

Laboratory Data MDLs/PQLs

Florida Department of Environmental
Protection

Pretreatment Program

March 20, 2009



Why Do We Sample?

- “Protect physical, chemical, and biological integrity” (Clean Water Act)
- Surface water, ground water, and residuals quality
- Permit compliance (IU and CA)



How Do You Measure an Analyte?

- Collect sample
- Prepare sample
- Calibrate equipment
- Measure analyte
- Compare analyte measurement to known standard
 - Run quality control samples



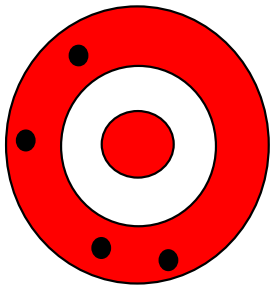
Lab Measurements

- There are many different methods to measure various types of analytes.
- Each method has specific quality control requirements to assure valid measurements.
- Refer to Rule 62-4.246, F.A.C.
- Refer to Department's SOPs
<http://www.dep.state.fl.us/labs/sop/index.htm>

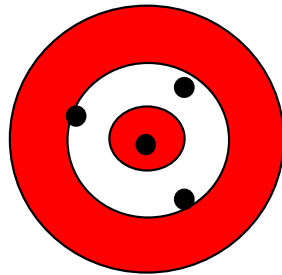


Precision and Accuracy

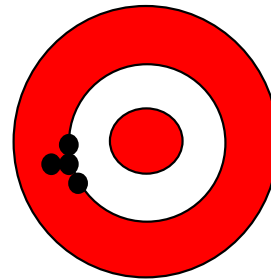
- Data needs to be both precise and accurate.
 - Precision: Consistency of measurements.
 - Accuracy: The ability to measure the “true” value.



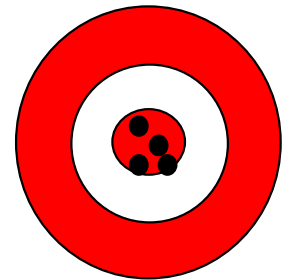
Poor precision,
Poor accuracy



Poor precision,
Good accuracy



Good precision,
Poor accuracy



Good precision,
Good accuracy



Data Quality

- DEP must verify that data are useable.
 - Consistent with target MDLs and PQLs found in Rule 62-4.246(3), F.A.C.
- Results need to be “real”
 - If result is higher than reported
 - environment is not protected
 - If result is lower than reported
 - costly, unnecessary treatment
- DEP has Statutory Authority to reject data

