Ghidorah 3: Achieving Efficiency in A Laboratory Information Management System (LIMS)

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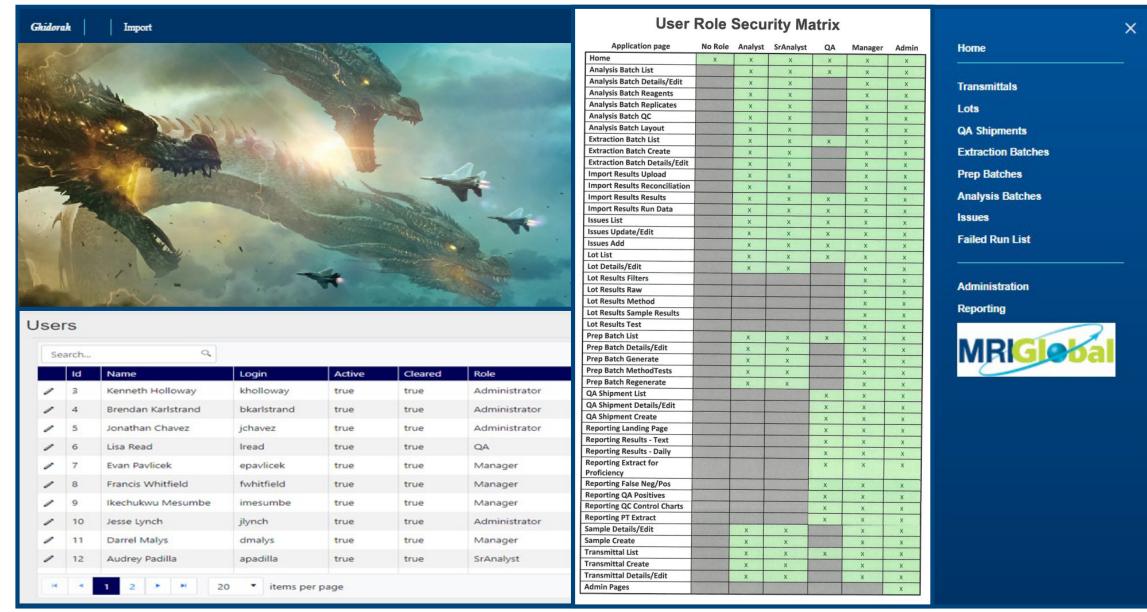*Gaithersburg, MD*

MRIGlobal

Introduction

In 1964, Ishiro Honda introduced Ghidorah, the three-headed monster, via 'Earth's Greatest Battle'.

In 2021, MRIGlobal reincarnates Ghidorah - LIMS, via science's greatest battle – Data Management.

Since its inception, MRIGlobal has strived to maintain state-of-the-art scientific technologies and facilities in order to provide our clients with the best science possible. The development of this LIMS Release Candidate, funded through an MRIGlobal Capital Expenditure, culminated in 3,330 labor hours by Fluent Consultants, Inc. in collaboration with MRIGlobal staff over the course of 10 months.

ISO/IEC-17025 Program Compliance

Production data is protected and secured in multiple ways. Physical server access is limited to personnel with appropriate badge access. Remote access to Production servers and databases is controlled by Active Directory. The application limits access by utilizing an active directory log-in through a web browser. Finally, each user is assigned a User Role which granulizes access to pages and data within the application. A complete software validation was conducted. Standard Operating Procedures (SOPs) are written and available.
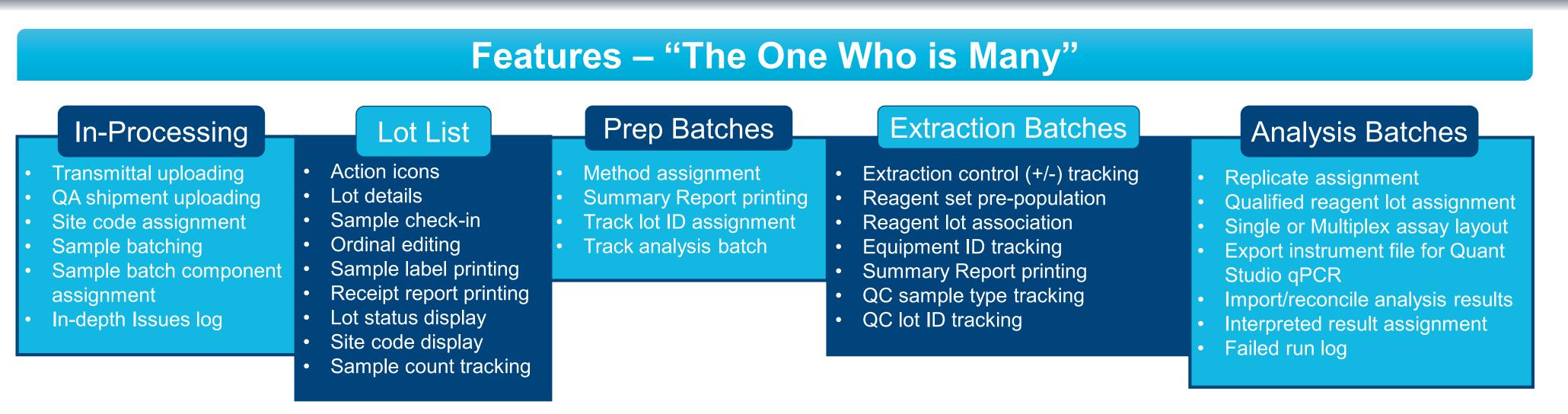

