## Reply

<SupportedCultures>

<Culture Key="en-US" Name="English" />

<Culture Key="zh-CHS" Name="中文" />

<Culture Key="fr-FR" Name="français" />

<Culture Key="de" Name="Deutsch" />

<Culture Key="ja" Name="日本語" />

<Culture Key="ru" Name="русский" />

<Culture Key="es-ES" Name="español" />

<Culture Key="pl" Name="polski" />

<Culture Key="cs-CZ" Name="čeština" />

<Culture Key="tr-TR" Name="Türkçe" />

</SupportedCultures>

# Version

This command returns the version for the protocol and the version of the Cornerstone application. This command does not require a client application to first perform the Logon command.

## Syntax

<Version/>

## Reply

<Version>

<Commands>3.0</Commands>

<Program>2.0.0</Program>

</Version>

# Ambient

This command retrieves the detail data for the ambient corresponding to the specified key.

## Parameters

**Key**: The unique key that identifies the specific ambient for which detail data is to be retrieved. Leading zeros may be omitted.

## Syntax

<Ambient Key="4467577170595717216"/>

## Reply

<Ambient>

<Name>Low CO₂</Name>

<Key>4467577170595717216</Key>

<Id>4467577170595717216</Id>

<Min>…</Min>

<Max>…</Max>

<Value>…</Value>

<MinNumber>…</MinNumber>

<MaxNumber>…</MaxNumber>

<ValueNumber>…</ValueNumber>

<Units>V</Units>

<InWarning>False</InWarning>

<Type>IRCell</Type>

</Ambient>

<Ambient>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested Key ### was not found.</ErrorMessage>

</Ambient>

# Ambients

This command retrieves general data about each ambient on the instrument.

## Syntax

<Ambients/>

## Reply

<Ambients>

<Ambient>

<Name>Low CO₂</Name>

<Key>4467577170595717216</Key>

<Id>4467577170595717216</Id>

<Min>…</Min>

<Max>…</Max>

<Value>…</Value>

<MinNumber>…</MinNumber>

<MaxNumber>…</MaxNumber>

<ValueNumber>…</ValueNumber>

<Units>V</Units>

<InWarning>False</InWarning>

<Type>IRCell</Type>

</Ambient>

…

</Ambients>

# AnalysisAbortReason

This command returns the most recent analysis abort reason.

## Syntax

<AnalysisAbortReason/>

## Reply

<AnalysisAbortReason>reason will appear here</AnalysisAbortReason>

The values returned will be one of the following:

Unknown

MissingMass

MissingMethod

UserAborted

MissingLocation\*

ReferenceSaturationError

MissingStandard

MissingName

MissingFurnaceSteps

LinearizationTableError

AllReplicatesAreAnalyzed

FurnaceMonitor

InvalidLocation\*

AutomationError\*

\* - these reasons are only applicable if an automation loader is being used.

# AutomationStatus

This command retrieves status data for the installed automation functionality.

## Parameters

**Id**: When a value is present in this parameter, the command will retrieve only data for the automation functionality with the specified id, otherwise the data for all installed automation system.

## Syntax

<AutomationStatus Id="…"/>

## Reply

<AutomationStatus>

<Automation Id="AutoCleaner" OperationMode="Enabled">

<CleanInterval>10</CleanInterval>

<NumberOfCleanCycles>2</NumberOfCleanCycles>

</Automation>

</AutomationStatus>

# Counter

This command retrieves the detail data for the counter corresponding to the specified key.

## Parameters

**Key**: The unique key that identifies the specific counter for which detail data is to be retrieved. Leading zeros may be omitted.

## Syntax

<Counter Key="13"/>

## Reply

<Counter>

<Key>0000000000000013</Key>

<Name label="Name">Incoming Purifier</Name>

<Description label="Description">Replace when 1/3rd of Copper Oxide turns reddish orange.</Description>

<ExpiresIn label="Expires In">Excluded</ExpiresIn>

<LastUsed label="Last Used">01/01/0001 05:00:00</LastUsed>

<LastModified label="Last Modified">03/11/2014 19:20:59</LastModified>

<Excluded label="Excluded">True</Excluded>

<Ignore label="Ignore">True</Ignore>

<CounterType label="Counter Type">Days</CounterType>

<CountBlanks label="Count Blanks">False</CountBlanks>

<UseInspect label="Inspect">True</UseInspect>

<InspectCount label="Current Count">0</InspectCount>

<NumInspectResets label="Number of Resets">11</NumInspectResets>

<InspectLimit label="Inspect Every">8</InspectLimit>

<LastInspectReset label="Last Reset">02/06/2014 20:18:54</LastInspectReset>

<UsePerform label="Stop">True</UsePerform>

<PerformCount label="Current Count">0</PerformCount>

<NumPerformResets label="Number of Resets">9</NumPerformResets>

<PerformLimit label="Perform Maintenance Every">180</PerformLimit>

<LastPerformReset label="Last Reset">02/06/2014 20:18:54</LastPerformReset>

</Counter>

<Counter>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested Key ### was not found.</ErrorMessage>

</Counter>

# Counters

This command retrieves general data about each counter on the instrument.

## Syntax

<Counters/>

## Reply

<Counters>

<Counter>

<Key>0000000000000013</Key>

<Name label="Name">Incoming Purifier</Name>

<Description label="Description">Replace when 1/3rd of Copper Oxide turns reddish orange.</Description>

<ExpiresIn label="Expires In">Excluded</ExpiresIn>

<LastUsed label="Last Used">01/01/0001 05:00:00</LastUsed>

<LastModified label="Last Modified">03/11/2014 19:20:59</LastModified>

<Excluded label="Excluded">True</Excluded>

</Counter>

…

</Counters>

# Detectors

This command retrieves information about the instrument’s detectors. It is only supported for instruments that contain IR cells.

## Syntax

<Detectors/>

## Reply

<Detectors>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

<Detectors>

<Detector ID="CO2High" Label="High CO2">

<Field ID="SerialNumber" Label="Cell Serial #">00500042</Field>

<Field ID="EmitterNumber" Label="Cell Emitter #">1</Field>

<Field ID="Reference" Label="Reference" Units="V">2.757450</Field>

<Field ID="Saturation" Label="Saturation" Units="V">0.014453</Field>

<Field ID="SignalToNoiseSignal" Label="Signal">2.46</Field>

<Field ID="SignalPassFail" Label="Signal To Noise Pass/Fail">Passed</Field>

<Field ID="SignalToNoise" Label="Signal-to-Noise Ratio">4.89</Field>

<Field ID="SignalToNoiseResult" Label="Signal To Noise Result Pass/Fail">Passed</Field>

<Field ID="SignalQualityTest" Label="Signal Quality">0.98</Field>

<Field ID="SignalQualityTestResult" Label="Signal To Noise Quality Test Result Pass/Fail">Passed</Field>

<EmitterOnTimes>

<EmitterOnTime Label="Emitter On Time ( - 1)" OnTime="00:00:10" LastWrittenToCell="12/05/2016 20:28:29" />

<EmitterOnTime Label="Emitter On Time (R\_FB)" OnTime="00:00:06" LastWrittenToCell="02/25/2013 15:58:17" />

<EmitterOnTime Label="Emitter On Time (00000251)" OnTime="00:00:42" LastWrittenToCell="02/25/2013 16:04:49" />

<EmitterOnTime Label="Emitter On Time (00500043)" OnTime="9.04:05:55" LastWrittenToCell="06/05/2013 13:41:17" />

<EmitterOnTime Label="Emitter On Time (00500042 - 1)" OnTime="164.00:45:51" LastWrittenToCell="11/09/2016 14:04:22" />

</EmitterOnTimes>

<TuningResults>

<TuningResult LMDC="10.00" HMDC="56.00" Date="12/05/2016 20:31:53" />

</TuningResults>

</Detector>

…

</Detectors>

</Detectors>

# Field

This command returns the current state of the specified user-defined field.

