Control charts….Who needs them?

Presented by:

AllMax Software, Inc.

We all do!!

Today we will be looking at how a database that is used to track, store and calculate not only data used for reporting, but the data that is used to create control charts for your lab. We will also look at the process of exporting and uploading the monthly reports to the state's eBIZ site.

What is a Control Chart?

Control charting is a means of visually tracking performance to determine when a procedure is not meeting data quality objectives. Control charts indicate when a procedure is headed out of control so the analyst can pause, eliminate the source of the problem, and prevent the out-of-control situation.

Control Chart Definitions & Formulas

- UWL = Upper Warning Limits

Control Chart Definitions & Formulas

- UWL = Upper Warning Limits

Average of the Values + (2 * Standard Deviation of the Values)

2 * Standard Deviation of the Difference of the Values

Control Chart Definitions & Formulas

- UWL = Upper Warning Limits
- UAL = Upper Action Limits

Control Chart Definitions & Formulas

- UAL = Upper Action Limits

Average of the Values + (3 * Standard Deviation of the Values)

3 * Standard Deviation of the Difference of the Values

Control Chart Definitions & Formulas

- UWL = Upper Warning Limits
- UAL = Upper Action Limits
- LWL = Lower Warning Limits

Control Chart Definitions & Formulas

- LWL = Lower Warning Limits

Average of the Values - (2 * Standard Deviation of the Values)

-2 * Standard Deviation of the Difference of the Values

Control Chart Definitions & Formulas

- UWL = Upper Warning Limits
- UAL = Upper Action Limits
- LWL = Lower Warning Limits
- LAL = Lower Action Limits

Control Chart Definitions & Formulas

- LAL = Lower Action Limits

Average of the Values - (3 * Standard Deviation of the Values)

-3 * Standard Deviation of the Difference of the Values

Control Chart Definitions & Formulas

- UWL = Upper Warning Limits
- UAL = Upper Action Limits
- LWL = Lower Warning Limits
- LAL = Lower Action Limits

These values are used as constants on the chart.

Nitrate Check Standard Control Chart:

Results for the nitrate samples are entered into the database.

For our example these values span over a month time period.

Nitrate Check Standard Control Chart:

Calculations for UWL, UAL, LWL and LAL are done using the nitrate Standard Deviation result.
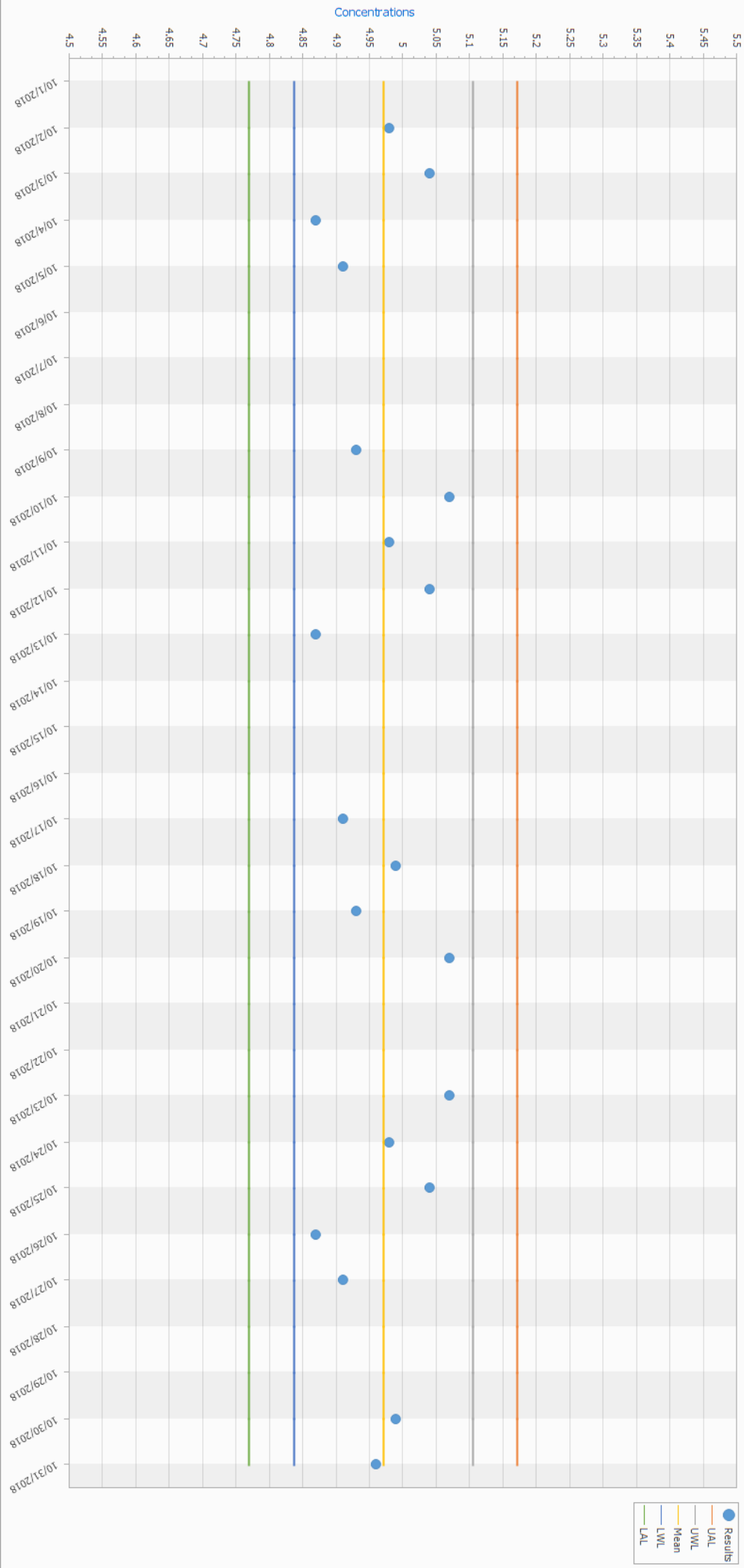
Nitrate Check Standard Control Chart:

