

PACIFIC GAS AND ELECTRIC COMPANY

ASSET AND RISK MANAGEMENT DISTRIBUTION INTEGRITY MANAGEMENT



Attachment H

Rev 0

Known Threat Identification and Known and Potential Threat Risk Evaluation

3/14/2014

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Overview

This attachment outlines the steps for performing the identification and subsequent risk evaluation of known threats, and the risk evaluation of potential threats. The identification of potential threats outlined in Attachment I: Issue Investigation Process. For more information regarding the risk philosophy, see RMP-15, Section 6. The risk evaluation process is a list of recommendations for Root Cause Analysis, which will be reviewed and approved by the DMP Steering Committee.

Known Threat Identification

This process details how to use the scrub bed (a.k.a. normalized) leak data to identify known threats to PG&E's gas distribution system. It utilizes the leak scrubbing procedure described in Attachment J: Leak Repair Data Reformatting and Scrub Process. The analysis is divided into two parts: Distribution at or below 60 psig, and Distribution above 60 psig.

1. QC the scrub bed data set:
 - 1.1. Check for duplicate leak numbers.
 - 1.2. Check for missing data in the fields: Cause, District, Line Use, Leak Source, as well as other missing data required for risk evaluation.
 - 1.3. If cause change field is yes, is the change valid?

[Step 2 requires a software license and basic proficiency with Tableau Desktop. For tutorials and training, visit <http://www.tableausoftware.com/learn/training>.]

2. Using Tableau Desktop 8.1, create a workbook (file) and load the data contained in the Excel spreadsheet of the scrub bed leaks. The workbook will contain the following worksheets and dashboards:
 - 2.1. 2014 DMP Threat ID.twb

2.1.1. Leaks by Cause – Company – At or Below 60psig

This workbook shows the count of leaks by Cause category.

- 2.1.1.1. Add variables to Columns:
 - 2.1.1.1.1. Count(Cause)
 - 2.1.1.1.2. Label data with its corresponding value
- 2.1.1.2. Add variables to Rows:
 - 2.1.1.2.1. Cause
- 2.1.1.3. Add other QuickFilters:
 - 2.1.1.3.1. YearRepaired: target year(s) only
 - 2.1.1.3.2. LineUse: Exclude Distribution Main>60psig and Unknown
 - 2.1.1.3.3. Division: Exclude Gas Transmission

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2.1.2. Leaks by Cause – District – At or Below 60psig

This workbook shows the count of leaks in each district by Cause category.

Add variables to Columns:

2.1.2.1.1. Count (Cause)

2.1.2.1.2. Label data with its corresponding value

2.1.2.2. Add variables to Rows:

2.1.2.2.1. District

2.1.2.2.2. Cause

2.1.2.3. Add other QuickFilters:

2.1.2.3.1. YearRepaired: target year(s) only

2.1.2.3.2. LineUse: Exclude Distribution Main > 60psig and Unknown

2.1.2.3.3. Division: Exclude Gas Transmission

2.1.3. Leaks by Cause / Reported Cause – At or Below 60psig

This workbook shows the count of leaks by Cause category and its originally reported cause from IGS.

2.1.3.1. Add variables to Columns:

2.1.3.1.1. Count (Cause)

2.1.3.1.2. Label data with its corresponding value

2.1.3.2. Add variables to Rows:

2.1.3.2.1. Cause

2.1.3.2.2. Reported Cause

2.1.3.2.3. Line Use

2.1.3.3. Add other QuickFilters:

2.1.3.3.1. YearRepaired: target year(s) only

2.1.3.3.2. LineUse: Exclude Distribution Main > 60psig and Unknown

2.1.3.3.3. Division: Exclude Gas Transmission

2.1.4. Leaks by Cause – Company – Above 60psig

This workbook shows the count of leaks by Cause category.