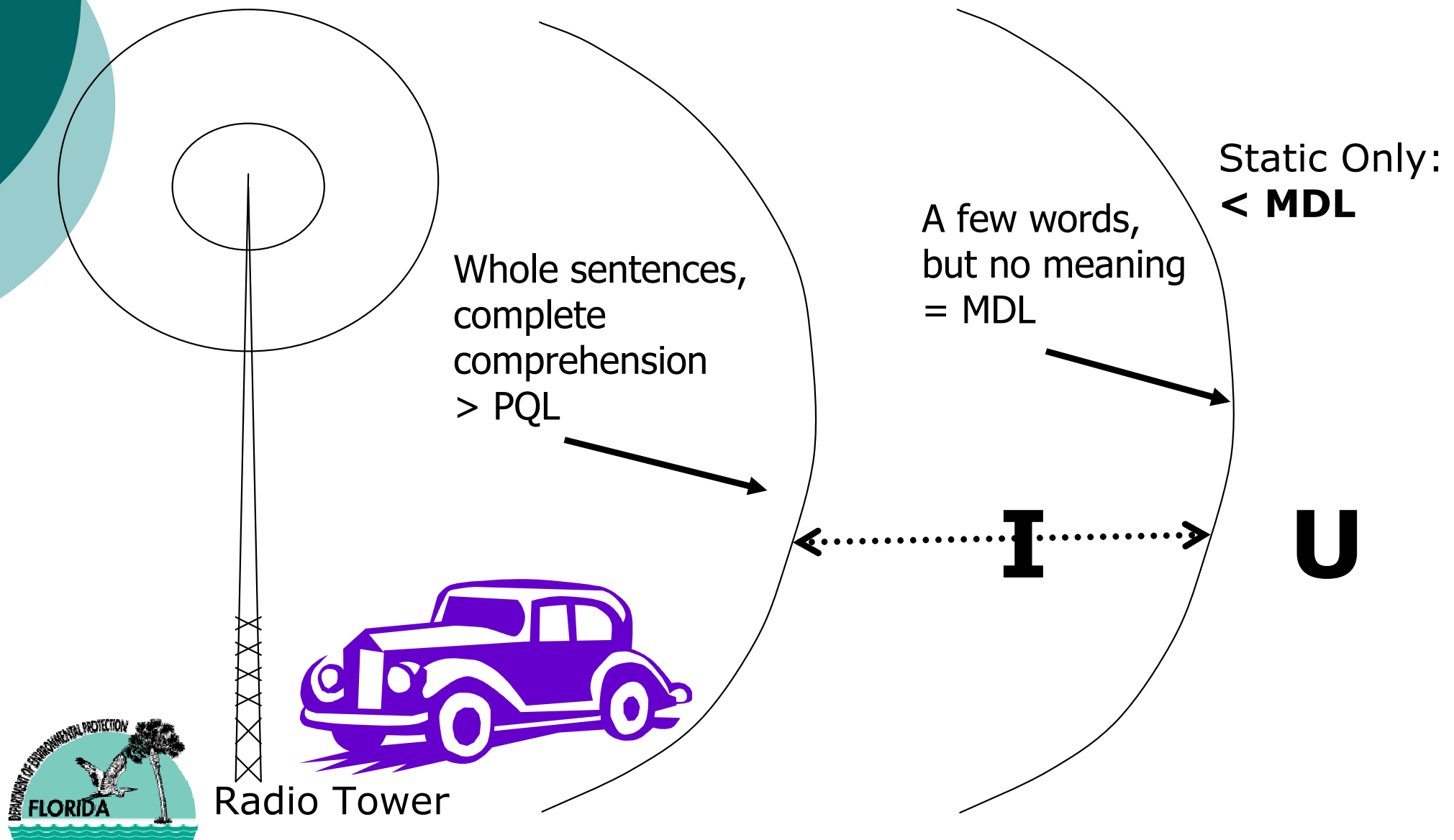


Definitions

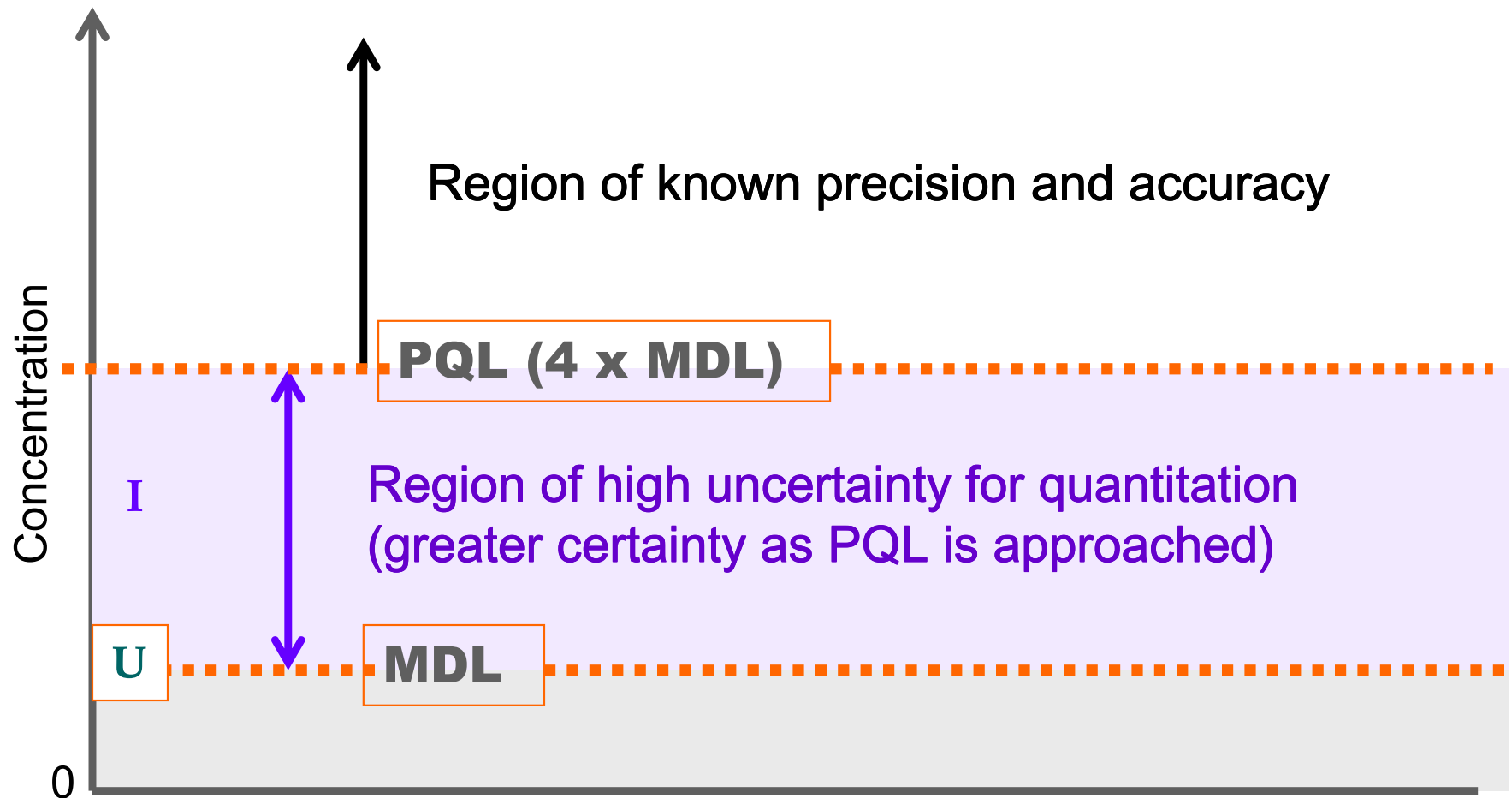
- Minimum Detection Limit (MDL): An estimate of the minimum amount of a substance that an analyte process can reliably detect. An MDL is analyte –specific and matrix-specific and laboratory dependent.
- Practical Quantitation Limit (PQL): The lowest level of measurement that can be reliably achieved during routine laboratory operating conditions within specified limits of precision and accuracy.



MDL/PQL Radio Reception Analogy



MDL/PQL Relationship



MDL as an Estimate of a Lab's Ability to Detect (not quantitate) at the MDL concentration

Detection Limit Values

- “U” Values > Permit Limits?
 - Method may not be appropriate; Use more sensitive method (if available)
 - Matrix interference or dilution may contribute to an elevated detection limit
- “I” Values Near Permit Limits
 - Compliance Issue? May require additional testing to resolve