System Design

Critical Design – Ability to deploy on existing MRIGlobal and external infrastructure and product flexibility intended for various work uses and programs
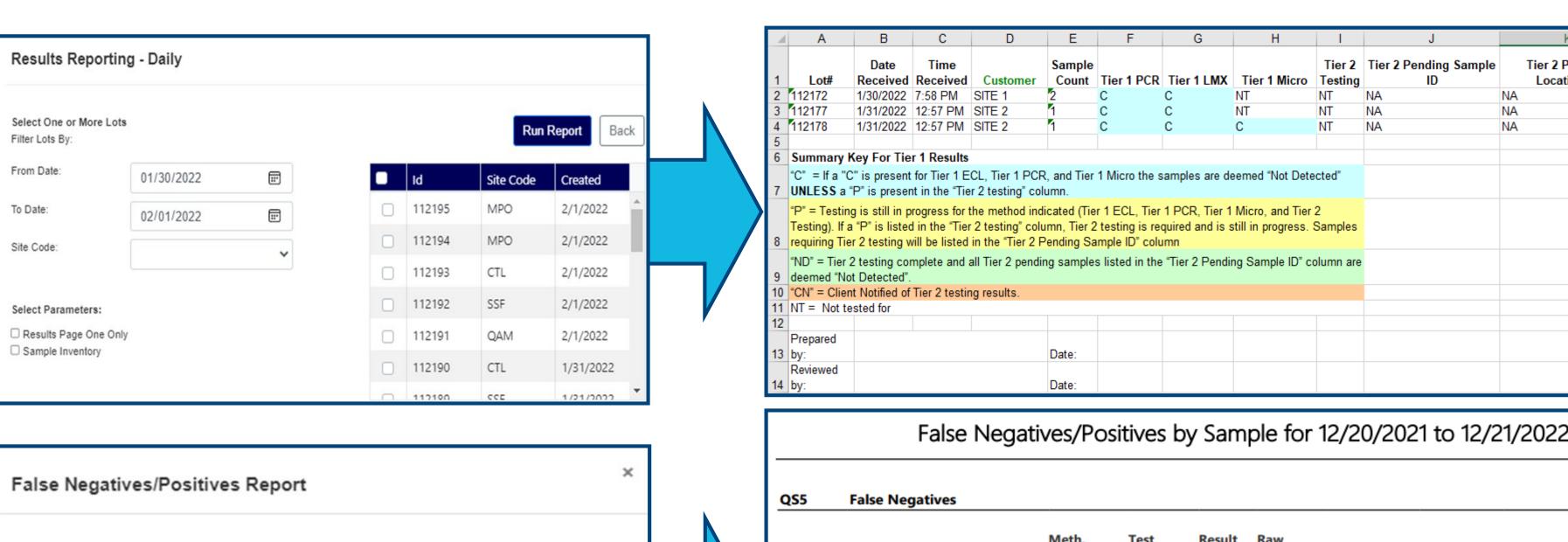
Backend –
- SQL database with 3 table types – Reference Values/Code Set, Transaction, and Audit
- Utilizes various stored procedures for complex data retrieval from the database
- SQL Server Reporting Services to generate system reports