2.1.4.1. Add variables to Columns:

2.1.4.1.1. Count (Cause)

2.1.4.1.2. Label data with its corresponding value

2.1.4.2. Add variables to Rows:

2.1.4.2.1. Cause

2.1.4.3. Add other QuickFilters:

2.1.4.3.1. YearRepaired: target year(s) only

2.1.4.3.2. LineUse: Distribution Main > 60psig only

2.1.5. Leaks by Cause – District – Above 60psig

This workbook shows the count of leaks in each district by Cause category.

2.1.5.1. Add variables to Columns:

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2.1.5.1.1. Count(Cause)

2.1.5.1.2. Label data with its corresponding value.

2.1.5.2. Add variables to Rows:

2.1.5.2.1. District

2.1.5.2.2. Cause

2.1.5.3. Add other QuickFilters:

2.1.5.3.1. YearRepaired: target year(s) only

2.1.5.3.2. LineUse: Distribution Main>60psig only

2.1.6. Leaks by Cause / Reported Cause – Above 60psig

This workbook shows the count of leaks by Cause category and its originally reported cause from IGS.

2.1.6.1. Add variables to Columns:

2.1.6.1.1. Count(Cause)

2.1.6.1.2. Label data with its corresponding value

2.1.6.2. Add variables to Rows:

2.1.6.2.1. Cause

2.1.6.2.2. Reported Cause

2.1.6.3. Add other QuickFilters:

2.1.6.3.1. YearRepaired: target year(s) only

2.1.6.3.2. LineUse: Distribution Main>60psig only

3. The known threats are identified by the causes shown in the workbooks above. Determine the appropriateness of the threat identification:

3.1. Were there any changes to the threat categorization in the scrub procedure?

3.2. Were there any changes to the A-form that could shift the threat category based on how a leak is classified?

3.3. Are the counts of leaks in each cause category in line with expectations and previous years?

3.4. Are the reported causes assigned to the correct cause?

3.5. If there are unexpected leak counts, what is the reason for the discrepancy?

4. Present the results of the analysis to the DMP Steering Committee. Discuss the following:

4.1. Scrub procedure changes

4.2. Special data considerations (e.g. leak reporting changes)

4.3. Missing data and secondary sources

4.4. Threat Identification results

Risk Calculations of Known Threats

This process details how to perform the risk calculations on the scrubbed leak data.

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1. Using the Excel spreadsheet of the scrubbed leaks, create 13 new columns with the following titles and data format. These are the scores for each consequence factor and the final risk score for leak.
 - 1.1. C_Damage
 - 1.2. C_Diameter
 - 1.3. C_Fatality
 - 1.4. C_Injury
 - 1.5. C_Grade
 - 1.6. C_InjuryFatalityMetric
 - 1.7. C_InjuryFatalityRatio
 - 1.8. C_NearPublic
 - 1.9. C_Pressure
 - 1.10. C_Proximity
 - 1.11. C_Surface
 - 1.12. C_Val12/Val1
 - 1.13. Risk_Raw

2. In the new columns, assign values to each of the above consequence factors and calculate risk score per the RMP-15, Section 6.5. Default values are assigned if values are missing or null in the resource data. The importance of the missing data is tested in the next step.

3. Risk Sensitivity of Missing Data

If required data for a risk factor is missing after the leak repair scrub process, a risk sensitivity analysis will be performed.

 - 3.1. Missing Data Statistics
 - 3.1.1. Document the number of leaks missing required factors.
 - 3.1.2. Determine if trends or patterns exist within the risk factor's values. This may aid in determining reasons for missing data.
 - 3.1.3. Risk output analyses utilize several of the following variables: Cause, District, City Use, and Leak Source. Determine if a disproportionate number of missing data is correlated with a variable. This may indicate how the risk output analysis will be impacted.
 - 3.2. Comparison of RCA recommendations
 - 3.2.1. For the risk factor in question, compare applicable output risk analysis(es) between best case and worst case factor value.
 - 3.2.2. If the comparison results in different RCA recommendations, add the new recommendations to the RCA list.

4. Independent Quality Control Review
 - 4.1. A second Risk Management engineer will verify accuracy of consequence value assignments through manual assignment in Excel, and verify the accuracy of risk score calculations by manually computing scores in Excel for 10% of leaks.