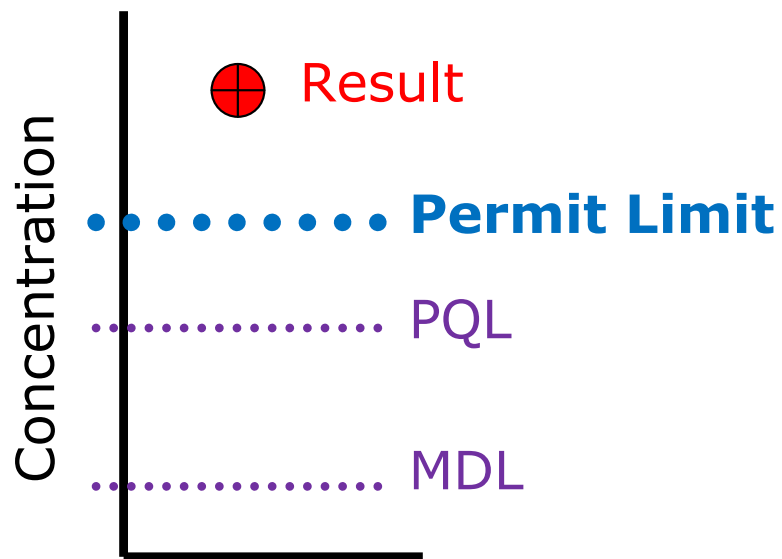


Discharge Monitoring Reports PQL, MDL and Compliance

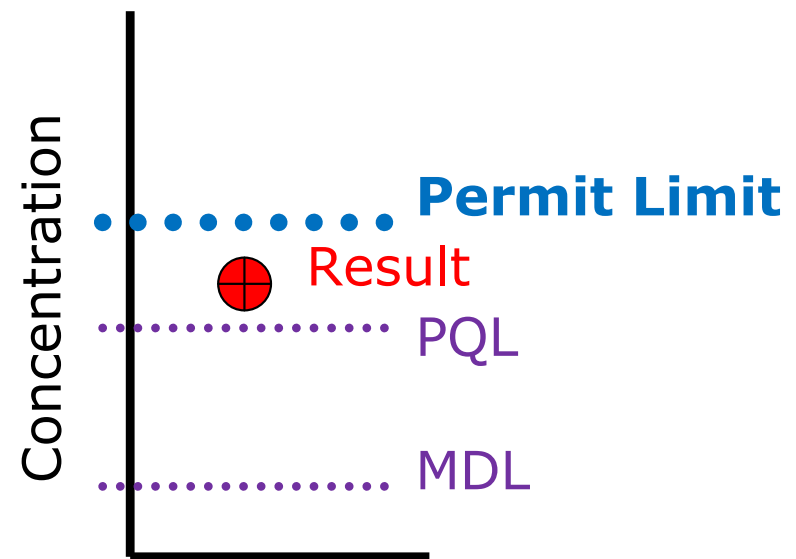
- Results \geq PQL are reported as measured
- Results $<$ PQL and \geq MDL shall be deemed as equal to the MDL and reported as such
- Results $<$ MDL shall be reported as the MDL preceded by the less than sign (" $<$ ")



