

Internal Audit Department  
NeighborWorks® America

Audit Review of  
Data Collections Integration  
&  
Analysis (SQL)

Project Number: NWA.CPPS-DTCOLL.2015

# Audit Review of Data Collections, Integration and Analysis (SQL)

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October 02, 2015

To: NeighborWorks America Audit Committee

Subject: Audit Review of Data Collections, Integration and Analysis (SQL)

Please find enclosed our draft audit report for the Data Collections, Integration and Analysis (SQL) review. Please contact me with any questions you might have. Thank you.

Frederick Udochi  
Chief Audit Executive

Attachment

cc: P. Weech  
C. Wehrwein  
J. Bryson  
L. Williams  
B. Richard

## Function Responsibility and Internal Control Assessment

### Audit Review of Data Collections Integration & Analysis (SQL)

<b>Business Function Responsibility</b>	<b>Report Date</b>	<b>Period Covered</b>
Corporate Planning, Performance And Strategy	October 2, 2015	January 1, 2015  Through  June 30, 2015
<b>Assessment of Internal Control Structure</b>		
Effectiveness and Efficiency of Operations		<b>Generally Effective<sup>1</sup></b>
Reliability of Financial Reporting		<b>Not Applicable</b>
Compliance with Applicable Laws and Regulations		<b>Not Applicable</b>

This report was conducted in accordance with the *International Standards for the Professional Practice of Internal Auditing*.

<sup>1</sup> **Legend for Assessment of Internal Control Structure:** **1. Generally Effective:** The level and quality of the process is satisfactory. Some areas still need improvement. **2. Inadequate:** Level and quality of the process is insufficient for the processes or functions examined, and require improvement in several areas. **3. Significant Weakness:** Level and quality of internal controls for the processes and functions reviewed are very low. Significant internal control improvements need to be made.

**Executive Summary of Observations, Recommendations and Management Responses**

Summarized Observation Risk Rating	Management Agreement with Observation (Yes/ No)	Internal Audit Recommendation Summary	Accept IA Recommendation (Yes/ No)	Management's Response to IA Recommendation	Estimated Date of Implementation (Month/Year)	Internal Audit Comments on Management Response
<p><b>Observation No. 1 – A Need to Reduce Process Time and Eliminate the Potential of Manual Errors in the Process</b></p> <p>Surveys submitted by NWOs are reviewed by Data Collections using a process defined in their “Data Collection Procedure Manual”. This manual details specific survey data points, tools used for validation, and common errors. Data Collections creates Excel spreadsheets from the Online Reporting System (ORS) and other data sources to use in their collection and validation process. Due to the online nature of some of the tools used (query views of the ORS data and cube views), some of the validation steps are performed visually and manually. Manually created tools can be more prone to unintentional errors or</p>	<p align="center"><b>Yes</b></p>	<p><b>Recommendation No. 1 – Pursue plan to enhance more automated reporting while reducing manual input</b></p> <p>A plan has already been proposed to enhance ORS by providing more automated reporting tools for fiscal year 2016. The “gold standard” would be an automated process that systematically compares key data between the systems and provides exceptions for a person to research and resolve these exceptions. Internal Audit recommends Data Collections continues to pursue this automation plan to enhance the process.</p>	<p align="center"><b>Yes</b></p>	<p>ORS is currently operating on a technical platform with constraints that limit enhancement capability. CPPS and IT&amp;S Divisions will work together to ensure that the ORS replacement system has the recommended automated validation and quality control functionality incorporated.</p>	<p align="center">FY2018</p>	