Risk Output Analysis of Known Threats

After the output risk calculations are verified, the risk results are further analyzed utilizing Tableau workbooks. The analysis is divided into two parts: Distribution at or below 60 psig, and Distribution above 60 psig. The following steps describe the worksheets and dashboards needed, and their respective variables and filters.

[Steps 1 and 2 require a software license and basic proficiency with Tableau Desktop. For tutorials and training, visit <http://www.tableausoftware.com/learn/training>. Step 1 also requires basic proficiency with ESR I ArcMap.]

1. Gas Distribution Above 60psig

This analysis requires supplementing the District 60 psig leaks with pipeline information from Transmission Integrity Management. This is accomplished through spatial data processing. The resulting spreadsheet of risk scores and GIS data will be analyzed with Tableau Desktop.

1.1. GIS data processing

1.1.1. Filter the scrubbed leaks spreadsheet for LineUse = "Distribution Main>60psig".

1.1.2. Using ArcCatalog, create a geodatabase table and import the leak numbers of the filtered dataset.

1.1.3. Join the data to the "Leak" feature class from TMAP GIS based on leak number.

1.1.4. Select those leaks that successfully joined.

1.1.5. Verify this number matches the number of filtered leak records.

1.1.6. Export the selection of leaks into a new feature class.

1.1.7. On this new feature class of leaks, spatially join the data from the "DeNormalized TransmissionMain" feature class based on the "Closest" feature.

1.1.8. Verify that each leak record is joined with a pipeline feature.

1.1.9. Based on leak repair comments, determine if there are leaks on High Pressure Regulator (HPR) sets.

1.1.9.1. Review these leaks to determine if the HPR (and its upstream transmission pressure pipe) are within 50 feet of a structure.

1.1.9.2. If such leaks exist, reassign the SL to use and recalculate the risk score of the leaks.

1.1.10. Export the verified data in a .dbf.

1.1.11. Open the .dbf in Excel and save as .xlsx file.

1.2. Create a Tableau workbook: 2014 DMP Risk Analysis – All Causes – Above 60psig.twb

1.2.1. Load the exported spreadsheet from the GIS data processing step.

1.2.2. Risk by Cause – Company

This worksheet provides a company-wide view of the risk scores for each cause.

1.2.2.1. Add variables to Columns:

1.2.2.1.1. Sum(Risk_Raw)

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1.2.2.2. Add variables to Rows:

1.2.2.2.1. Cause

1.2.2.3. Add other QuickFilters:

1.2.2.3.1. YearRepaired: target year(s) only

1.2.2.3.2. LineUse: Distribution Main>60psig only

1.2.3. Route Selection

This worksheet identifies routes for RCA.

1.2.3.1. Add variables to Columns:

1.2.3.1.1. Sum(Risk_Row)

1.2.3.2. Add variables to Rows:

1.2.3.2.1. Route_1

1.2.3.3. Add other QuickFilters:

1.2.3.3.1. YearRepaired: target year(s) only

1.2.3.3.2. LineUse: Distribution Main>60psig only

1.2.3.4. Add Reference Lines for Medium and High Risk:

1.2.3.4.1. Right-click on Sum(Risk_Row) and then "Add a Reference Line"

1.2.3.4.2. Select the "Distribution" box.

1.2.3.4.3. Select "Entire Table" under Scope.

1.2.3.4.4. Under Computation, input the values reflecting the criteria for Medium and High Risk as outlined in RMP-15, Section 6.6.

1.3. Root Cause Analysis recommendations

1.3.1. Identify the Routes that meet the medium or high risk criteria.

1.3.2. Compile this list in a spreadsheet titled "2014 DIMP RCA Recommendations.xlsx". This list will be reviewed by the DIMP Steering Committee as described in Approval and Documentation section below.

1.3.3. Proceed to identify RCA candidates for Distribution below 60 psig.

2. Gas Distribution at or below 60 psig

Using Tableau Desktop, create four workbooks (.twb file), each loaded with the Excel spreadsheet containing the risk scores of the scrubbed leaks. The workbook will contain the following worksheets and dashboards:

2.1. 2014 DIMP Risk Analysis – All Causes – Company – at or below 60psig.twb

2.1.1. Risk by Cause – Company

This worksheet provides a company-wide view of the risk scores for each cause.