## Parameters

**Key**: The unique key that identifies the field.

## Syntax

<Field Key="24"/>

## Reply

<Field>

<Key>0000000000000024</Key>

<Name label="Name">C[CO₂] Avg.</Name>

<FieldIdentifier>UDF: 36</FieldIdentifier>

<Description label="Description">C[CO₂] equivalency for Carbon in Sets</Description>

<LastUsed label="Last Used">01/01/0001 00:00:00</LastUsed>

<LastModified label="Last Modified">08/05/2013 17:58:23</LastModified>

<Excluded label="Excluded">False</Excluded>

<Type label="Type">Numeric</Type>

<EntryMethod label="Entry Method">Calculated</EntryMethod>

</Field>

<Field>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested Key ### was not found.</ErrorMessage>

</Field>

# Fields

This command returns the current state of all user-defined fields.

## Syntax

<Fields/>

## Reply

<Fields>

<Field>

<Key>0000000000000024</Key>

<Name label="Name">C[CO₂] Avg.</Name>

<FieldIdentifier>UDF: 36</FieldIdentifier>

<Description label="Description">C[CO₂] equivalency for Carbon in Sets</Description>

<LastUsed label="Last Used">01/01/0001 00:00:00</LastUsed>

<LastModified label="Last Modified">08/05/2013 17:58:23</LastModified>

<Excluded label="Excluded">False</Excluded>

</Field>

…

</Fields>

# Filters

This command returns the list of user-defined filters.

## Syntax

<Filters/>

## Reply

<Filters>

<Filter key="00000000000019D8">Types: Standard; Standards: 501-505</Filter>

</Filters>

# GasState

This command returns the current gas state of the instrument.

## Syntax

<GasState/>

## Reply

<GasState>ON/OFF/CONSERVE</GasState>

# MessageHistory

This command returns the instrument messages displayed to the user.

## Syntax

<MessageHistory/>

## Reply

<MessageHistory InstrumentID="23556ab6-5d20-452e-bf1e-1466452158c2">

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success.</ErrorMessage>

<Message><![CDATA[2016-11-22T16:19:40.5728092Z Unable to depressurize system. Proceed with caution.]]></Message>

<Message><![CDATA[2016-11-22T16:18:53.0582967Z Could not connect to Instrument (error: 10061). Please check connections and power.]]></Message>

….

</Message>

# Method

This command returns detail data for the specified method.

## Parameters

**Key**: The unique key that identifies the method. Leading zeroes may be omitted.

## Syntax

<Method Key="D3"/>

## Reply

<Method>

<Key>00000000000000D3</Key>

<Name label="Name">SWV</Name>

<Description label="Description"></Description>

<LastUsed label="Last Used">03/19/2014 15:28:29</LastUsed>

<LastModified label="Last Modified">06/03/2013 11:36:00</LastModified>

<Excluded label="Excluded">False</Excluded>

<Sections>

<Section label="General Parameters">

<field label="Purge Time" units="s" rawValue="10">10 s</field>

<field label="Delay Time" units="s" rawValue="10">10 s</field>

<field label="Sample Cool Time" units="s" rawValue="0">0 s</field>

<field label="Furnace Mode" rawValue="Constant">Constant</field>

<field label="Furnace Power" units="%" rawValue="100">100 %</field>

</Section>

<Section label="Element Parameters">

<Subsection label="Carbon">

<field label="Integration Delay" units="s" rawValue="0">0 s</field>

<field label="Starting Baseline" units="s" rawValue="2">2 s</field>

<field label="Use Comparator" rawValue="true">Yes</field>

<field label="Comparator Level" units="%" rawValue="1">1.00 %</field>

<field label="Minimum Integration Time" units="s" rawValue="40">40 s</field>

<field label="Maximum Integration Time" units="s" rawValue="60">60 s</field>

<field label="Range Select" rawValue="Auto">Auto</field>

<field label="Range Lower Limit" units="" rawValue="800">800</field>

<field label="Range Upper Limit" units="" rawValue="950">950</field>

</Subsection>

…

</Section>

…

</Sections>

</Method>

<Method>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested Key ### was not found.</ErrorMessage>

</Method>

# Methods

This command returns all methods.

## Syntax

<Methods/>

## Reply

<Methods>

<Method>

<Key>00000000000000D3</Key>

<Name label="Name">SWV</Name>

<Description label="Description"></Description>

<LastUsed label="Last Used">03/19/2014 15:28:29</LastUsed>

<LastModified label="Last Modified">06/03/2013 11:36:00</LastModified>

<Excluded label="Excluded">False</Excluded>

</Method>

…

</Methods>

# NextToAnalyze

This command returns the replicate tag and set key for the replicate that is next to be analyzed.

## Syntax

<NextToAnalyze/>

## Reply

<NextToAnalyze SetKey="00000000000019BB" ReplicateTag="1"/>

# Prerequisite

This command returns the current state of the specified prerequisite.

## Parameters

**Key**: The unique key that identifies the method. Leading zeroes may be omitted.

## Syntax

<Prerequisite Key="Ready To Analyze"/>

## Reply

<Prerequisite name="Ready To Analyze" value="false"/>

<Prerequisite>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested Key ### was not found.</ErrorMessage>

</Prerequisite>

# Prerequisites

This command returns the current state of all prerequisites.

## Syntax

<Prerequisites/>

## Reply

<Prerequisites>

<Prerequisite name="Ready To Analyze" value="false" />

<Prerequisite name="Hardware In Use" value="false" />

<Prerequisite name="Analyzing" value="false" />

<Prerequisite name="Gas On" value="false" />

<Prerequisite name="Gas Off" value="false" />

<Prerequisite name="Gas Conservation" value="false" />

…

</Prerequisites>

# QCStatus

This command returns the current state of quality control for a method.