Summarized Observation Risk Rating	Management Agreement with Observation (Yes/ No)	Internal Audit Recommendation Summary	Accept IA Recommendation (Yes/ No)	Management's Response to IA Recommendation	Estimated Date of Implementation (Month/Year)	Internal Audit Comments on Management Response
<p>omissions, and some of these contain advanced macros and/or require manipulation of the data.</p> <p>Risk Rating: (b) (5)</p>						
<p><b>Observation No. 2 – Validation Steps Performed By Information Technology and Services for the Data Warehouse (DW)</b></p> <p>Internal Audit noted that IT&amp;S follows a defined process to move the data from ORS to the data warehouse. This process includes steps to help ensure that the data is complete and accurate. At the end, a quality control process is performed by Data Collections to validate the DW cubes and that the reporting is correct and ties back to ORS before the data is released for use within NWA. However, validation efforts performed by IT&amp;S were not evidenced in the form of any documentation.</p> <p>Risk Rating: (b) (5)</p>	Yes	<p><b>Recommendation No. 2 - Retain Proof of Data Validation by IT&amp;S</b></p> <p>Internal Audit recommends that IT&amp;S document the validation steps and capturing the results of the validation efforts to demonstrate successful completion of these activities.</p>	Yes	IT&S will formally log all defects identified during the application/system integration testing process. IT&S will prioritize the identified defects to ensure that they are addressed appropriately.	Q2 FY 2016	

## **RISK Rating Legend**

### **Risk Rating: HIGH**

A serious weakness which significantly impacts the Corporation from achieving its corporate objectives, financial results, statutory obligations or that may otherwise impair the Corporation's reputation.

### **Risk Rating: Moderate**

A control weakness which could potentially undermine the effectiveness of the existing system of internal controls and/or operational efficiency, integrity of reporting and should therefore be addressed.

### **Risk Rating: Low**

A weakness identified which does not seriously detract from the system of internal controls and or operational effectiveness/efficiency, integrity of reporting but which should nonetheless be addressed by management.

<b>Management Responses to The Audit Review of:  Data Collections, Integration and Analysis (SQL)</b>		
<b># Of Responses</b>	<b>Response</b>	<b>Recommendation #</b>
2	Agreement with the recommendation(s)	1,2
	Disagreement with the recommendation(s)	

## Background

The Data Collections & Analysis unit within the Corporate Planning, Performance, and Strategy (CPPS) Division has defined its primary role as being, “responsible for ensuring that all the information NeighborWorks America collects is valid and follows corporate priorities around data the corporation needs”. Additionally, this functional area sees itself as, “responsible for the design, development and implementation of data collection tools and processes and is responsible for quality control”. Since the collected data is used in numerous ways to report on the activities of NeighborWorks America’s communities across the nation, Data Collections considers the users / stakeholders for their specific services to be both internal and external customers.

The collection of quarterly data utilizes the NWA network of more than 240 community development organizations which are divided into five regions across the United States. Each NWA network organization (NWO) provides the requested quarterly data through surveys initiated by NWA. Data from these quarterly surveys is critical to NWA business owners, in order to analyze, monitor and report on numerous activities and initiatives within Network Organizations. The data is also used for reporting to external stakeholders and entities, including the U.S. Congress.

In addition to the Data Collections’ defined validation process, the Relationship Managers (RM) perform supplemental validation efforts and because these managers are closer to the NWO activities, they can identify anomalies that are not readily apparent to Data Collections. Also, Data Collections tracks and reports the RM and NWO responsiveness and timeliness to help identify areas for improvement.

Due to the essential nature of this data being accurate for internal and external reporting purposes, Internal Audit conducted a review of the quarterly data collection and validation process and engaged the services of (b) (4) (a consulting firm) to assist with that purpose.

## Objective

The objective of this review was to obtain reasonable assurance:

- That the objectives of the Data Collections Integration & Analysis SQL system have been met
- That it yields complete and accurate data/results that can be validated
- Around data accuracy by reviewing input/output process controls, system timeliness and accessibility; including data protection and security.

## Scope

To review this process, Internal Audit primarily used the documentation examples available to support the process steps from the 2<sup>nd</sup> and 3<sup>rd</sup> quarters of FY2015. Also, it was necessary to utilize other documentation covering FY2015 in general. Examples included the 2015 Quarterly Data Collection Timeline, and the 2015 Annual Survey (Data Dictionary) prepared at the beginning of the year.



The re-validation of the actual data collected by NW and conducting security access reviews were out of scope for this review.