2.1.1.1. Add variables to Columns:

2.1.1.1.1. Sum(Risk_Row)

2.1.1.2. Add variables to Rows:

2.1.1.2.1. Cause

2.1.1.3. Add other QuickFilters:

2.1.1.3.1. YearRepaired: target year(s) only

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- 2.1.1.3.2. Division: exclude Gas Transmission
- 2.1.1.3.3. LineUse: exclude Distribution Main60psig and Unknown
- 2.1.1.3.4. Exclude the data combinations of Other, Above Ground Facility, Valve, and Grades 1.5, 2, and 3.

2.2.2014DMP Risk Analysis – All Causes Except Excavation and Other – District.twb

2.2 Risk by District / Line Use / Leak Source

With the leaks caused by Excavation and Other separated out, this worksheet provides an overview of the risk scores of the remaining causes in each district.

2.2.1.1. Add variables to Columns:

- 2.2.1.1.1. SumRisk_Faw)
- 2.2.1.1.2. Avg(Risk_Faw)
- 2.2.1.1.3. Count(Risk_Faw)
- 2.2.1.1.4. Label data with its corresponding value.

2.2.1.2. Add variables to Rows:

- 2.2.1.2.1. Division (filter out Gas Transmission)
- 2.2.1.2.2. District
- 2.2.1.2.3. Cause (filter out Excavation and Other)
- 2.2.1.2.4. LineUse (filter out Distribution Main60psig and Unknown)
- 2.2.1.2.5. LeakSource

2.2.1.3. Add other QuickFilters:

- 2.2.1.3.1. YearRepaired: target year(s) only

2.2.1.4. Add Reference Lines for Medium and High Risk:

- 2.2.1.4.1. Right-click on SumRisk_Faw) and then “Add a Reference Line”
- 2.2.1.4.2. Select the “Distribution” box.
- 2.2.1.4.3. Select “Entire Table” under Scope.
- 2.2.1.4.4. Under Computation, input the values reflecting the criteria for Medium and High Risk as outlined in RMP-15, Section 6.6.

2.2 Medium Risk

This worksheet displays the District/Cause/LineUse/LeakSource combinations that meet the medium risk criterion.

2.2.2.1. Add variables to Columns:

- 2.2.2.1.1. SumRisk_Faw) (filter: values of medium risk range - lower limit inclusive, upper limit exclusive)
- 2.2.2.1.2. Count(Risk_Faw)
- 2.2.2.1.3. Label data with its corresponding value.

2.2.2.2 Add variables to Rows:

- 2.2.2.2.1. District
- 2.2.2.2.2. Cause (filter out Excavation and Other)
- 2.2.2.2.3. LineUse (filter out Distribution Main60psig and Unknown)

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2.2.2.2.4. LeakSource

2.2.2.3. Add other QuickFilters:

2.2.2.3.1. YearRepaired: target year(s) only

2.2 High Risk

This worksheet displays the District/Cause/LineUse/LeakSource combinations that meet the high risk criterion.

2.2.3.1. Add variables to Columns:

2.2.3.1.1. Sum(Risk_Raw) (filter: values of high risk range - lower limit inclusive, upper limit inclusive)

2.2.3.1.2. Count(Risk_Raw)

2.2.3.1.3. Label data with its corresponding value.

2.2.3.2. Add variables to Rows:

2.2.3.2.1. District

2.2.3.2.2. Cause (filter out Excavation and Other)

2.2.3.2.3. LineUse (filter out Distribution Main>Opsig and Unknown)

2.2.3.2.4. LeakSource

2.2.3.3. Add other QuickFilters:

2.2.3.3.1. YearRepaired: target year(s) only

2.2 Mid & High Risk Selection

This dashboard combines the previous 3 worksheets into one display.