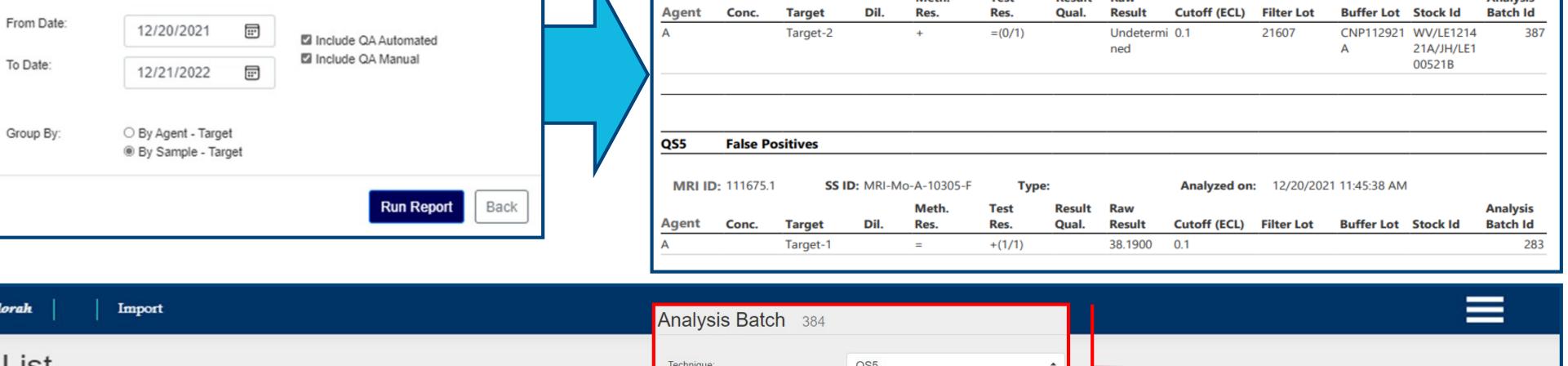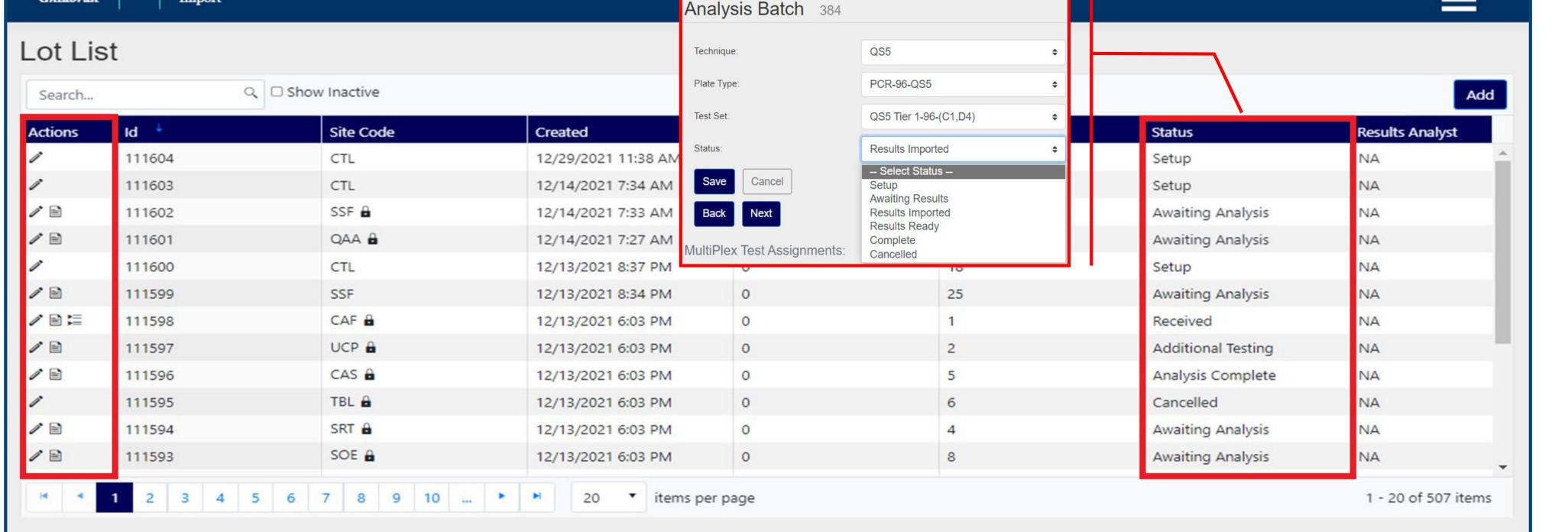**Frontend –**
- Compatible with multiple web browsers.
- Based on .NET Core (ASP.net 5.0) framework.
- Download/Upload interface for sample transmittal and instrument eData files