## Parameters

**MethodKey**: The unique key that identifies the method. Leading zeroes may be omitted.

## Syntax

<QCStatus MethodKey="D3"/>

## Reply

<QCStatus>

<MethodKey>00000000000000D3</MethodKey>

<InControlState>NotInControl</InControlState>

<FailReasons>

<FailReason>BlankTimeLapse</FailReason>

<FailReason>CheckOutOfRange</FailReason>

…

</FailReasons>

</QCStatus>

<QCStatus>

<ErrorCode>7</ErrorCode>

<ErrorMessage>Quality Control not supported.</ErrorMessage>

</QCStatus>

<QCStatus>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested MethodKey ### was not found.</ErrorMessage>

</QCStatus>

# RemoteControlState

This command returns the flag indicating if the Cornerstone application is currently in Remote Control mode.

## Syntax

<RemoteControlState/>

## Reply

<RemoteControlState>True/False</RemoteControlState>

# RepDetail

This command retrieves the detail data for the specified replicate in the specified set.

## Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

## Syntax

<RepDetail SetKey="10A" Tag="1"/>

## Reply

<RepDetail>

<SetKey>000000000000010A</SetKey>

<replicate>

<Tag>1</Tag>

<detailFields>

<field label="Carbon Mass" registryId="Carbon Mass"  
 units="g" rawValue="0.0016637569300525586" id="102" width="100">0.00166 g</field>

<field label="Carbon Adjusted Area" registryId="Carbon Adjusted Area"  
 units="" rawValue="" id="113" width="100">Low 0.00223</field>

<field label="Carbon Peak Height" registryId="Carbon Peak Height"  
 units="" rawValue="" id="114" width="100">Low 608.96956</field>

…

</detailFields>

</replicate>

</RepDetail>

<RepDetail>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested SetKey ### was not found.</ErrorMessage>

</RepDetail>

# Report

This command retrieves the detail data for the report corresponding to the specified key.

## Parameters

**Key**: The unique key that identifies the specific report for which detail data is to be retrieved. Leading zeros may be omitted.

## Syntax

<Report Key="19D5"/>

## Reply

<Report>

<Key>00000000000019D5</Key>

<Name label="Name">Default</Name>

<Description label="Description">Built-in default report</Description>

<LastUsed label="Last Used">01/01/0001 00:00:00</LastUsed>

<LastModified label="Last Modified">04/22/2014 20:09:37</LastModified>

<Excluded label="Excluded">False</Excluded>

<Printer label="Printer">[Default]</Printer>

<PageOrientation label="Page Orientation">Landscape</PageOrientation>

<SetSpacing label="Spacing between sets">OneLine</SetSpacing>

<SetBeginFields>

<Field name="Indent" label="" />

<Field name="Name" label="Name" />

<Field name="Method" label="Method" />

<Field name="Carbon Avg." label="Carbon Average" />

<Field name="Sulfur Avg." label="Sulfur Average" />

<Field name="n=" label="n=" />

<Field name="CR/LF" label="" />

<Field name="Indent" label="" />

<Field name="Description" label="Description" />

<Field name="Carbon Std. Dev." label="Carbon Std. Dev." />

<Field name="Sulfur Std. Dev." label="Sulfur Std. Dev." />

<Field name="Carbon RSD" label="Carbon %RSD" />

<Field name="Sulfur RSD" label="Sulfur %RSD" />

<Field name="CR/LF" label="" />

</SetBeginFields>

<ReplicateFields>

<Field name="Indent" label="" />

<Field name="Colored Dot" label="Colored Dot" />

<Field name="Mass" label="Sample Mass" />

<Field name="Comments" label="Comments" />

<Field name="Carbon Concentration" label="Carbon Concentration" />

<Field name="Sulfur Concentration" label="Sulfur Concentration" />

<Field name="Analysis Date" label="Analysis Date" />

<Field name="CR/LF" label="" />

</ReplicateFields>

<SetEndFields />

</Report>

<Report>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested Key ### was not found.</ErrorMessage>

</Report>

# Reports

This command returns the current state of all prerequisites.

## Syntax

<Reports/>

## Reply

<Reports>

<Report>

<Key>00000000000019D5</Key>

<Name label="Name">Default</Name>

<Description label="Description">Built-in default report</Description>

<LastUsed label="Last Used">01/01/0001 00:00:00</LastUsed>

<LastModified label="Last Modified">04/22/2014 20:09:37</LastModified>

<Excluded label="Excluded">False</Excluded>

</Report>

…

</Reports>

# RepPlot

This command retrieves plot data for the specified replicate in the specified set

## Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

## Syntax

<RepPlot SetKey="10A" Tag="1"/>

## Reply

<RepPlot>

<Key>000000000000010A</Key>

<Plot>

<Replicate Tag="1" Index="1">

<Analyte Label="Carbon" Value="0.176058934397096" Units="%">

<Trace>

<XMin>0</XMin>

<XMax>635023556952440000</XMax>

<YMin>0</YMin>

<YMax>608.96955624580892</YMax>

<TracePoints>

<TracePoint DateTime="0">0.03540591324117</TracePoint>

<TracePoint DateTime="4000000">0.0198581157788256</TracePoint>

<TracePoint DateTime="8000000">0.00719802712102269</TracePoint>

<TracePoint DateTime="12000000">-0.00821030676779452</TracePoint>

…

<TracePoint DateTime="408000000">5.13798516536813</TracePoint>

<TracePoint DateTime="412000000">4.90620026790337</TracePoint>

<TracePoint DateTime="416000000">4.68418034252164</TracePoint>

</TracePoints>

</Trace>

</Analyte>

…

</Replicate>

</Plot>

</RepPlot>

<RepPlot>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested SetKey ### was not found.</ErrorMessage>

</RepPlot>

# Sequence

This command retrieves the status of the specified sequence.

## Parameters

**Name**: The name of the sequence.

## Syntax

<Sequence Name="Cycle Pump Off"/>

## Reply

<Sequence Name="Cycle Pump Off" Running="false"/>

<Sequence>

<ErrorCode>4</ErrorCode>

<ErrorMessage>Requested Name ### not found.</ErrorMessage>

</Sequence>

# Sequences

This command retrieves the status of each sequence.

## Syntax

<Sequences/>

## Reply

<Sequences>

…

<Sequence Name="Cycle Furnace Check" Running="false" />

<Sequence Name="Cycle Pump Off" Running="false" />

<Sequence Name="Cycle Pump On" Running="false" />

…

</Sequences>

# Set

This command retrieves the detail data for the set corresponding to the specified key.

