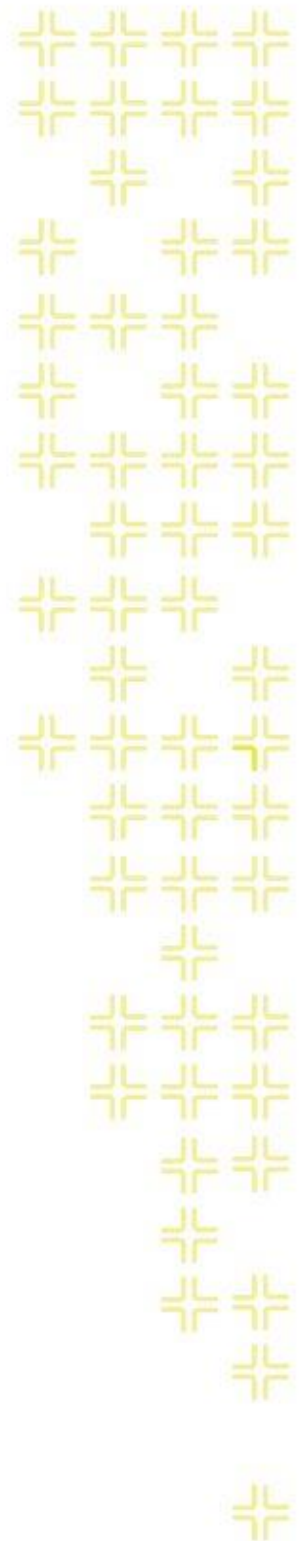# lucity™

TRAINING GUIDE

Data Quality Tools for GIS and Lucity Spatial

Data Quality Tools for GIS and Lucity Spatial

In this session, we'll cover the tools that can be used to ensure your GIS data is clean in regards to Lucity, as well as the tools that can check for and fix any erroneous data in the Lucity Spatial tables.

Table of Contents

Highlights for version 2017

- QA/QC now has a 5th test for Non-Simple Geometry.
- Spatial Query Suite within the Lucity Data Quality tool now has a 10th test for Spatial records that either failed processing or are awaiting processing, with an option to reprocess selected records.

Highlights for version 2017r2

- Update Geodatabase values now supports updating the Lucity Auto ID field.

GIS – ArcCatalog Tools

The first part of this session covers data quality tools for your GIS data that is linked to Lucity. All of these tools exist within the ArcCatalog portion of the Lucity GIS Desktop extension.
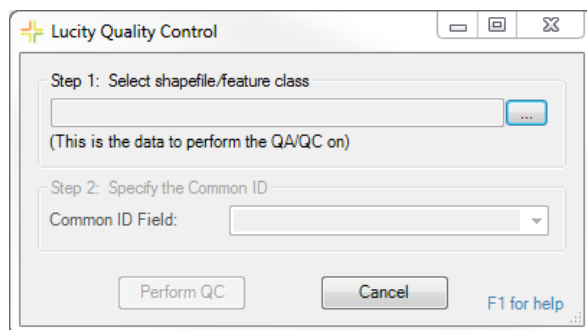
In ArcCatalog, the Lucity GIS Tools dropdown menu:
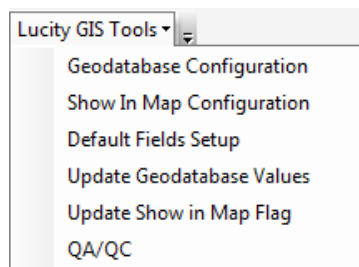
QA/QC

The QA/QC tool can be used against any shapefile or feature class to identify potential data problems that can impact functionality between GIS and Lucity.

To use the tool, select QA/QC from the Lucity GIS Tools menu. The following dialog appears:

- **Step 1: Select shapefile/feature class:** This is the feature class that you would like to perform the QA/QC tests against. This can be any shapefile or feature class, regardless of whether or not it is linked to Lucity.

- **Step 2: Specify the Common ID:** This is the field in the GIS feature class that either is, or will be, linked to the Common ID field in the Lucity module, and is used for two of the QA/QC tests. This field is used to determine the linkage between any given GIS feature and its corresponding Lucity record. It is required to be unique.