- QA/QC/PT/Daily Client reporting tools
- Equipment tracing and Reagent Lot/Qualified Reagent Lot tracing/inventory
- Lot status dashboard:
  - Setup
  - Received
  - Additional Testing
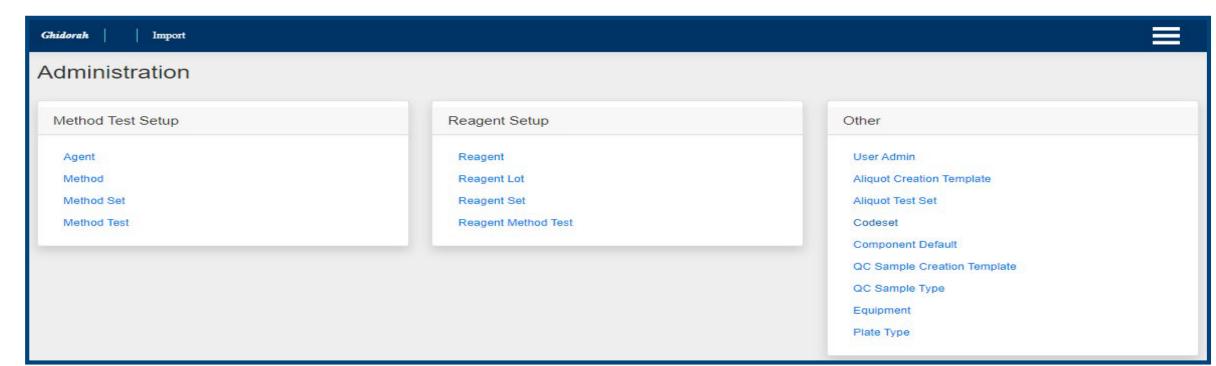 - Awaiting Analysis
  - Analysis Complete
  - Cancelled

