

*Keeping the Lab in Control  
Using  
Control Charts*

# What is Meant by “In Control”



- Consistently generating data of known quality
- Consistently meeting Data Quality Objectives

# What is “*Control Charting*”



- Compare current to past performance
- Based on past *bias* and *precision*
- Monitor for “out-of-control” situations
- Watch for trends (good or bad)

# What Can Be “*Control Charted*”

- Any measurement that is *repeated often*
- Example: Glucose/Glutamic Acid BOD Standard
  - Analyze G/GA standard several times
  - Compute “average” and “standard deviation”
  - Compare to published data quality objective
  - “Average” is indication of *bias*
  - “Standard Deviation” is indication of *precision*

# Example: G/GA BOD Standard

- You analyze G/GA 20 times  
200, 192, 201, 185, 204, 210, 195, 200,  
189, 203, 211, 208, 197, 185, 189, 201,  
200, 190, 189, 187
  - Mean (average) is 197 mg/L
  - Standard deviation is 8.2 mg/L

# Example: G/GA BOD Std (Cont'd)

- Compare average and std deviation to published data quality objective---*Std Method 5210 B* says...
  - Average should be ~198 mg/L (197 mg/L is OK)
  - Standard deviation should be <<30.5 mg/L (8.2 mg/L is OK)

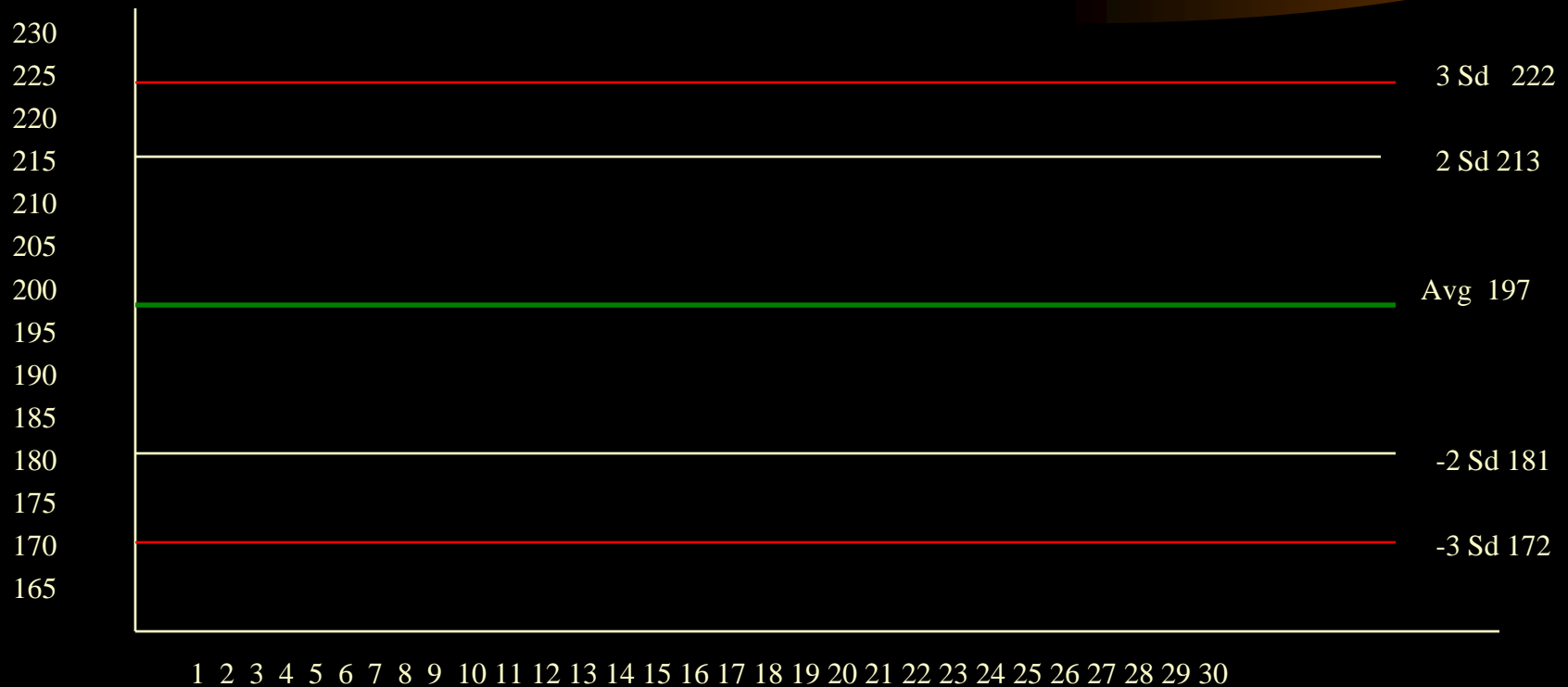
## Example: G/GA BOD Std (Cont'd)