Once you have clicked Perform QC, the process begins. When the tool is finished running against the entire shapefile/feature class, this dialog will appear with all five logs (one for each test) visible:
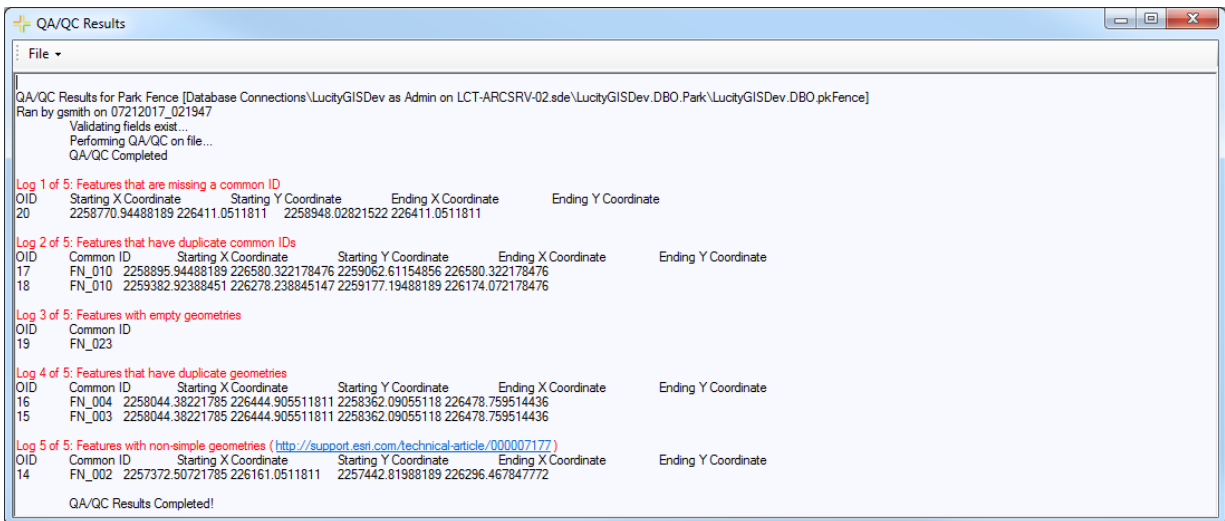
Note: The QA/QC Results can either be printed or exported by selecting File>>Print (or Save) at the top of the QA/QC Results window.

GIS features that fail each test have the following written to the log: 1.) Esri ObjectID (OID), 2.) Common ID (except for test #1), 3.) Beginning/Ending X/Y Coordinates, and 4.) Reason for Non-Simple Geometry, if the geometry type is polygon.

Here's an explanation of each test:

- **Features that are missing a common ID:** These are features that have a null or empty value in their Common ID field. These features are unable to be found by Lucity because a non-null Common ID value is required to find a Lucity-linked feature in GIS.

- **Features that have duplicate common IDs:** These are features that have the same Common ID value as other features in GIS. If this Common ID value exists in Lucity, this means that all of the GIS features with that Common ID are linked to the same record in Lucity, which is not a supported setup (the Common ID must be a unique, one-to-one relationship).

- **Features with empty geometries:** These are features that exist in the GIS feature class' attribute table, but have no spatial information associated to them. This particularly can cause issues with editing, as editing operations attempted on empty geometry will likely fail.

- **Features that have duplicate geometries:** These are features that have the exact same geometry as other features within the GIS feature class (features that are sitting on top of each other). This may or may not cause failures with editing, but will likely affect things like spatial relationships, etc.

- **Features with non-simple geometries:** These are features that have complex, often erroneous geometries. Esri's description: "Non-simple features may interrupt data processing and/or produce error messages when working with them in ArcGIS". Some examples include: self-intersecting lines, discontinuous parts, null Z-values, and duplicate vertices. More information: http://support.esri.com/en/technical-article/000007177

  Note: Although the test for non-simple geometries can be quite helpful in assessing GIS data quality, we strongly suggest utilizing Esri's geometry validation tools as well, as they provide much more depth than the Lucity QA/QC tool is capable of.