## Parameters

**Key**: The unique key that identifies the set. Leading zeros may be omitted.

## Syntax

<Set Key="10A"/>

## Reply

<Set>

<set>

<Key>000000000000010A</Key>

<headerFields>

<field label="Type" registryId="SampleType" rawValue="Sample" id="1"  
 width="100">Sample</field>

<field label="Name" registryId="Set Name" id="2" width="100">25355 P4</field>

<field label="Description" registryId="Description" id="3" width="100"></field>

<field label="Method" registryId="Method" id="5" width="100">SWV</field>

<field id="4" registryId="Set Analysis Date" label="Analysis Date"  
 width="100">4/23/2013 7:13:44 PM</field>

<field label="Carbon Average" registryId="Carbon Avg." units="%"  
 rawValue="0.17605893439709616" id="100" width="100">0.176 %</field>

<field label="Sulfur Average" registryId="Sulfur Avg." units="%"  
 rawValue="0.033813161955929379" id="101" width="100">0.0338 %</field>

</headerFields>

<SampleType>Sample</SampleType>

<NumRepsInSet>1</NumRepsInSet>

<AnalysisState>Analyzed</AnalysisState>

<IsPaused>false</IsPaused>

<IsExpanded>false</IsExpanded>

<IsSelected>false</IsSelected>

</set>

<Analytes>

<Analyte label="Carbon">Carbon</Analyte>

<Analyte label="Sulfur">Sulfur</Analyte>

</Analytes>

</Set>

<Set>

<ErrorCode>4</ErrorCode>

<ErrorMessage>Requested Key ### not found.</ErrorMessage>

</Set>

# SetKeys

This command retrieves the unique key for each set.

## Parameters

**FilterKey**: The unique key that identifies the filter to use when retrieving the sets. Leading zeros may be omitted.

## Syntax

<SetKeys FilterKey="19D8"/>

## Reply

<SetKeys>

<key>00000000000000DF</key>

<key>000000000000067A</key>

<key>000000000000068A</key>

<key>000000000000069E</key>

<key>00000000000006B0</key>

<key>00000000000006C2</key>

<key>00000000000006DD</key>

<key>00000000000006EB</key>

<key>00000000000006F7</key>

<key>0000000000000704</key>

<key>0000000000000A02</key>

<key>0000000000000A25</key>

<key>00000000000019BB</key>

<Count>13</Count>

<Analytes>

<Analyte label="Carbon">Carbon</Analyte>

<Analyte label="Sulfur">Sulfur</Analyte>

</Analytes>

</SetKeys>

# SetKeysEx2

This command retrieves the unique key for each set, along with the set analysis date.

## Syntax

<SetKeysEx2 />

## Reply

<SetKeysEx2>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success.</ErrorMessage>

<key keyValue="0000000000000056" AnalysisDate="09/06/2016 19:45:07" />

<key keyValue="0000000000000060" AnalysisDate="09/06/2016 22:31:00" />

<key keyValue="000000000000006B" AnalysisDate="09/07/2016 16:40:34" />

<key keyValue="000000000000007F" AnalysisDate="09/07/2016 19:43:12" />

<key keyValue="0000000000000094" AnalysisDate="09/08/2016 18:50:55" />

<key keyValue="00000000000000A5" AnalysisDate="09/08/2016 21:53:53" />

<key keyValue="00000000000000A6" AnalysisDate="09/08/2016 22:52:54" />

</SetKeysEx2>

# SetReps

This command retrieves general data for each replicate in the specified set.

## Parameters

**Key**: The unique key that identifies the set. Leading zeros may be omitted.

**IncludeDetailData**: Indicates if the replicate data should include the detail data in addition to the general data.

## Syntax

<SetReps Key="10A" IncludeDetailData="False"/>

## Reply

<SetReps>

<Key>000000000000010A</Key>

<replicates>

<replicate>

<Tag>1</Tag>

<headerFields>

<field label="Sample Mass" registryId="Sample Mass" valueStatus=”Normal” units="g"  
 rawValue="0.945" id="11" width="100">0.9450 g</field>

<field label="Comments" registryId="Comments" id="12" width="100"></field>

<field label="Operator" registryId="Operator" id="13" width="100"></field>

<field id="14" registryId="Rep Analysis Date" label="Analysis Date"  
 width="100">4/23/2013 7:13:44 PM</field>

<field label="Carbon" registryId="Carbon Concentration" units="%"  
 rawValue="0.17605893439709616" id="100" width="100">0.176 %</field>

<field label="Sulfur" registryId="Sulfur Concentration" units="%"  
 rawValue="0.033813161955929379" id="101" width="100">0.0338 %</field>

</headerFields>

<AnalysisState>Analyzed</AnalysisState>

<RecalculatedDate>0001-01-01T00:00:00</RecalculatedDate>

<IsExcluded>false</IsExcluded>

<IsExpanded>false</IsExpanded>

<IsNext>false</IsNext>

<IsSelected>false</IsSelected>

<PausedState>NotPaused</PausedState>

</replicate>

</replicates>

</SetReps>

<SetReps>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested Key ### not found.</ErrorMessage>

</SetReps>

The Sample Mass (id = 11) element provides a “valueStatus” attribute which conveys the state of the mass. There are two possible values for this attribute:

* Normal – this is the default status for the sample mass. When the set’s method has defined a Sample Mass Range and the replicate’s mass is within range, the status value will be Normal. If a Sample Mass Range is not in use for the method, the status value will default to Normal.
* Warning – this is the status value when the set’s method has defined a Sample Mass Range and the replicate’s mass is either not specified (empty) or falls outside of the range.

# Sets

This command retrieves general set data for the number of sets specified.

## Parameters

**FilterKey**: The unique key that identifies the filter to use when retrieving the sets. Leading zeros may be omitted.

**Number**: The number of sets to return.

**StartAt**: The index of first set to return. If the default value (-1) is used, then the sets returned will be the most recent # of sets where # is specified in the Number parameter.

## Syntax

<Sets FilterKey="" Number="2" StartAt="-1"/>

## Reply

<Sets>

<FirstIndex>2247</FirstIndex>

<LastIndex>2248</LastIndex>

<TotalSamplesAvailable>2249</TotalSamplesAvailable>

<sets>

<set>

<Key>000000000000198E</Key>

<headerFields>

<field label="Name" registryId="Set Name" id="2" width="100">Evan</field>

…

</headerFields>

<SampleType>Sample</SampleType>

<NumRepsInSet>5</NumRepsInSet>

<AnalysisState>Analyzed</AnalysisState>

<IsPaused>false</IsPaused>

<IsExpanded>false</IsExpanded>

<IsSelected>false</IsSelected>

</set>

…

</sets>

<Analytes>

<Analyte label="Carbon">Carbon</Analyte>

<Analyte label="Sulfur">Sulfur</Analyte>

</Analytes>

</Sets>

# Solenoid

This command retrieves the detail data for the solenoid corresponding to the specified key.

## Parameters

**Key**: The unique key that identifies the specific solenoid for which detail data is to be retrieved.

## Syntax

<Solenoid Key="4539633652371300352"/>

## Reply

<Solenoid>

<Name label="Name">Carrier Inlet</Name>

<Key>4539633652371300352</Key>

<Label>sv101</Label>

<BitState>Unset</BitState>

</Solenoid>

<Solenoid>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested Key ### not found.</ErrorMessage>

</Solenoid>

# Solenoids

This command retrieves general data about each solenoid on the instrument.