## **Methodology**

Internal Audit began this review with an Introductory Meeting and a conference call, which were held on July 17, 2015 and July 23, 2015 respectively. The objective was to obtain an understanding of the workflow control objectives that are in place for Data Collections Integration and Analysis SQL within Corporate Planning Performance and Strategy. The project was primarily accomplished through interviews with key stakeholders in Corporate Planning Performance and Strategy (CPPS), Data Collections, IT&S, Real Estate, and Home Ownership. Also subject to review was process documentation provided by the stakeholders, and supporting documentation for key collection and validation process steps and controls.

Based on discussions with NWA business owners and Data Collections, the data being captured each quarter is kept relevant and useful through an annual review and update of all data points (data dictionary). This helps to ensure the right data needed for analysis and reporting is included, and old, unnecessary data is removed.

Lists of the stakeholders interviewed and the documents reviewed are contained in **Appendix A** and **Appendix B**.

Below are the observations and recommendations that resulted from the testing performed.

## **Observations and Recommendations**

### **Observation 1 – A Need to Reduce Process Time and Eliminate the Potential of Manual Errors in the Process**

Surveys submitted by NWOs are reviewed by Data Collections using a process defined in their “Data Collection Procedure Manual”. This manual details specific survey data points, tools used for validation, and common errors. Data Collections creates Excel spreadsheets from ORS the Online Reporting System (ORS) and other data sources to use in their collection and validation process. Due to the online nature of some of the tools used (query views of the ORS data and cube views), some of the validation steps are performed visually and manually. See **APENDIX C: Data Validation – ORS** for additional detail on validation steps. Manually created tools can be more prone to unintentional errors or omissions, and some of these contain advanced macros and/or require manipulation of the data.

### **Recommendation 1 – Pursue plan to enhance more automated reporting while reducing manual input**

A plan has already been proposed to enhance ORS by providing more automated reporting tools for fiscal year 2016. The “gold standard” would be an automated process that

systematically compares key data between the systems and provides exceptions for a person to research and resolve this focus on exceptions. Internal Audit recommends that Data Collections continues to integrate this automation plan in order to enhance the process.

## **Observation 2 – Validation Steps Performed By Information Technology and Services for the Data Warehouse**

Internal Audit noted that IT&S follows a defined process to move the data from ORS to the data warehouse. This process includes steps to help ensure that the data is complete and accurate. At the end, a quality control process is performed by Data Collections to validate the DW cubes<sup>2</sup> and that the reporting is correct and ties back to ORS before the data is released for use within NWA. However, validation efforts performed by IT&S were not evidenced in the form of any documentation. See **APENDIX C: Data Validation – DW** for additional detail on validation steps

## **Recommendation 2 – Retain Proof of Data Validation by IT&S**

Internal Audit recommends that IT&S document the validation steps by capturing the results of the validation efforts to demonstrate successful completion of these activities.

## **Conclusion**

The Data Collections function has a well-documented process for collecting and validating the quarterly survey data. This is evidenced by a detailed procedure in the manual and multiple process flow documents currently in existence. In addition, we noted through interviews that improvement to the process is an on-going effort built into the overall process. An example of this ongoing effort is the plan to enhance ORS functionality to incorporate reports and tracking tools manually prepared by Data Collections.

Thanks again to the Senior Vice-President of Corporate Planning, Performance and Strategy and the Data Collections and IT&S teams for their cooperation and assistance during this review.

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<sup>2</sup> The data cube format used by CPPS makes available an Excel spreadsheet format with pivot tables to allow a user to query the data in a wide variety of ways in order to provide relevant information to the user's area of interest.

## APPENDIX A: The List of Process Stakeholders Interviewed

The following table documents the interviews conducted and the business areas where the observations and themes were collected.

Department	Name & Title	Date
Corporate Planning, Performance & Strategy	(b) (6) – SVP	7/23/2015
Data Collections	(b) (6) – Senior Manager	9/24/2015
IT&S	(b) (6) – Director Software Engineering	9/23/2015
IT&S	(b) (6) – Sr. SQL Developer	9/23/2015
Home Ownership	(b) (6) – Specialist Home Ownership	9/23/2015
Real Estate	(b) (6) – VP National Real Estate Programs	9/24/2015
Real Estate	(b) (6) – National Real Estate Programs	9/24/2015

## APPENDIX B: Listing of Process Documents Reviewed

The following table lists the documentation reviewed to assist in identifying additional observations and themes presented within this report.