2.2.4.1. Click on the "New Dashboard" tab at the right of the tab toolbar.

2.2.4.2. Drag the Risk by District / Line Use / Leak Source, Medium Risk, and High Risk worksheets into the dashboard.

2.2.4.3. Set the following QuickFilters to "Apply to Selected Worksheets" i, ii, and iii above:

2.2.4.3.1. Cause

2.2.4.3.2. YearRepaired (filter: target year(s) only)

2.2.4.3.3. Division

2.2.4.3.4. District

2.2.4.3.5. LineUse

2.2.4.3.6. LeakSource

2.2.4.4. Ensure that the Sum(Risk_Raw) QuickFilters apply only to the respective worksheets of Medium Risk and High Risk.

2.2 Medium and High Risk

This worksheet combines the medium and high risk District/Cause/Line Use/Leak Source combinations into one list. This will enable the creation of the interactive 'Risk /

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Performance" dashboard.

- 2.2.5.1. Add variables to Columns:
 - 2.2.5.1.1. $\text{Sum}(\text{Risk_Fav})$ (filter: lower limit = lower bound of medium risk range, no upper limit)
 - 2.2.5.1.2. $\text{Count}(\text{Risk_Fav})$
 - 2.2.5.1.3. Label data with its corresponding value.
- 2.2.5.2. Add variables to Rows:
 - 2.2.5.2.1. District
 - 2.2.5.2.2. Cause (filter out Excavation and Other)
 - 2.2.5.2.3. LineUse (filter out Distribution Main>60psig and Unknown)
 - 2.2.5.2.4. LeakSource
- 2.2.5.3. Add other QuickFilters:
 - 2.2.5.3.1. YearRepaired: target year(s) only
- 2.2.5.4. Add Reference Lines for Medium and High Risk:
 - 2.2.5.4.1. Right-click on $\text{Sum}(\text{Risk_Fav})$ and then "Add a Reference Line"
 - 2.2.5.4.2. Select the "Band" box.
 - 2.2.5.4.3. Select "Entire Table" under Scope.
 - 2.2.5.4.4. Input the two band constants reflecting the lower bound of Medium and lower bound of High Risk as outlined in RMP-15, Section 6.6.

2.2.6. Performance

This worksheet displays the trend of leak counts repaired from the most recent 5 years of data and the regression line of the leak history for specific combinations of District/Cause/Line Use/Leak Source. This allows for the determination of Good, Fair, and Poor performance.

- 2.2.6.1. Add variables to Columns:
 - 2.2.6.1.1. District
 - 2.2.6.1.2. Cause
 - 2.2.6.1.3. LineUse
 - 2.2.6.1.4. LeakSource
 - 2.2.6.1.5. YearRepaired (filter: include previous 5 years of repaired leaks)
- 2.2.6.2. Add variables to Rows:
 - 2.2.6.2.1. $\text{Count}(\text{Risk_Fav})$
 - 2.2.6.2.2. Label data with its corresponding value.
- 2.2.6.3. Add other QuickFilters:
 - 2.2.6.3.1. Division: exclude Gas Transmission
- 2.2.6.4. Right click on any data point and add a linear trend line.

2.2. Risk / Performance Analysis

This dashboard combines the worksheets of Medium and High Risk, and Performance. This

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allows for an interactive display to determine which Medium and High Risk combinations have Fair or Poor performance, which will result in the list of 2014 Root Cause Analysis areas.