## Syntax

<Solenoids/>

## Reply

<Solenoids>

<Solenoid>

<Name label="Name">Carrier Inlet</Name>

<Key>4539633652371300352</Key>

<Label>sv101</Label>

<BitState>Unset</BitState>

</Solenoid>

<Solenoid>

<Name label="Name">Lance</Name>

<Key>4539633652371300353</Key>

<Label>sv102</Label>

<BitState>Unset</BitState>

</Solenoid>

…

</Solenoid>

# Standard

This command retrieves the detail data for the standard corresponding to the specified key.

## Parameters

**Key**: The unique key that identifies the specific standard for which detail data is to be retrieved. Leading zeros may be omitted.

## Syntax

<Standard Key="26"/>

## Reply

<Standard>

<Key>0000000000000026</Key>

<Name label="Name">501-024 LN 1026</Name>

<Description label="Description"></Description>

<LastUsed label="Last Used">04/10/2013 13:45:06</LastUsed>

<LastModified label="Last Modified">04/23/2013 12:13:52</LastModified>

<Excluded label="Excluded">True</Excluded>

<GasDoseType label="Gas Dose">None</GasDoseType>

<GasDoseCycles label="Number of Doses">1</GasDoseCycles>

<Analytes>

<Analyte label="Carbon">

<Key>Carbon</Key>

<Range label="Range">High</Range>

<Certified label="Certified" units="Percent">0.0341</Certified>

<Uncertainty label="Uncertainty" units="Percent">0.0005</Uncertainty>

<LowerControlLimit label="Lower Control Limit" units="Percent">0.0336</LowerControlLimit>

<UpperControlLimit label="Upper Control Limit" units="Percent">0.0346</UpperControlLimit>

<CheckStandard label="Check Standard">False</CheckStandard>

</Analyte>

<Analyte label="Sulfur">

<Key>Sulfur</Key>

<Range label="Range">Both</Range>

<Certified label="Certified" units="Percent">0.00029</Certified>

<Uncertainty label="Uncertainty" units="Percent">2E-05</Uncertainty>

<LowerControlLimit label="Lower Control Limit" units="Percent">0.00027</LowerControlLimit>

<UpperControlLimit label="Upper Control Limit" units="Percent">0.00031</UpperControlLimit>

<CheckStandard label="Check Standard">False</CheckStandard>

</Analyte>

</Analytes>

</Standard>

<Standard>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested Key ### not found.</ErrorMessage>

</Standard>

# Standards

This command retrieves general data about each standard on the instrument.

## Syntax

<Standards/>

## Reply

<Standards>

<Standard>

<Key>0000000000000026</Key>

<Name label="Name">501-024 LN 1026</Name>

<Description label="Description"></Description>

<LastUsed label="Last Used">04/10/2013 13:45:06</LastUsed>

<LastModified label="Last Modified">04/23/2013 12:13:52</LastModified>

<Excluded label="Excluded">True</Excluded>

<GasDoseType label="Gas Dose">None</GasDoseType>

<GasDoseCycles label="Number of Doses">1</GasDoseCycles>

</Standard>

<Standard>

<Key>0000000000000027</Key>

<Name label="Name">501-506 R0296</Name>

<Description label="Description"></Description>

<LastUsed label="Last Used">05/08/2013 18:08:23</LastUsed>

<LastModified label="Last Modified">04/23/2013 13:16:03</LastModified>

<Excluded label="Excluded">False</Excluded>

<GasDoseType label="Gas Dose">None</GasDoseType>

<GasDoseCycles label="Number of Doses">1</GasDoseCycles>

</Standard>

…

</Standards>

# Status

This command the current status of the instrument, such as the state of the "Analyzing" flag, the "ReadyToAnalyze" flag, the "HardwareInUse" flag, the "NeedsMaintenance" flag, as well as optionally the current values of the main screen gauges, the most recent leak check results, and the most recent system check results.

## Parameters

**IncludeGauges**: Indicates whether to include the current value of the main screen gauges in the response data.

**IncludeSystemCheckResults**: Indicates whether to include the results from the latest system check in the response data.

**IncludeLeakCheckResults**: Indicates whether to include the results from the latest leak check in the response data.

## Syntax

<Status IncludeGauges="True" IncludeSystemCheckResults="True" IncludeLeakCheckResults="True"/>

## Reply

<Status>

<Elements>

<User>jmh</User>

<Analyzing>False</Analyzing>

<ReadyToAnalyze>False</ReadyToAnalyze>

<Paused>False</Paused>

<SamplesRemaining>3</SamplesRemaining>

<HardwareInUse>False</HardwareInUse>

<NeedsMaintenance>False</NeedsMaintenance>

<HardwareStatus>Not Ready To Analyze.</HardwareStatus>

</Elements>

<Widgets>

<Widget Label="Grid Current" Id="1" Units="mA" Warning="false"></Widget>

</Widgets>

<SystemCheckResults>

<SystemCheck Id="QUICK">

<Result ExecutionDate="6/3/2013 12:28:00 PM">

<Segment Type="StatusMessage" Result="COMPLETED,27,27,26,1" />

</Result>

</SystemCheck>

</SystemCheckResults>

<LeakCheckResults>

<LeakCheck Id="SYSTEM" Label="System Leak Check">

<Result ExecutionDate="6/4/2013 4:39:58 PM" MassiveLeak="False" PressureIncreased="False">

<Segment Type="Detector" Result="Failed" InitialPressure="1533.10347444096" FinalPressure="1520.81305229154" PressureChange="-12.2904221494232" Label="System" />

</Result>

</LeakCheck>

</LeakCheckResults>

</Status>

# Switch

This command retrieves the detail data for the standard corresponding to the specified key.

## Parameters

**Key**: The unique key that identifies the specific standard for which detail data is to be retrieved. Leading zeros may be omitted.

## Syntax

<Switch Key="4539633648093110272"/>

## Reply

<Switch>

<Name label="Name">Pedestal Up</Name>

<Key>4539633648093110272</Key>

<Label>sw5</Label>

<BitState>Ignore</BitState>

</Switch>

<Switch>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested Key ### not found.</ErrorMessage>

</Switch>

# Switches

This command retrieves general data about each standard on the instrument.

## Syntax

<Switches/>

## Reply

<Switches>

<Switch>

<Name label="Name">Pedestal Up</Name>

<Key>4539633648093110272</Key>

<Label>sw5</Label>

<BitState>Ignore</BitState>

</Switch>

<Switch>

<Name label="Name">Pedestal Down</Name>

<Key>4539633648093110273</Key>

<Label>sw6</Label>

<BitState>Ignore</BitState>

</Switch>

…

<Switches>

# SystemParameters

This command retrieves data about each of the system parameters.

## Syntax

<SystemParameters/>

## Reply

<SystemParameters>

<field label="Gas Standby Mode" rawValue="Disable">Disable Standby</field>

<field label="Dust Filter Temperature" units="°C" rawValue="110">110 °C</field>

<field label="Back Pressure Control" units="mmHg" rawValue="790">790 mmHg</field>

<field label="Weekday Wake Up" rawValue="false">Disabled</field>

<field label="Saturday Wake Up" rawValue="false">Disabled</field>

<field label="Sunday Wake Up" rawValue="false">Disabled</field>

<field label="Gas Doser" rawValue="false">Enabled</field>

</SystemParameters>

# Transport

This command retrieves the detail data for the transport corresponding to the specified key.