Document File Name	Description
Quarterly Review Procedure Manual	Primary process document listing objectives, terms, tools and process steps used by the Data Collections team
Quarterly Reports Validation Process Diagram	High-level depiction of the quarterly reports validation process
Quarterly QC Process Mapping	More detailed process flowcharts showing quarterly quality control (data validation) steps performed by Data Collections and IT&S
Data Validation Process	High-level depiction of the quarterly reports validation process
2015 Quarterly Timeline	Process steps and due dates by quarter for the data collection and validation processes
FY15Q2 Review Tracking Sheet	Tool used by Data Collections to track the Q2 data collection deliverables and due dates for Rocky Mountain, Midwest and South West Solutions
FY2015 Q1 QC Analysis	Quality control analysis report of results from a Data Collections review of FY13 Q3 through FY15 Q1 data
FY2015 Q2 Quarterly Reporting Compliance and Review Feedback	Data Collections prepared summary of the compliance data by region, Relationship Manager, and organization
RM quarterly data review	Quarter over quarter analysis of key data points, summarized by type of survey category (Investment, Home Ownership Creation, Home Ownership Preservation, Rental, Home Ownership Counseling Hours) – used by Relationship Managers to review and validate data prior to release for general use by NW
FY2015 Annual Survey DD, FY2015 Quarterly DD – Clients Financing and Projects Summary, FY2015 Quarterly DD – Community Building and Engagement, FY2015 Quarterly DD – Financial Capability	Documents prepared for the 2015 annual review of data elements (data dictionary) included in the quarterly data collection survey process – used by Data Collections, NW business owners, and organizations to determine what data needs to be collected for reporting and analysis
FY15 Q3 – comprehensive quarterly report files	Email from Data Collections to IT&S noting the results of the Q3 2015 data validation review, and releasing the data for NW business owner use
8011 FY15 Q3 Quarterly Summary Report, 8011 YTD Summary Report, 8339 FY15 Q3 Quarterly Summary Report, 8339 YTD Summary Report, FY15 Q3 - QC file for Comprehensive Quarterly Reports, FY15 Q3 All NWOs Summary Report, FY15 Q3 Partners Summary Report, FY2015 Cube Requirements, YTD Summary All NWOs, QC checklist	ORS reports and summarization analysis documents used by Data Collections to validate data warehouse analysis cubes and reporting accuracy for Q3 2015

## APPENDIX C: Data Collections – Process Workflow Procedures

### Data Collected

Annually, the Data Collections group within Corporate Planning Performance and Strategy (CPPS) coordinates with key NWA business owners and with the NWOs to update the data to be collected each quarter. This data to be collected is based on NWA business analysis and reporting needs. The individual data points are documented in a “data dictionary” and are used to design the systems used in the quarterly collection and reporting process. Data Collections receives input from the business owners and NWOs about which data is no longer needed, is not valid (data point does not provide a meaningful metric), and new data to be collected for NW business needs. Based on this feedback, the data dictionary document is modified and used to update the systems noted below.

### Tools Used

NWA uses a custom written software application, Online Reporting System (ORS), as the data collection tool. ORS was developed for NWA by a third party, (b) (4) and the application is hosted by another third party, (b) (4) (b) (4) also provides ongoing development and support for ORS.

CounselorMAX is a third party application owned and operated by Emerging Market Technologies Applications (EMT Applications). The application is used by NWOs to provide access to homeownership education and services. CounselorMAX provides to NWOs a function to upload data directly to ORS for their quarterly reporting of counseling services.

The NW enterprise data warehouse is maintained by NWA’s IT&S Division and is fed data from ORS, which is used to create analysis “cubes” and pre-defined reports. Cubes are “views” of data presented to an end user to help facilitate analysis for business purposes.