Other ArcCatalog Tools

The following tools do not solely exist as data quality tools, but they can be quite helpful in improving the quality of your GIS data. These include Update Geodatabase Values, Domain Configuration (inside of Geodatabase Configuration), and Update Show In Map Flag.

Update Geodatabase Values

As of version 2017r2, the Update Geodatabase Values tool now supports updating the Lucity Auto ID field in GIS. There are some places in Lucity GIS that will use the Lucity Auto ID before the Common ID, if there is a field for it in GIS; it is these places that require the Lucity Auto ID value to be correct.

To use the Update Geodatabase Values tool, first select any Lucity-linked feature class within the catalog tree in ArcCatalog, and then go to Lucity GIS Tools>>Update Geodatabase Values. The following prompt appears with all the fields in the feature class that can be updated from Lucity, including the field that stores the Lucity Auto ID:
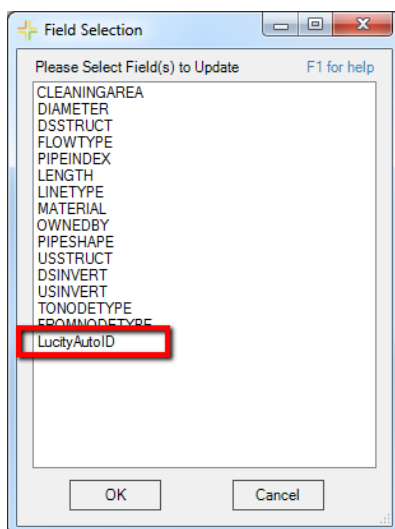
Click OK, and all selected fields in GIS will be updated with the value that is in Lucity. In the case of the Lucity Auto ID field, the correct Lucity Auto ID will be assigned to each feature in GIS.

> *Note: If you choose to update the Lucity Auto ID field in GIS, the process may take longer compared to updating other fields, as the tool will have to use the Common ID to perform the join during the update, which is not quite as efficient.*

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Geodatabase Configuration – Domain Configuration

The Domain Configuration Tool can be useful in ensuring your GIS domains (and the features in your feature classes that use them) are in sync with the linked Lucity picklists.