Features – "The One Who is Many"

In-Processing
- Transmittal uploading
- QA shipment uploading
- Site code assignment
- Sample batching
- Sample batch component assignment
- In-depth Issues log

Lot List
- Action icons
- Lot details
- Sample check-in
- Ordinal editing
- Sample label printing
- Receipt report printing
- Lot status display
- Site code display
- Sample count tracking

Prep Batches
- Method assignment
- Summary Report printing
- Track lot ID assignment
- Track analysis batch

Extraction Batches
- Extraction control (+/-) tracking
- Reagent set pre-population
- Reagent lot association
- Equipment ID tracking
- Summary Report printing
- QC sample type tracking
- QC lot ID tracking

Analysis Batches
- Replicate assignment
- Qualified reagent lot assignment
- Single or Multiplex assay layout
- Export instrument file for Quant Studio qPCR
- Import/reconcile analysis results
- Interpreted result assignment
- Failed run log

Reporting – Daily Results and Quality Assurance (QC Charts not pictured)
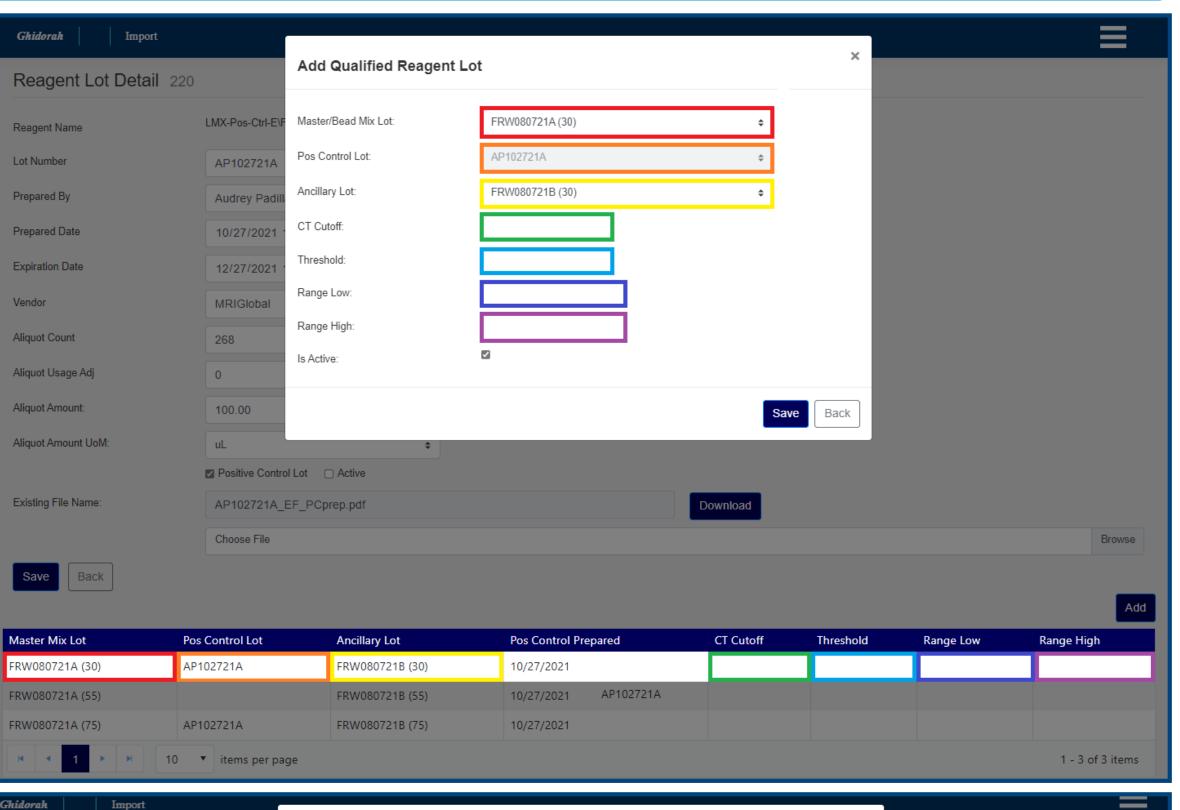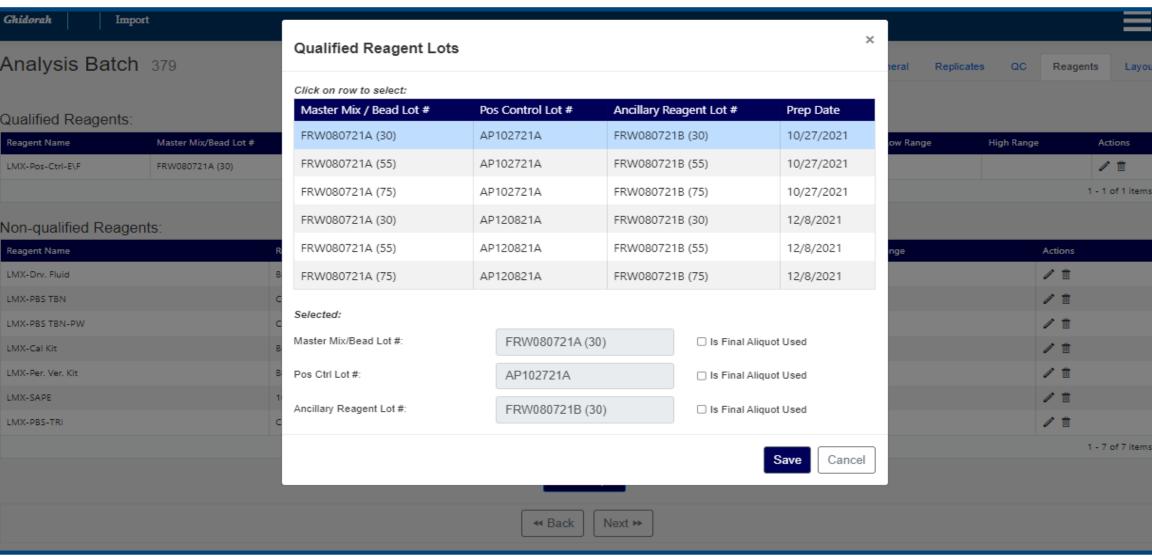

Qualified Reagent Lot Tracing

Thank you

We would like to extend a special thank you to our laboratory team as well as our IT infrastructure team - Sean Burkett, Barney Frazier, & Dave Bliss - without whom this implementation would not be possible.

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