## Parameters

**Key**: The unique key that identifies the specific transport for which detail data is to be retrieved. Leading zeros may be omitted..

## Syntax

<Transport Key="19D9"/>

## Reply

<Transport>

<Key>00000000000019D9</Key>

<Name label="Name">New Transport</Name>

<Description label="Description"></Description>

<LastUsed label="Last Used">01/01/0001 00:00:00</LastUsed>

<LastModified label="Last Modified">04/23/2014 14:05:13</LastModified>

<Excluded label="Excluded">False</Excluded>

<TransmitOption label="Transmit Option">File</TransmitOption>

<TransportAutomatically label="Transport Automatically">False</TransportAutomatically>

<TransportFormat label="Transport Format">Delimited</TransportFormat>

<TransportUnits label="Transport Units With Results">True</TransportUnits>

<CharacterEncoding label="Character Encoding">UTF8NoBOM</CharacterEncoding>

<ExportOptions label="Export Options">Append</ExportOptions>

<ExportFileName label="Export File Name">[Default]</ExportFileName>

<TransmitBegin label="Transmit Begin"></TransmitBegin>

<TransmitEnd label="Transmit End"></TransmitEnd>

<SetEnd label="Set End"></SetEnd>

<ReplicateEnd label="Replicate End"></ReplicateEnd>

<FieldBegin label="Field Begin"></FieldBegin>

<FieldEnd label="Field End"></FieldEnd>

<SetBeginFields>

<Field name="Name" label="Name" />

<Field name="Type" label="Type" />

<Field name="Method" label="Method" />

<Field name="CR/LF" label="" />

</SetBeginFields>

<ReplicateFields>

<Field name="Carbon Mass" label="Carbon Mass" />

<Field name="Sulfur Mass" label="Sulfur Mass" />

<Field name="Carbon Concentration" label="Carbon Concentration" />

<Field name="Sulfur Concentration" label="Sulfur Concentration" />

<Field name="CR/LF" label="" />

</ReplicateFields>

<SetEndFields />

</Transport>

<Transport>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested Key ### not found.</ErrorMessage>

</Transport>

# Transports

This command retrieves general data about each transport on the instrument.

## Syntax

<Transports/>

## Reply

<Transports>

<Transport>

<Key>00000000000019D9</Key>

<Name label="Name">New Transport</Name>

<Description label="Description"></Description>

<LastUsed label="Last Used">01/01/0001 00:00:00</LastUsed>

<LastModified label="Last Modified">04/23/2014 14:05:13</LastModified>

<Excluded label="Excluded">False</Excluded>

</Transport>

</Transports>

# ValveStates

This command retrieves state of each valve state on the instrument.

## Syntax

<ValveStates/>

## Reply

<ValveStates >

<ValveState Name="Unknown" Active="False" />

<ValveState Name="Gas Off" Active="False" />

<ValveState Name="Oxygen Off HeAr On" Active="False" />

…

</ValveStates>

# Messages

This command returns the list of messages for the logged in user.

## Syntax

<Messages/>

## Reply

<Messages>

<Messages>

<Message>

<Id>#</Id>

<Type>…</Type>

<Label>…</Label>

<Date>…</Date>

<Data>…</Data>

<Message>…</Message>

</Message>

</Messages>

<TotalMessagesAvailable>#</TotalMessagesAvailable>

</Messages>

# MostRecentMessageId

This command returns the most recent message Id.

## Syntax

<MostRecentMessageId/>

## Reply

<MostRecentMessageId>#</MostRecentMessageId>

# NotificationSettings

This command returns the notification settings for the currently logged in user.

## Syntax

<NotificationSettings/>

## Reply

<NotificationSettings>

<Notification Id="#" Excluded="…" Frequency="…" FrequencyUnits="…" Label="…" Description="…">

<MobileAppMailbox>T/F</MobileAppMailbox>

<Email>T/F</Email>

<TextMessage>T/F</TextMessage>

</Notification>

…

</NotificationSettings>

# RemoveMessages

This command removes the specified messages for the logged in user.

## Parameters

**Id**: The unique key that identifies the specific message to remove. Leading zeroes may be omitted.

## Syntax

<RemoveMessages>

<Message Id="1234">

</RemoveMessages>

## Reply

<RemoveMessages>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</RemoveMessages>

# SaveNotificationSettings

This command sets the notifications settings for the current logged in user

## Syntax

<SaveNotificationSettings>

<Notification Id="#">

<MobileAppMailbox>T/F </MobileAppMailbox>

<Email>T/F</Email>

<TextMessage>T/F</TextMessage>

</Notification>

…

</SaveNotificationSettings>

## Reply

<SaveNotificationSettings>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</SaveNotificationSettings>

# SetReplicateNotification

This command sets the notification setting for the specified replicates to the specified value, either on (true) or off (false).

## Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

## Syntax

<SetReplicateNotification>

<Replicate SetKey="#" Tag="#" Notification="T/F"/>

…

</SetReplicateNotification>

## Reply

<SetReplicateNotification>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</SetReplicateNotification>

# AddSamples

This command creates new replicates to be added to an existing set or into a new set. This command will have a different behavior depending upon whether or not Cornerstone is in remote control mode. If the application is not in remote control mode, when this command is executed the Cornerstone operator will be alerted that new samples are being requested to be added remotely. Only when the user acknowledges this alert will the samples be added to Cornerstone. When Cornerstone is in remote control mode, the samples will be added immediately.

## Parameters: Add Replicates to an Existing Set

**SetKey**: The unique key that identifies the specific set into which new replicates will be added. Leading zeroes may be omitted.

## Parameters: Add Replicates to a New Set

Each parameter to apply to the new set is contained in an element named “Field”. The Field element should specify which parameter it is representing by the use of the “Id” attribute. Values for the field are specified as the value of the “Field” element. The common parameter “Id” values are described below. In order to specify a value for a user-defined field, the “Id” attribute should be given the identifier value of the field, which is contained in the “FieldIdentifier” element of the response to the Field or Fields command.

**SampleType**: The sample type of the set. Valid values are "Blank", "GasDose", "Sample" and "Standard".

**Name**: The name for the set. This parameter only applies for sets with sample types of "Blank" and "Sample". For other sample types this parameter is not used and can be omitted.

**Description**: The set description. This parameter is optional.

**MethodKey**: The unique key that identifies the specific method to assign to the set. Leading zeros may be omitted.

**StandardKey**: The unique key that identifies the specific standard to assign to the set. Leading zeros may be omitted. This parameter only applies for sets with sample types of "GasDose" and "Standard". For other sample types this parameter is not used and can be omitted.