To use the tool, first launch the Geodatabase Configuration Tool (Lucity GIS Tools>>Geodatabase Configuration). Once you're inside of Geodatabase Configuration, in the lefthand treeview, select either the parent workspace node, or one of the feature class nodes, right-click>>Domains>>Domain Configuration. The following prompt appears:
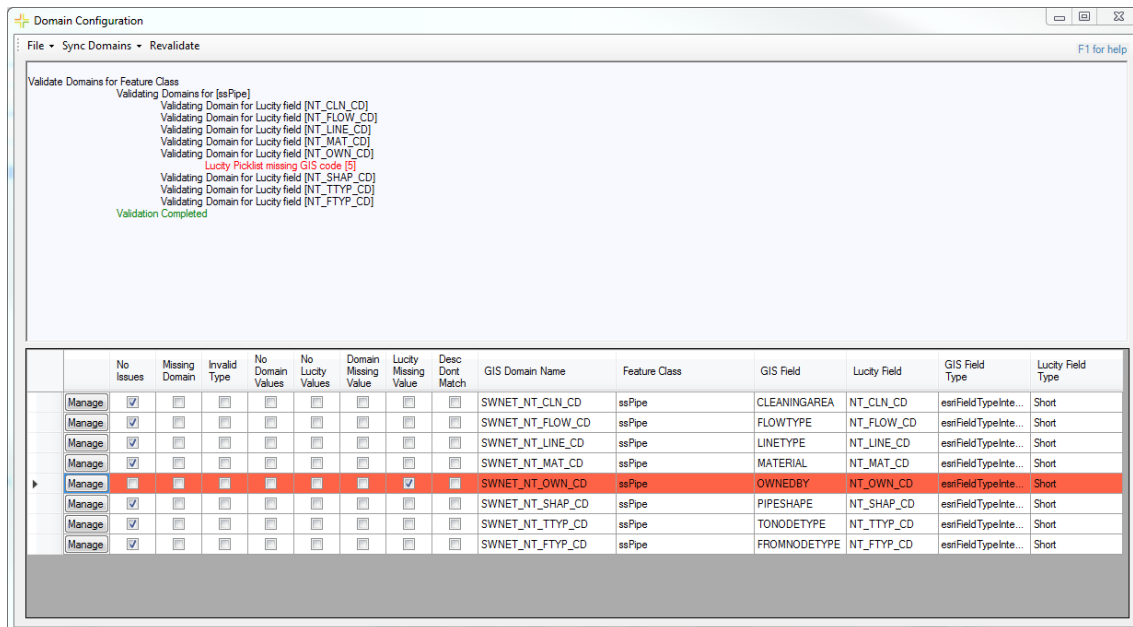
Domains that are out of sync with Lucity will have their rows highlighted in red in the grid. Click Manage to handle the discrepancies. The following window appears:
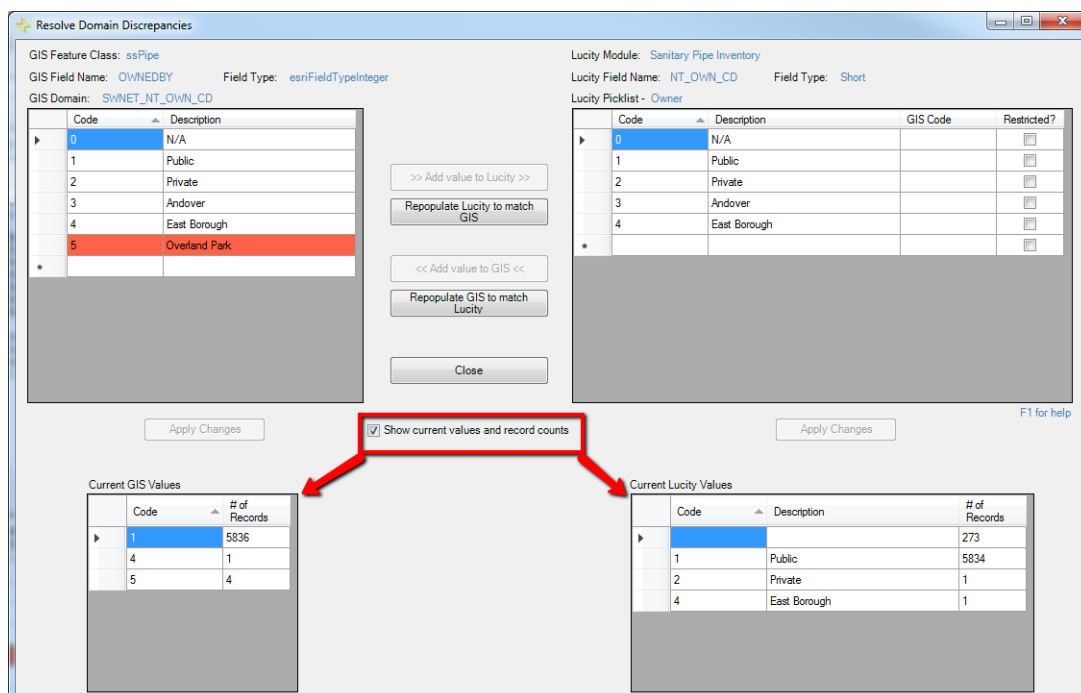
Values shown in red in the top to grids have no match in GIS/Lucity. You can check "Show current values and record counts" to see how many records in GIS/Lucity are using any given domain or picklist value. This helps to give an idea of what needs to be changed to get the GIS domain back in sync with the corresponding Lucity picklist, and what would be affected by the changes. It is useful to run this tool before syncing data into Lucity from GIS, as it will prevent data issues caused by mismatched picklist values.

To use the tool, make changes by adding or removing values in the top grids, and using the Add Value or Repopulate buttons. When finished, click Apply Changes for GIS and/or Lucity.

For more details about the Domain Configuration Tool, please see the **Geodatabase Configuration Tool Overview** session.