Total of Sample Value / # of Samples = Average

99.41 / 20 = 4.97

Standard Deviation = 0.07

- UWL   4.97 + (2 * 0.07) = 5.10
- UAL   4.97 + (3 * 0.07) = 5.17
- LWL   4.97 – (2 * 0.07) = 4.84
- LAL   4.97 – (3 * 0.07) = 4.77

Nitrate Check Standard

TSS Duplicate Control Chart:

Results for the TSS samples and the TSS duplicates are entered into the database.

For our example these values span over a month time period.

TSS Duplicate Control Chart:

A calculation is done to get the difference between the TSS sample and the TSS duplicate.

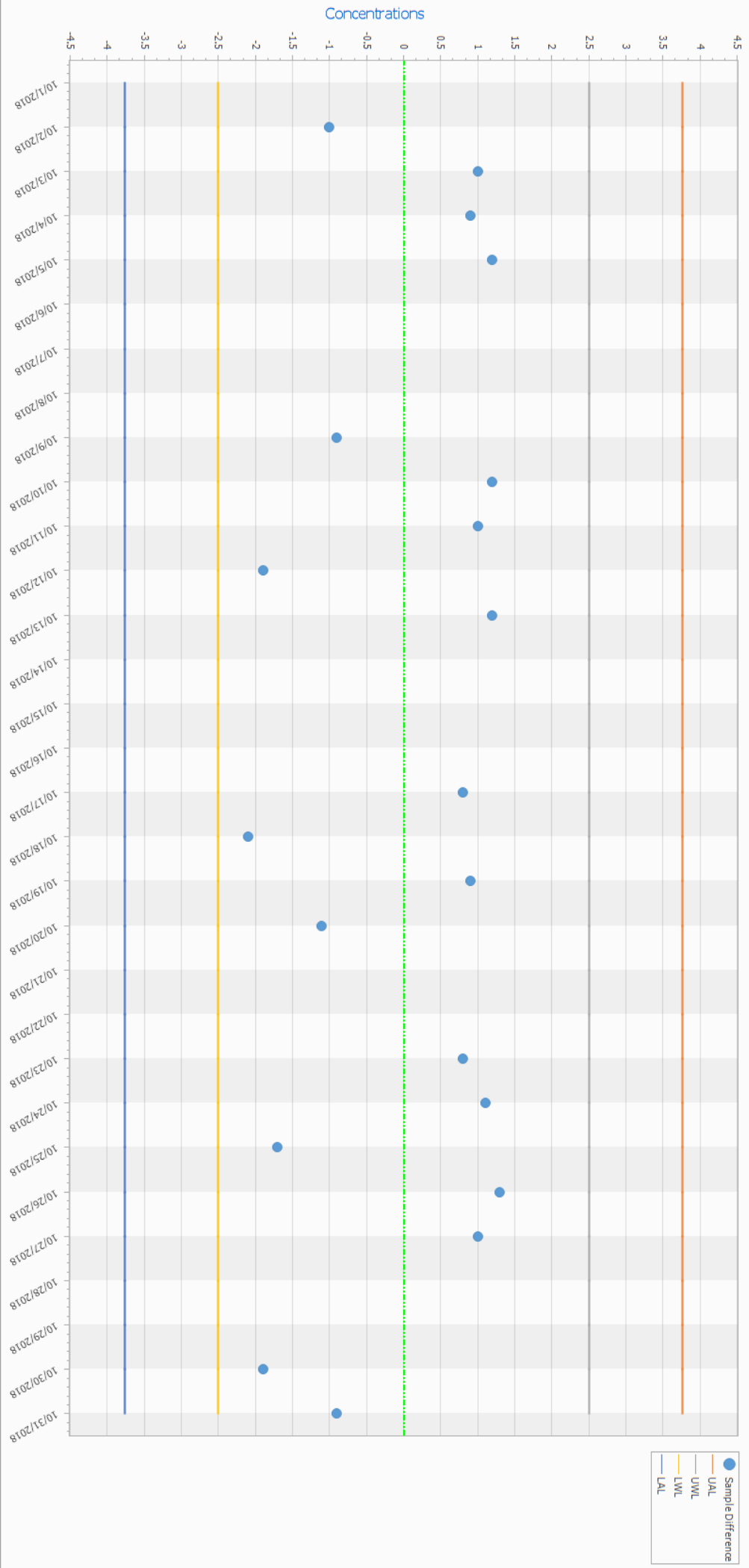Example: (Sample 1 Result – Duplicate 1 Result = Difference)