### Data Collection

ORS groups the data to be collected in surveys. These surveys combine the data into a variety of functions and services, including:

- Community Business Lending
- National Real Estate Programs
- Programs and Services
- Residential Lending Activities
- Salary and Customer Service
- General Information

The NWA Data Collections group initiates the quarterly NWO survey process based on a published calendar of collection process steps and due dates. Steps and dates are included for:

- Tracking initial input of survey data by NWOs;

- Data Collections review and validation of the survey data provided by all NWOs.
- Data Collections reporting of survey data to NWA Relationship Managers (RM), and tracking RM review and approval of the data;
- Finalizing survey data for IT&S to load into the enterprise data warehouse and analysis and reporting data bases, and;
- Completing a Quality Control of all survey data prior to releasing for NWA business owner use.

### Data Validation - ORS

Initial data validation is automatically performed by ORS using predefined edit checks when an NWO submits a survey. Identified edit check errors are presented to the NWO for correction and resubmission of the data. An NWO can accept the survey with edit errors if they feel the data is accurate (e.g. no data because the NWO had no activity for that quarter).

Submitted surveys are reviewed by Data Collections using a process defined in their “Data Collection Procedure Manual”. This manual details specific survey data points, tools used for validation, and common errors. ORS has functions for internal and external notes to attach to surveys or an NWO. Internal notes are used to set reminders for use by NWA personnel (e.g. a follow up reminder for the next quarter). External notes are used to communicate with NWOs with questions, requests for further data, and to reject surveys when they have errors. Each Collection analyst manually tracks their outstanding requests and rejections to help ensure NWOs respond by the due dates. Reporting of NWO responsiveness is provided each quarter to RMs to help manage those interactions.

After the Data Collections review process is complete, the Senior Manager “closes” the surveys in ORS. Closed surveys can no longer be updated or rejected by Data Collections or the NWOs. The Senior Manager, or a designee, sends an email to the IT&S group to request the ORS data be loaded into the NWA data warehouse (DW).

### Data Warehouse Load

ORS creates a closed survey data file and places it on a secure FTP site within (b) (4). IT&S executes a script to transfer (using secure FTP) the survey data file from (b) (4) to NWA and load the raw data onto a file. Another script is run to create DW Dimension and Fact tables using this raw data. The Dimension and Fact tables are used by IT&S to build analysis cubes and predefined reports using SQL Server Analysis Services (SSAS) and SQL Server Reporting Services (SSRS), respectively.

### Data Validation – DW

After the raw data is transferred from ORS to DW, IT&S performs a row count check to ensure no rows were dropped. They also run queries against the original ORS data to display key data which is compared to the raw data file.

As part of a final Quality Control process, predefined ORS reports are used by a designated Data Collections Analyst to validate the DW cube and reporting data. Two NWOs are tied

between ORS and DW in detail, and the overall network totals are reconciled. The Senior Manager Data Collections also manually scans the network totals for reasonableness. After completion of these validation steps, Data Collections sends an email to IT&S to open the cube and reporting capability for general use within NWA.

## APPENDIX D: Bio – (b) (6) Audit Personnel

(b) (6), CISSP, CISA | Senior Manager IT Audit & Analytics | (b) (4)

(b) (6) is a certified audit and security professional with extensive experience in technology and compliance audits and information security coupled with an expertise in evaluating and resolving issues through collaboration.

She has over 25 years' experience conducting IT Audit and Information Security assessments and has practical experience in technology operational functions to include programming, network support, and IT Project Management. Throughout her career she has developed and applied analytic tools and methodologies to create efficiencies in testing and to solve business problems.

(b) (6), CIA | Project Professional | (b) (4)

(b) (6) is an Internal Audit, risk assessment/mitigation, information security, and compliance professional with more than 30 years of varying positions, ranging through IT audit, corporate audit, SOX consulting, financial controller, business continuity and information security within the retail, wholesale, distribution, energy and financial services industries.

Throughout his career he has built high performing teams and led projects to address tactical and strategic business risks and create value for organizations. This was accomplished through excellent communication, team-building, risk evaluation, project management and problem solving skills.