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Update Show In Map Flag

While Update Show In Map Flag does not modify your GIS data at all, it can be very helpful in determining what records in Lucity have no matching feature in GIS. Normally, this field is automatically updated, but in some circumstances it may not be, so this tool ensures that the In Map Flag field in Lucity is correct.

To use the tool, select Lucity GIS Tools>>Update Show In Map Flag. You will be prompted to select the type of map data that you use:
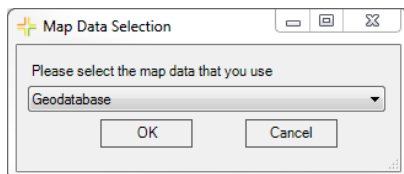
Once you have selected your type of map data, a form appears with all modules you have linked to GIS. Go ahead and select all modules you would like to update, and click OK.
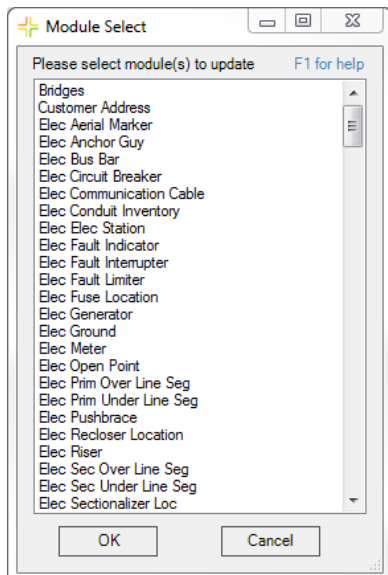
Once the process begins, it will query each linked feature class to each selected module to determine if there are matching features in the linked feature classes (using the Common ID), updating that module's In Map field for each record in the module as it goes along.

After the process is complete, the In Map field can then be used with the Common ID to query against the GIS data to find discrepancies between what is in GIS versus what is in Lucity.

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Lucity Spatial – DataQuality.exe (DQS)

The second part of this session covers data quality tools for the Lucity Spatial tables. All of these tools exist as queries within the Spatial Query Suite inside the Lucity Data Quality Tool. If you have a complete install of Lucity Desktop, the Lucity Data Quality Tool can be found in your local workstation \bin directory, or can be accessed from Start>>All Programs>>Lucity>>Admin Tools.
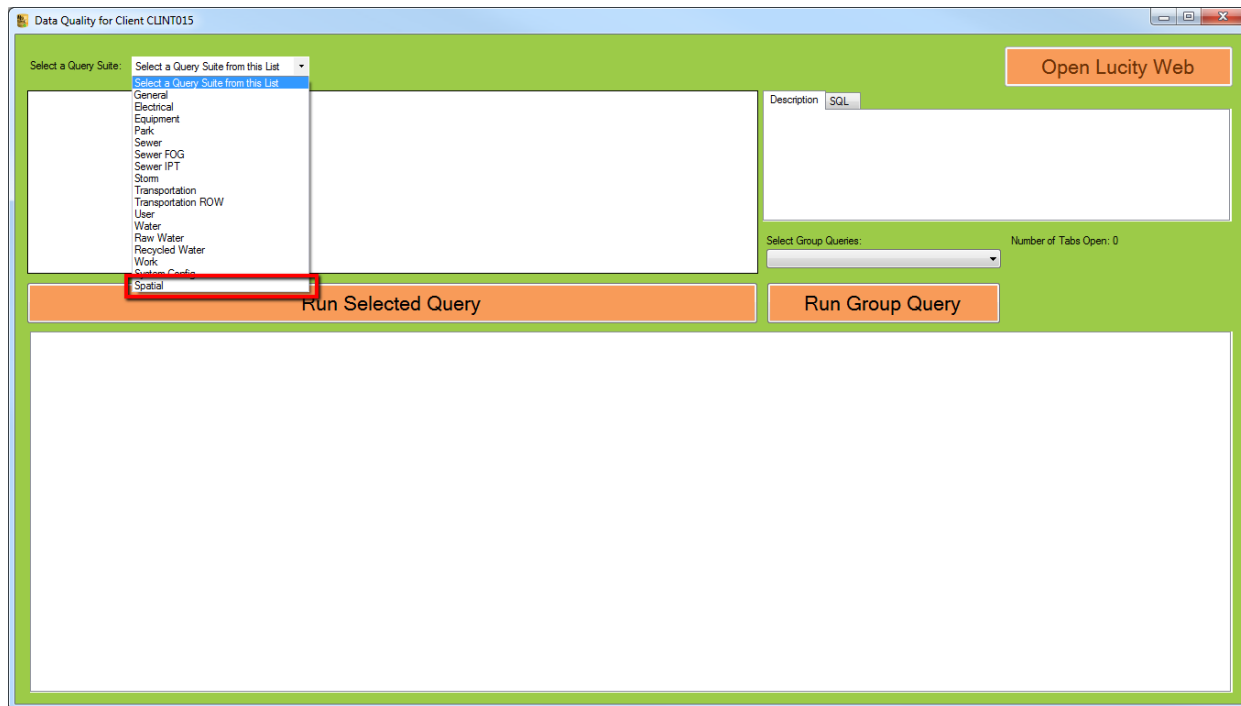
These queries (10 total) are all ran against the Lucity Work Spatial tables that are used by the Lucity Spatial Indexer, which include the work geometry tables for points, lines, and polygons (WKGEOMPT, WKGEOMLN, and WKGEOMPG), and the work spatial change table (WKSPATIALCHANGE).