3.10 – 4.10 = -1.00

Calculations for UWL, UAL, LWL and LAL are done using the Difference Standard Deviation result.

TSS Duplicate Control Chart:

Standard Deviation = 1.25

- UWL   2 * 1.25 = 2.51
- UAL   3 * 1.25 = 3.76
- LWL   – 2 * 1.25 = – 2.51
- LAL   – 3 * 1.25 = – 3.76

TSS Duplicate Samples

Reviewing the Control Chart:

Possible areas to look at include, but are not limited to:

- Reviewing data for calculation errors
- Making fresh standards
- Inspecting equipment & reviewing logs for equipment issues, & performing maintenance
- Verifying that the analysis was analyzed by SOP protocol
- Reanalyzing sample & its associated QC
- Discarding sample (if sample is found to be mishandled), & collect & analyze new sample

What's Next?

eDMR Submittal:

Once laboratory results, flow values and all other information needed for the monthly reports are entered into the database, you are now ready to prepare and submit them.

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📄 Create New Reports
📝 Edit an Open Report
📋 Submittals/Revisions

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- **Discharge Monitoring > Create New Reports**
  Use this screen to start a new DMR. Blank DMRs are generated each monitoring period and listed below with status "NEW". Past DMRs are also listed with status "Open" or "Submitted".

Search Panel

Permit Number	Facility Name	Report Type	Report Frequency	Report Date	Status	Due Date	Online Entry	XML	Excel	View Form
1PE00003*PD	Middletown WWTP	4500	Monthly	11/01/2018 - 11/30/2018	NEW	12/20/2018	✏️	📄	📊	◈
1PK00003*MD	Beavercreek WRRF	4500	Monthly	11/01/2018 - 11/30/2018	NEW	12/20/2018	✏️	📄	📊	◈
1PE00003*PD	Middletown WWTP	4500	Monthly	10/01/2018 - 10/31/2018	NEW	11/20/2018	✏️	📄	📊	◈
1PK00003*MD	Beavercreek WRRF	4500	Monthly	10/01/2018 - 10/31/2018	NEW	11/20/2018	✏️	📄	📊	◈

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NOTE: The file will be named "requirement_543724"

NOTE: *The file will be named "requirement_ 543724"*

```xml
<?xml version="1.0" encoding="UTF-8"?>
- <eDMR>
  - <MetaData>
      <SchemaIdentification>e-DMR Schema version 1.2</SchemaIdentification>
      <SchemaDescription>e-DMR Work Group Schema version 1.2</SchemaDescription>
      <SchemaPurpose>Electronic Discharge Monitoring Report submissions</SchemaPurpose>
      <SchemaVersion>1.2</SchemaVersion>
      <SchemaCreateBy>e-DMR XML Schema Work Group</SchemaCreateBy>
      <SchemaCreateDate>2002-02-28</SchemaCreateDate>
      <SchemaLastUpdateBy>e-DMR XML Schema Work Group</SchemaLastUpdateBy>
      <SchemaLastUpdateDate>2003-10-20</SchemaLastUpdateDate>
      <SchemaContactInformation>leopard.matthew@epa.gov, and Edmr_support@enfotech.com </SchemaContactInformation>
  </MetaData>
  - <Receiver>
      <AgencyName>Ohio EPA</AgencyName>
      <ReceivercontactName>EDMR Administrator</ReceivercontactName>
      <ReceivercontactTitle>EDMR Administrator</ReceivercontactTitle>
    - <ReceiverMailAddress>
        <MailingAddressText/>
        <SupplementalAddressText/>
        <MailingAddressCityName/>
        <MailingAddressStateUSPSCode>OH</MailingAddressStateUSPSCode>
        <MailingAddressStateName/>
        <MailingAddressCountryName/>
        <MailingAddressZIPCode/>
    </ReceiverMailAddress>
  </Receiver>
```