- 197 mg/L avg, 8.2 std deviation “good enough”
- Construct “control chart”---central line based on avg - 197 mg/L
- Upper and lower warning and action limits based on 2 and 3 standard deviations on each side of central line
- Subsequent G/GA results are plotted on chart
- Chart then used to watch for trends (good or bad)

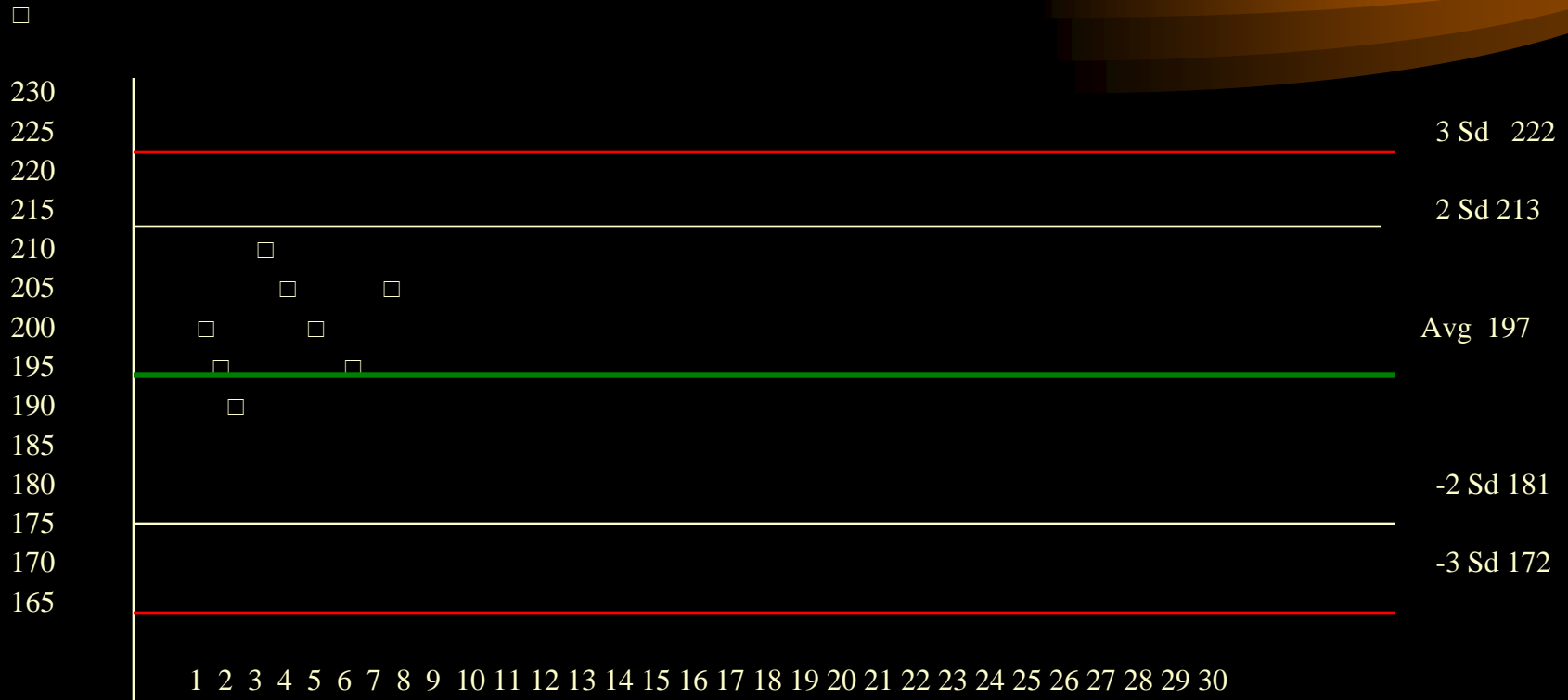
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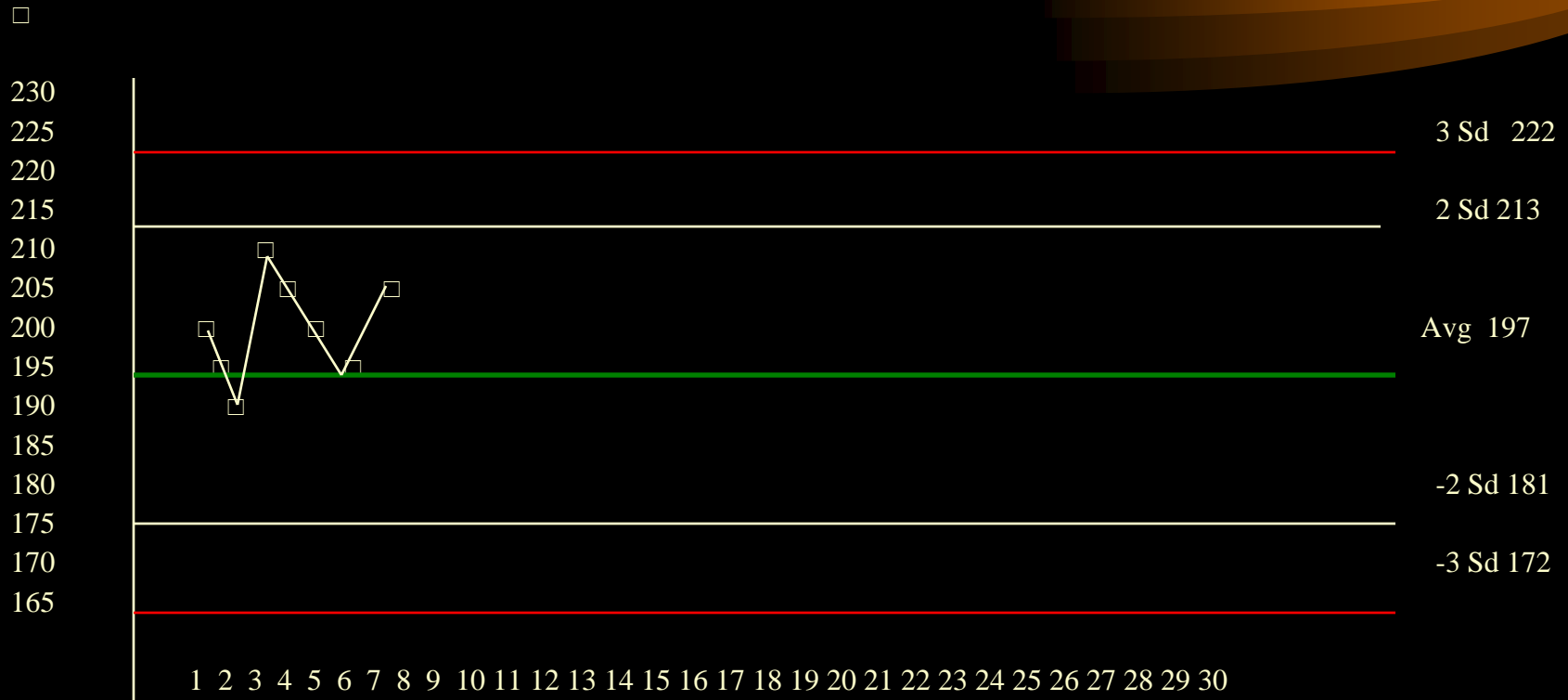
# Building the Chart