> *Note: All queries in the Spatial Query Suite are currently only supported for SQL Server. Theses queries are not yet available for Oracle databases.*

For more information about the Lucity Spatial Indexer, see the **Overview of Lucity Spatial** session.

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Wrong Geometry Types

The three Lucity work geometry tables exist to store points, lines, or polygons. Although incredibly unusual, features of the wrong geometry type have ended up in these tables before (i.e. polygons in the points table). There are three queries to test for this:

- Non-point features in the Work Point table (Test #1).

- Non-line features in the Work Line table (Test #4).

- Non-polygon features in the Work Polygon table (Test #7).

Since this situation can cause errors in processing, these queries fall under the "Error" Group. To run any of these queries, select the row for the test in the top grid, and click Run Selected Query. A results grid will appear at the bottom of the window:

All erroneous records will display in the results grid. For this particular query type, there is an option to fix the data. To do this, select the record in the results grid, and click Fix Selected (Spatial). The following prompt appears:
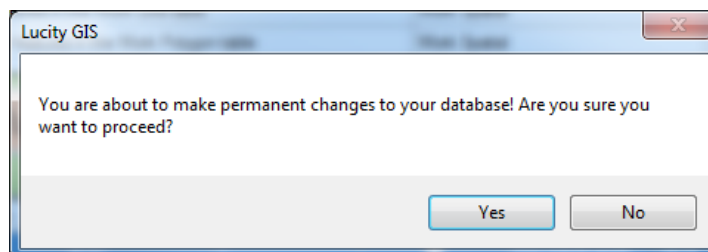
Clicking Yes will move all erroneous records to their correct geometry table, and delete them from the current table. In the example in the screenshot above, this record will be copied into the work polygons table (WKGEOMPG) and deleted from the work points table (WKGEOMPT).

Spatial reference discrepancies

This set of queries tests for records in the WKGEOM tables that have a spatial reference different from what is defined in the Operational WKID field within Lucity System Settings:
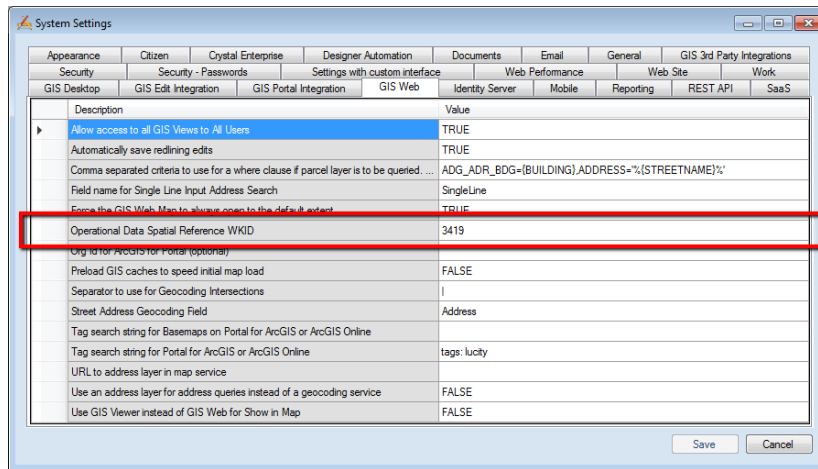
There are three queries to test for this:

- Spatial reference discrepancies in the Work Point table (Test #2).
- Spatial reference discrepancies in the Work Line table (Test #5).
- Spatial reference discrepancies in the Work Polygon table (Test #8).