Produce and Export Reports:

Produce Reports

Report Date: 9/1/2018 ... 🔄 Fetch Data

Report Name	Report Type	Report Description	Selected	Status	Verify Data	Print	Export
			☑			☑	☑
001 Final (SUMMER ONLY)	Ohio_4500	Ohio 4500	☑	OK		☑	☑
001 Final Pg 1 (ALL MONTHS)	Ohio_4500	Ohio 4500	☑	OK		☑	☑
001 Final Pg 2 (ALL MONTHS)	Ohio_4500	Ohio 4500	☑	OK		☑	☑
588 Sludge (ALL MONTHS)	Ohio_4500	Ohio 4500	☑	OK		☑	☑
601 Influent (ALL MONTHS)	Ohio_4500	Ohio 4500	☑	OK		☑	☑
801 Upstream (ALL MONTHS)	Ohio_4500	Ohio 4500	☑	OK		☑	☑
801 Upstream (SUMMER ONLY)	Ohio_4500	Ohio 4500	☑	OK		☑	☑
901 Downstream (ALL MONTHS)	Ohio_4500	Ohio 4500	☑	OK		☑	☑
901 Downstream (SUMMER ONLY)	Ohio_4500	Ohio 4500	☑	OK		☑	☑

Number of Reports: 9 (9 selected)

Adding Operator Hours to eDWR:

Under "**Comments**," next to the appropriate date, enter the **professional operator of record's full name** (initials are unacceptable) and a comma, **professional operator certification number** and a comma. Add the **time in (in military time)** and a comma. Add the **time out** (in military time) and a comma. Finally enter the **total hours the professional operator spent onsite at the facility.** Enter as many professional operators as needed to accurately reflect staffing levels on a given date. For distribution system visits add a comma after the last total hours entry and add the professional certified operators certificate number who performed the visit. You may save and resume your work at any time, but only one report may be submitted by the professional operator of record for each reporting period. Submitting a report multiple times will overwrite previously submitted reports and potentially misreport staffing information to the database.

> **Examples:**
> operator of record's full name, operator certification number, time in, time out, total hours

- Ty Law,WS3-12345678-18,0800,1100,3,Mo Hall,WS3-11111111-67,1300,1800,5
- Ty Law,WS3-12345678-18,0800,1600,8

Produce and Export Reports:

Produce Reports

Report Date: 9/1/2018   🔄 Fetch Data

For water facilities

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001 Final (SUMMER ONLY)	Ohio_4500	Ohio 4500	☑	OK		☑	☑
001 Final Pg 1 (ALL MONTHS)	Ohio_4500	Ohio 4500	☑	OK		☑	☑
001 Final Pg 2 (ALL MONTHS)	Ohio_4500	Ohio 4500	☑	OK		☑	☑
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801 Upstream (SUMMER ONLY)	Ohio_4500	Ohio 4500	☑	OK		☑	☑
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901 Downstream (SUMMER ONLY)	Ohio_4500	Ohio 4500	☑	OK		☑	☑

Number of Reports: 9 (9 selected)

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901 Downstream (SUMMER ONLY)	Ohio_4500	Ohio 4500	☑	OK		☑	☑

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Adding Operator Hours to eDMR:

To meet the new Operator Recordkeeping requirements of OAC 3745-7-09 that went effective in August 2018, the 4 parameters below, need added to the waste water eDMR in the lowest-numbered outfall (ex. 001) each month.

Parameter Code	Parameter Name	Format
79858	Plant Core Person ID*	middle 7 digits of operator's certificate #
82073	Plant Time In	Military time HHMM without ":"
82074	Plant Time Out	Military time HHMM without ":"
79859	Collection System Visit Core Person ID+	middle 7 digits of operator's certificate #

*operator of record who fulfilled the minimum staffing requirement for the day

+operator who conducted the collection system visit on that day

Additional Documentation/Instructions:

Wastewater eDMR:

https://epa.ohio.gov/Portals/35/edmr/doc/eDMR-OperatorHours.pdf

Water eDWR:

https://epa.ohio.gov/Portals/28/documents/reporting/edwr-OperatorHours.pdf

Conclusion:

In summary, preparing charts and reports are an important part of a laboratory and our jobs as operators.

Make sure you have the tools needed to make your job easy. Use what is best for you.

Remember: work smarter, not harder.

Thank You!