# Using the Chart



# Using the Chart



200, 198, 185, 211, 205, 200, 189, 200, .....from previous chart

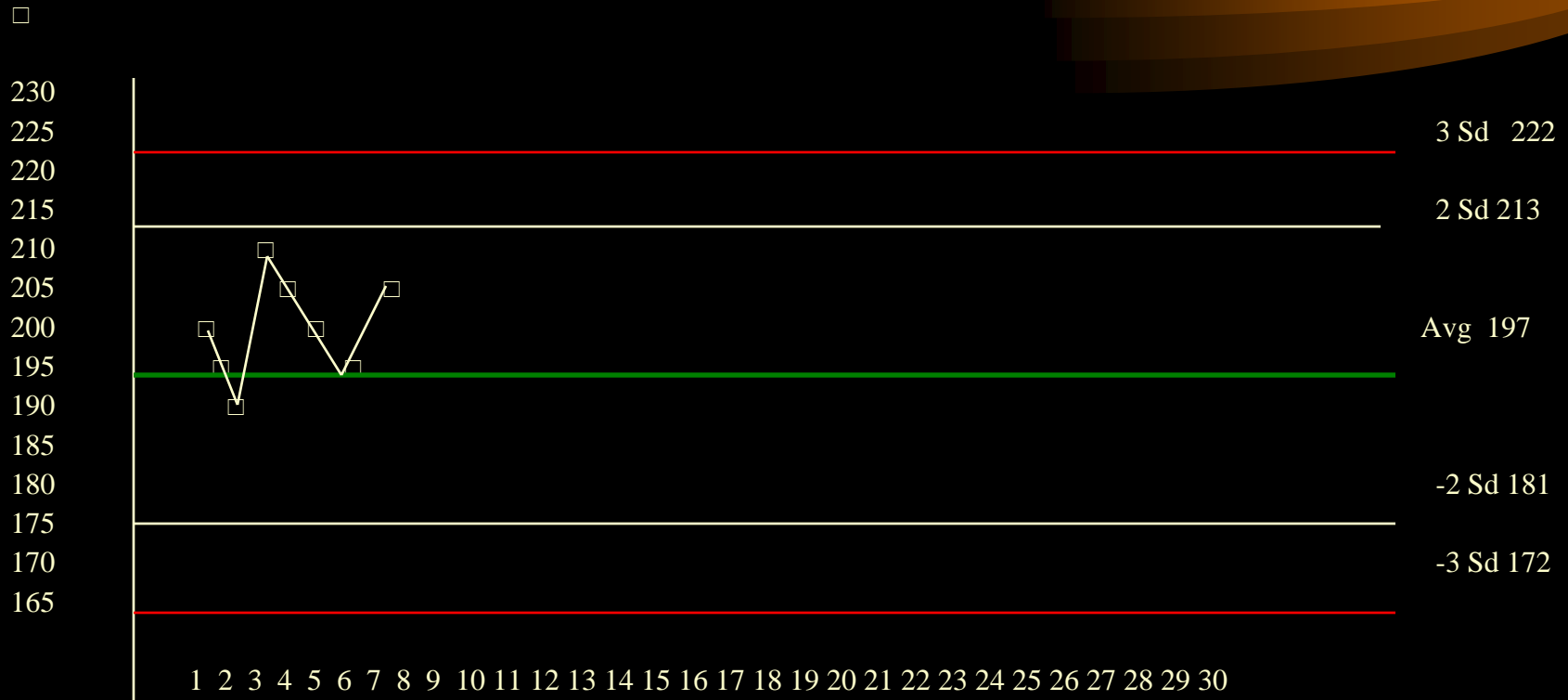
# *Data Quality – But is it REALLY “good?”*

## GGA Results

<u>Date</u>		<u>Date</u>		<u>Date</u>	
5/3	200	7/12	195	9/20	182
5/10	198	7/19	199	9/27	185
5/17	185	7/26	205	10/4	190
5/24	211	8/02	187	10/11	165
5/31	205	8/09	189		
6/7	200	8/16	201		
6/14	189	8/23	196		
6/21	206	8/30	200		
6/28	189	9/6	189		
7/5	200	9/13	189		

control charting  
would have  
predicted failure

# Using the Chart



200, 198, 185, 211, 205, 200, 189, 200, .....from previous chart

# Using the Chart



*But there must be  
a better way.....*