These queries belong to the "Warning" group, since they may or may or may not cause issues in processing, but will likely cause unexpected results. To run any of these queries, select the test in the top grid and click Run Selected Query. The results will display in the bottom grid:
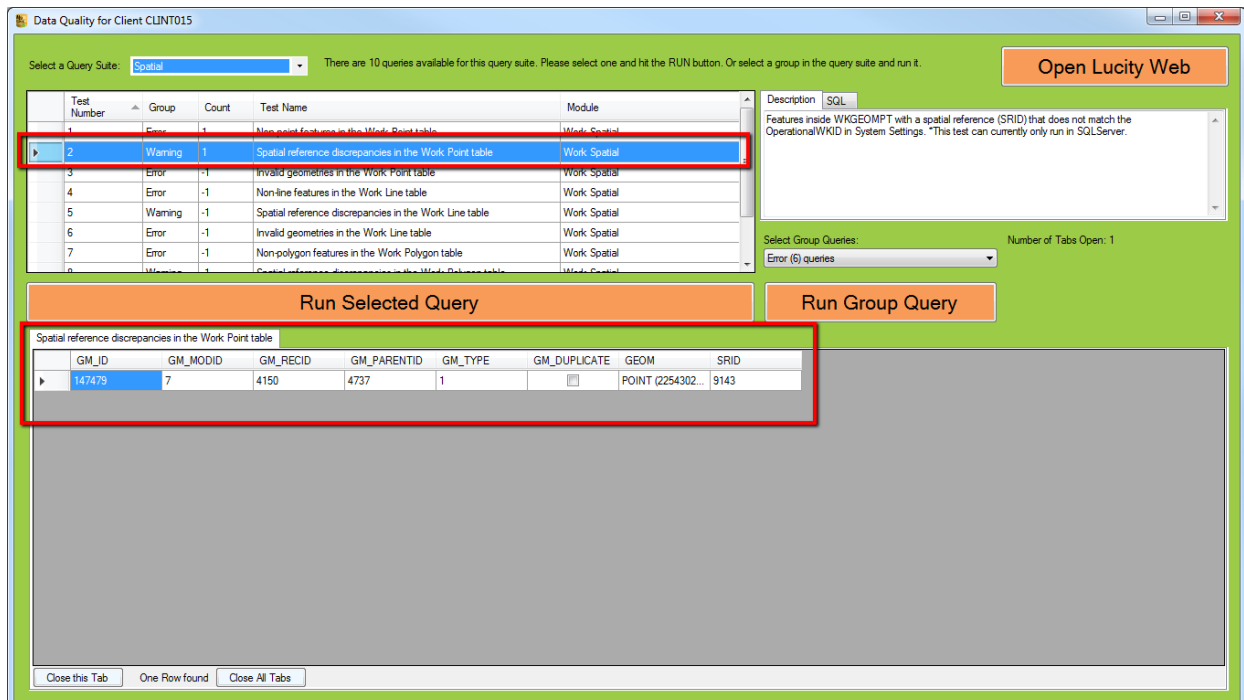
Invalid Geometries

If there are features with non-simple geometries in your GIS (see above section on the QA/QC tool), there is potential that these can be processed and copied into the work geometry tables, and cause issues down the road. SQL Server recognizes these geometries as invalid geometries.

There are three queries to test for this:

- Invalid geometries in the Work Point table (Test # 3).

- Invalid geometries in the Work Line table (Test #6).

- Invalid geometries in the Work Polygon table (Test #9).