## Parameters: Replicates

Each parameter to apply to the new set is contained in an element named “Field”. The Field element should specify which parameter it is representing by the use of the “Id” attribute. Values for the field are specified as the value of the “Field” element. The common parameter “Id” values are described below.

**Mass**: The replicate mass.

**Comments**: The replicate comments.

**Location**: The replicate location when using a shuttle loader automation system. This parameter is optional.

## Parameters: PromptOperatorForEntry

**PromptOperatorForEntry**: Indicates if the operator should be prompted to add the remotely added samples or if the remotely added samples should be added immediately. If this value is not specified, then the operator will be prompted and the samples will not be added until the operator acknowledges the prompt.

## Syntax: Add Replicates to an Existing Set

<AddSamples>

<PromptOperatorForEntry>True</PromptOperatorForEntry>

<SetKey>1234</SetKey>

<Replicates>

<Replicate>

<Field Id=”Mass”>1.1</Field>

<Field Id=”Comments”></Field>

<Field Id=”Location”></Field>

</Replicate>

<Replicate>

<Field Id=”Mass”>1.2</Field>

<Field Id=”Comments”></Field>

<Field Id=”Location”></Field>

<Field Id=”UDF: 1234”>User defined field value here</Field>

</Replicate>

</Replicates>

</AddSamples>

## Syntax: Add Replicates to a New Set

<AddSamples>

<PromptOperatorForEntry>True</PromptOperatorForEntry>

<Set>

<Field Id=”SampleType”></Field>

<Field Id=”Name”></Field>

<Field Id=”Description”></Field>

<Field Id=”MethodKey”>0</Field>

<Field Id=”StandardKey”>0</Field>

<Field Id=”UDF: 1111”>User defined field value here</Field>

</Set>

<Replicates>

<Replicate>

<Field Id=”Mass”>1.0</Field>

<Field Id=”Comments”></Field>

<Field Id=”Location”></Field>

<Field Id=”UDF: 1234”>User defined field value here</Field>

</Replicate>

<Replicate>

<Field Id=”Mass”>1.0</Field>

<Field Id=”Comments”></Field>

<Field Id=”Location”></Field>

<Field Id=”UDF: 1234”>User defined field value here</Field>

</Replicate>

</Replicates>

</AddSamples>

## Reply

The reply is immediate. A successful reply does not necessarily mean that the samples were actually added, if the PromptOperatorForEntry value was not specified or was specified with a value of True.

<AddSamples>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</AddSamples>

# Abort

This command aborts a sequence currently running on the instrument.

## Syntax

<Abort/>

## Reply

<Abort>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</Abort>

# Abort

This command aborts a sequence currently running on the instrument.

## Syntax

<Abort/>

## Reply

<Abort>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</Abort>

# AddQcRectifyTrigger

This command will insert a replicate to trigger the necessary blanks, check standards and calibration standards to be analyzed in order to bring QC for the specified method back into control. The inserted replicate will be marked as the next sample to be analyzed. Upon completion of the analysis of the QC blanks, check standards and calibration standards, the trigger replicate will not be analyzed, but rather will be marked as aborted.

If QC is not enabled or is already in control, then no trigger replicate will be added.

## Parameters

**MethodKey**: The unique key that identifies the method. Leading zeros may be omitted.

## Syntax

<AddQcRectifyTrigger MethodKey=”D3”/>

## Reply

<AddQcRectifyTrigger>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</AddQcRectifyTrigger>

Response when QC is not enabled or already in control.

<AddQcRectifyTrigger>

<ErrorCode>20</ErrorCode>

<ErrorMessage>QC rectification not required.</ErrorMessage>

</AddQcRectifyTrigger>

# Analyze

This command starts the analysis sequence.

## Syntax

<Analyze/>

## Reply

<Analyze>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</Analyze >

# AssignNextToAnalyze

This command specifies the next replicate to analyze. If the ReplicateTag attribute is omitted or the value left at the default (0), then the first unanalyzed replicate within the specified set will be marked as next to analyze.

## Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**ReplicateTag**: The identifier of the replicate within the set.

## Syntax

<AssignNextToAnalyze SetKey="1234"/>

<AssignNextToAnalyze SetKey="1234" ReplicateTag="1" />

## Reply

<AssignNextToAnalyze>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested ReplicateTag 1 not found.</ErrorMessage>

</AssignNextToAnalyze>

# ContinueAnalysis

This command continues the analysis sequence when Cornerstone has prompted the user to perform an action and indicate when analysis should continue.

## Syntax

<ContinueAnalysis/>

## Reply

<ContinueAnalysis>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</ContinueAnalysis>

# DeleteSamples

This command deletes the specified sets and replicates. Analyzed replicates must first be marked as "Excluded" before being deleted.

## Set Parameters

**Key**: The unique key that identifies the set. Leading zeros may be omitted.

## Replicate Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

## Syntax

<DeleteSamples>

<Set Key="1234"/>

</DeleteSamples>

<DeleteSamples>

<Replicate SetKey="1234" Tag="1"/>

</DeleteSamples>

## Reply

<DeleteSamples>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</DeleteSamples>

<DeleteSamples>

<ErrorCode>16</ErrorCode>

<ErrorMessage>Cannot delete samples that are not excluded: SetKey:1234 Tag:1.</ErrorMessage>

</DeleteSamples>

# ExcludeSamples

This command marks the specified sets and replicates as excluded.

## Set Parameters

**Key**: The unique key that identifies the set. Leading zeros may be omitted.

## Replicate Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

## Syntax

<ExcludeSamples>

<Set Key="1234"/>

</ExcludeSamples>

<ExcludeSamples>

<Replicate SetKey="1234" Tag="1"/>

</ExcludeSamples>

## Reply

<ExcludeSamples>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</ExcludeSamples>

# IncludeSamples

This command marks the specified sets and replicates as included.

## Set Parameters

**Key**: The unique key that identifies the set. Leading zeros may be omitted.

## Replicate Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

## Syntax

<IncludeSamples>

<Set Key="1234"/>

</IncludeSamples>

<IncludeSamples>

<Replicate SetKey="1234" Tag="1"/>

</IncludeSamples >

## Reply

<IncludeSamples>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</IncludeSamples>

# InvalidateQCComponent

Resets the specified portion of quality control in order to it to be rectified the next time quality control runs.

## Parameters

**MethodKey**: The unique key that identifies the method. Leading zeros may be omitted.

**Component**: The quality control component to reset. Valid values are:

* “Blanks”
* “Checks”
* “All” – resets both Blanks and Checks.

## Syntax

<InvalidateQCComponent MethodKey="D3" Component=”All”/>

## Reply

<InvalidateQCComponent>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</InvalidateQCComponent>

# ModifySamples

This command modifies the values of fields in sets and in replicates.