Reporting Compliance: Examples



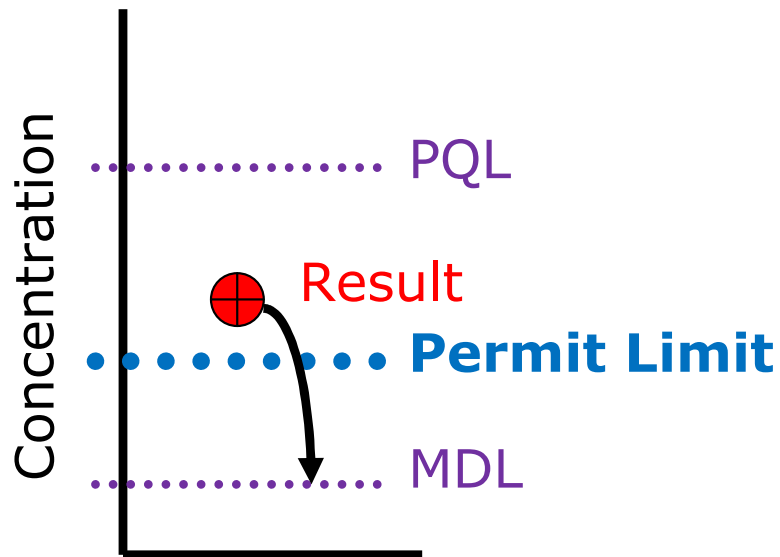
Non-Compliance



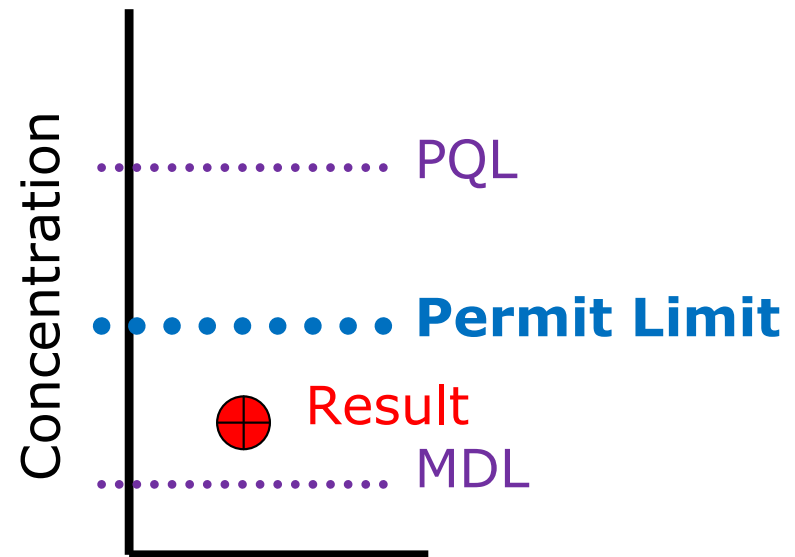
Compliance



Reporting Compliance: Examples



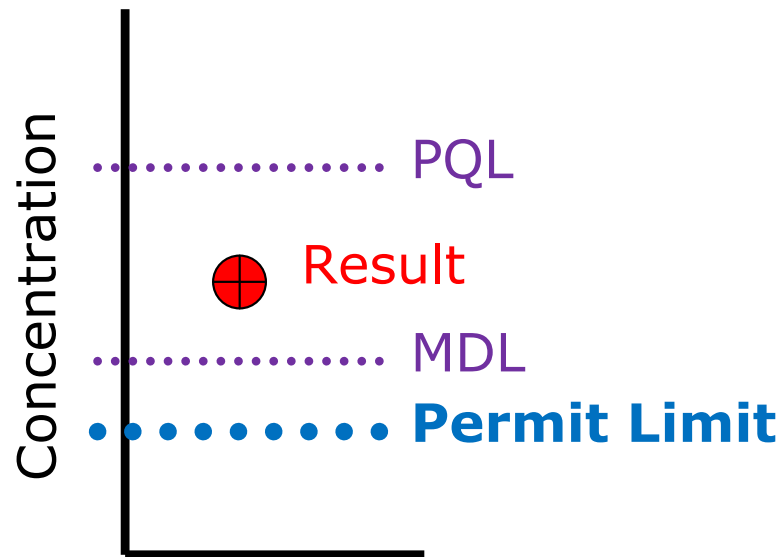
Compliance
(Results < PQL are
deemed = MDL)



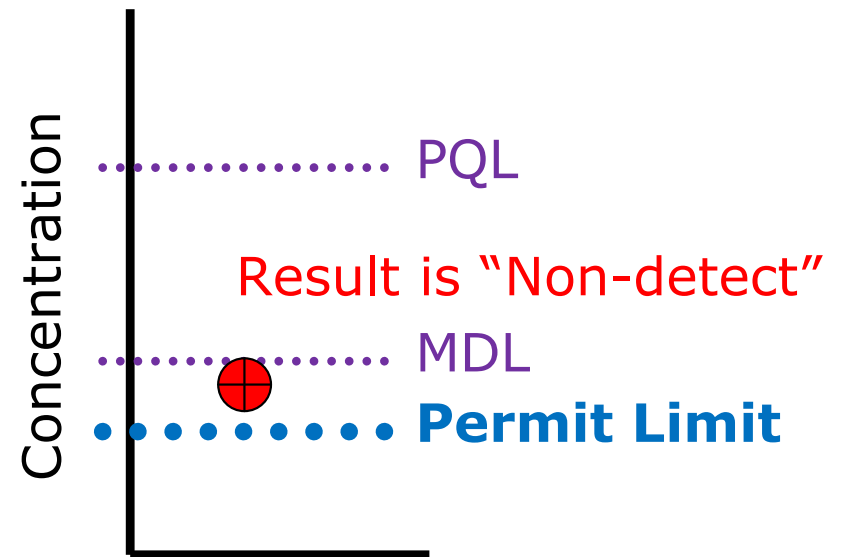
Compliance



Reporting Compliance: Examples



Non-Compliance



Compliance



Questions?

- Rule 62-4.246, F.A.C.
www.dep.state.fl.us/labs/docs/mdl_pql_guide.pdf
- Rule 62-160, F.A.C.
[www.dep.state.fl.us/legal/**Rules**/general/62-160/62-160.pdf](http://www.dep.state.fl.us/legal/Rules/general/62-160/62-160.pdf)
- Department's SOPs
<http://www.dep.state.fl.us/labs/sop/index.htm>