These queries belong to the "Error" group because any process attempted on records in the Lucity Spatial tables with invalid geometry will fail. To run any of these queries, select the test in the top grid and click Run Selected Query. The results will display in the bottom grid:

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Spatial records that failed processing/are awaiting processing

Sometimes the Spatial Indexer fails to process a record, and the geometry never gets written to the appropriate work geometry table. This shows up later when the expected geometry is missing from the results of one of the tools that uses the spatial tables. All records that fail processing remain in the WKSPATIALCHANGE table with an error message and description, while successfully processed records are moved out of the table.

To run this query, select the test in the top grid and click Run Selected Query. The results will display in the bottom grid:


This is a new query with version 2017 and it returns all records from WKSPATIALCHANGE. It belongs to the "Info" query group.

Records that failed processing will have the following fields populated: **SPCH_GUID**, **SPCH_SU_ERROR**, and **SPCH_SU_DESC**. Records that are awaiting processing by the Spatial Indexer will exist in the results, but will not have these fields populated.

To fully utilize this query to resolve records that failed processing in the Spatial Indexer, follow these steps:

1. Correct whatever errors show up within the **SPCH_SU_ERROR** and **SPCH_SU_DESC** fields. These are usually related to issues with the editable GIS service (feature doesn't exist in the service, feature class doesn't exist in the service, the service can't be accessed for any given period of time while processing is attempted, etc.).

2. Once these errors are corrected, select however many rows in the bottom grid that you want to reprocess, and click Reprocess Selected.
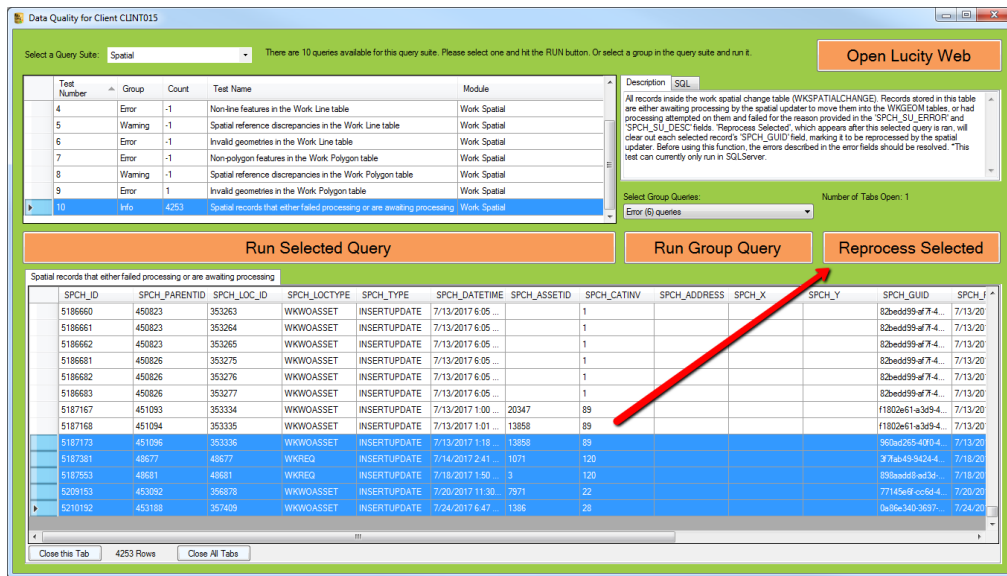
3. The following prompt appears. Click Yes, and the **SPCH_GUID** field is cleared out for all the selected records, marking them to be processed again by the Spatial Indexer.
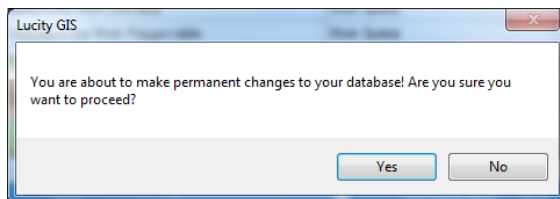
Note: The Spatial Indexer runs every 5 minutes, so you may not see results immediately when reprocessing a selected set of records. If you get stuck while troubleshooting this, please do feel free to contact Lucity Support for further assistance.

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