## Set Parameters

**Key**: The unique key that identifies the set. Leading zeros may be omitted.

**Field Id**: Valid values include: Description.

## Replicate Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

**Field Id**: Valid values include: Comments.

## Syntax

<ModifySamples>

<Set Key="1234"/>

<Field Id="Description">My Description</Field>

</ModifySamples>

<ModifySamples>

<Replicate SetKey="1234" Tag="1"/>

<Field Id="Comments">My Comments</Field>

</ModifySamples >

## Reply

<ModifySamples>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</ModifySamples>

<ModifySamples>

<ErrorCode>10</ErrorCode>

<ErrorMessage>Missing attribute {} in element {}.</ErrorMessage>

</ModifySamples>

<ModifySamples>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested {} {} not found.</ErrorMessage>

</ModifySamples>

<ModifySamples>

<ErrorCode>19</ErrorCode>

<ErrorMessage>Missing element {}.</ErrorMessage>

</ModifySamples>

# PauseSamples

This command modifies the paused state of the specified replicates.

## Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

**Paused**: Valid values are "ManuallyPaused" and "NotPaused".

## Syntax

<PauseSamples>

<Replicate SetKey="1234" Tag="1" Paused="ManuallyPaused"/>

</PauseSamples>

## Reply

<PauseSamples>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</PauseSamples>

# PerformInstrumentAction

This command performs the specified action on the instrument.

## Parameters

**Action**: Indicates the action to perform on the instrument. If this parameter is not provided or the value is blank, the list of available actions is returned. Some of the valid actions are: Clean, TogglePedestal, SystemLeakcheck, SegmentedLeakcheck, PneumaticLeakcheck, SystemCheck, and Vacuum.

## Syntax

<PerformInstrumentAction Action="Clean"/>

## Reply

<PerformInstrumentAction>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success.</ErrorMessage>

<Actions>

<Action>Clean</Action>

<Action>TogglePedestal</Action>

<Action>SystemLeakcheck</Action>

<Action>SegmentedLeakcheck</Action>

<Action>PneumaticLeakcheck</Action>

<Action>SystemCheck</Action>

<Action>Vacuum</Action>

</Actions>

</PerformInstrumentAction>

<PerformInstrumentAction>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</PerformInstrumentAction>

<PerformInstrumentAction>

<ErrorCode>7</ErrorCode>

<ErrorMessage>Unable to execute command because the hardware is in use.</ErrorMessage>

</PerformInstrumentAction>

<PerformInstrumentAction>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested Action Xyz not found.</ErrorMessage>

</PerformInstrumentAction>

# RecalcSamples

This command performs a recalculation on the specified sets and replicates.

## Set Parameters

**Key**: The unique key that identifies the set. Leading zeros may be omitted.

## Replicate Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

## Syntax

<RecalcSamples>

<Set Key="1234"/>

</RecalcSamples>

<RecalcSamples>

<Replicate SetKey="1234" Tag="1"/>

</RecalcSamples>

## Reply

<RecalcSamples>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</RecalcSamples>

# ResetCounter

This command performs a reset on the counter corresponding to the specified key.

## Parameters

**Key**: The unique key that identifies the specific counter on which a reset will be performed. Leading zeros may be omitted.

## Syntax

<ResetCounter Key="1234"/>

## Reply

<ResetCounter>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</ResetCounter>

<ResetCounter>

<ErrorCode>10</ErrorCode>

<ErrorMessage>Missing attribute Key in element ResetCounter.</ErrorMessage>

</ResetCounter>

<ResetCounter>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested Key 1234 not found.</ErrorMessage>

</ResetCounter>

# ResetCounters

This command performs a reset on all counters.

## Syntax

<ResetCounters/>

## Reply

<ResetCounters>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</ResetCounters>

# SetGasState

This command sets the gas state on the Cornerstone instrument to the specified state.

## Parameters

**State**: Gas state to set on instrument. Valid values are "ON", "OFF", and "CONSERVE".

## Syntax

<SetGasState State="ON" />

## Reply

<SetGasState>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</SetGasState>

<SetGasState>

<ErrorCode>8</ErrorCode>

<ErrorMessage>Command currently unavailable.</ErrorMessage>

</SetGasState>

<SetGasState>

<ErrorCode>9</ErrorCode>

<ErrorMessage>Parameter State contained an unknown value. Use ON/OFF/CONSERVE instead.</ErrorMessage>

</SetGasState>

<SetGasState>

<ErrorCode>10</ErrorCode>

<ErrorMessage>Missing attribute State in element SetGasState.</ErrorMessage>

</SetGasState>

<SetGasState>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested State X not found.</ErrorMessage>

</SetGasState>

# TransmitSamples

This command transmits the specified set and replicate data using the specified transport.

## Parameters

**Key**: The unique key that identifies the transport. Leading zeros may be omitted.

## Set Parameters

**Key**: The unique key that identifies the set. Leading zeros may be omitted.

## Replicate Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

## Syntax

<TransmitSamples Key="5678">

<Set Key="1234"/>

</TransmitSamples >

<TransmitSamples Key="5678">

<Replicate SetKey="1234" Tag="1"/>

</TransmitSamples >

## Reply

<TransmitSamples>

<ErrorCode>0</ErrorCode>

<ErrorMessage>Success</ErrorMessage>

</TransmitSamples>

<TransmitSamples>

<ErrorCode>10</ErrorCode>

<ErrorMessage>Missing attribute Key in element ResetCounter.</ErrorMessage>

</TransmitSamples>

<TransmitSamples>

<ErrorCode>11</ErrorCode>

<ErrorMessage>Requested Key 1234 not found.</ErrorMessage>

</TransmitSamples>

# Error Codes

|  |  |
| --- | --- |
| **Error code** | DESCRIPTION |
| 0 | None. |
| 1 | An unknown command was received which Cornerstone does not recognize. |
| 2 | Another user is currently logged-on to Cornerstone. |
| 3 | Log on attempt failed; either user name or password is incorrect. |
| 4 | Received data was not in XML format and therefore could not be parsed. |
| 5 | Execution of command requires user to be logged on. |
| 6 | An exception has occurred. The ErrorMessage element will contain the exception description. |
| 7 | The current remote control state of Cornerstone does not allow the supplied command to be executed. |
| 8 | The current state of Cornerstone does not allow the supplied command to be executed. The ErrorMessage element will contain further details. |
| 9 | Command contained unknown parameters. The ErrorMessage element will contain further details. |
| 10 | One or more command attributes were not supplied. The ErrorMessage element will contain further details. |
| 11 | The requested data item (i.e. a set, a counter, a method, etc.) was not found. |
| 12 | General error. The ErrorMessage element will contain further details. |
| 13 | User does not have permission to execute requested command. |
| 14 | Unable to delete item as it is referenced by other items. |
| 15 | Unable to modify sample field because field is not editable. |
| 16 | Cannot delete samples that are not excluded. |
| 17 | Cannot delete samples that are being analyzed. |
| 18 | Cannot delete samples that are being loaded. |
| 19 | One or more command elements were not supplied. The ErrorMessage element will contain further details. |
| 20 | Quality Control rectification not required. |
| 21 | Complete command data not received within timeout period. |