- 2.2.7.1. Click on the 'New Dashboard' tab at the right of the tab toolbar.
- 2.2.7.2. Drag the Medium and High Risk and Performance worksheets into the dashboard, displayed side by side.
- 2.2.7.3. Add a Cause QuickFilter that applies only to the Medium and High Risk worksheet.
- 2.2.7.4. Add the following QuickFilters that apply only to the Performance worksheet:
 - 2.2.7.4.1. Cause
 - 2.2.7.4.2. LineUse
 - 2.2.7.4.3. LeakSource
 - 2.2.7.4.4. YearRepaired
- 2.2.7.5. Add an Action Filter that shows the Performance graphs of selected areas from the Medium and High Risk worksheet:
 - 2.2.7.5.1. Click on the Dashboard menu, then select Actions
 - 2.2.7.5.2. Click Add Action -> Filter
 - 2.2.7.5.3. Under Source Sheets,
 - 2.2.7.5.3.1. Check only Medium and High Risk
 - 2.2.7.5.3.2. Check Run Action on Select
 - 2.2.7.5.4. Under Target Sheets,
 - 2.2.7.5.4.1. Check only Performance
 - 2.2.7.5.4.2. Check Clearing the selection will Show all values
 - 2.2.7.5.5. Under Target Filters, add Filters:
 - 2.2.7.5.5.1. District
 - 2.2.7.5.5.2. Cause
 - 2.2.7.5.5.3. LineUse
 - 2.2.7.5.5.4. LeakSource

2.3. 2014 DMP Risk Analysis – Excavation only – Qty.twb

2.3.1 Risk by City / Line Use

This worksheet provides an overview of the risk scores for the cause of Excavation in each city.

- 2.3.1.1. Add variables to Columns:
 - 2.3.1.1.1. Sum(Risk_Fav)
 - 2.3.1.1.2. Avg(Risk_Fav)
 - 2.3.1.1.3. Count (Risk_Fav)
 - 2.3.1.1.4. Label data with its corresponding value.
- 2.3.1.2. Add variables to Rows:
 - 2.3.1.2.1. City

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- 2.3.1.2.2. LineUse (filter out Distribution Main>60psig and Unknown)
 - 2.3.1.3. Add other QuickFilters:
 - 2.3.1.3.1. Division: exclude Gas Transmission
 - 2.3.1.3.2. Cause: Excavation only
 - 2.3.1.3.3. YearRepaired: target year(s) only
 - 2.3.1.4. Add Reference Lines for Medium and High Risk:
 - 2.3.1.4.1. Right-click on Sum(Risk_{Raw}) and then "Add a Reference Line"
 - 2.3.1.4.2. Select the "Distribution" box.
 - 2.3.1.4.3. Select "Entire Table" under Scope.
 - 2.3.1.4.4. Under Computation, input the values reflecting the criteria for Medium and High Risk as outlined in RMP-15, Section 6.6.
- 2.3.2. Medium Risk
- This worksheet displays the City/Line Use combinations that meet the medium risk criterion.
- 2.3.2.1. Add variables to Columns:
 - 2.3.2.1.1. Sum(Risk_{Raw}) (filter: values of medium risk range - lower limit inclusive, upper limit exclusive)
 - 2.3.2.1.2. Count(Risk_{Raw})
 - 2.3.2.1.3. Label data with its corresponding value.
 - 2.3.2.2. Add variables to Rows:
 - 2.3.2.2.1. City
 - 2.3.2.2.2. Cause (filter for Excavation only)
 - 2.3.2.2.3. LineUse (filter out Distribution Main>60psig and Unknown)
 - 2.3.2.3. Add other QuickFilters:
 - 2.3.2.3.1. Division: exclude Gas Transmission
 - 2.3.2.3.2. YearRepaired: target year(s) only
- 2.3.3. High Risk
- This worksheet displays the City/Line Use combinations that meet the medium risk criterion.
- 2.3.3.1. Add variables to Columns:
 - 2.3.3.1.1. Sum(Risk_{Raw}) (filter: values of high risk range - lower limit inclusive, upper limit inclusive)
 - 2.3.3.1.2. Count(Risk_{Raw})
 - 2.3.3.1.3. Label data with its corresponding value.
 - 2.3.3.2. Add variables to Rows:
 - 2.3.3.2.1. City
 - 2.3.3.2.2. Cause (filter for Excavation only)
 - 2.3.3.2.3. LineUse (filter out Distribution Main>60psig and Unknown)
 - 2.3.3.3. Add other QuickFilters:
 - 2.3.3.3.1. Division: exclude Gas Transmission
 - 2.3.3.3.2. YearRepaired: target year(s) only

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2.3.4. ~~Medium and High Risk Selection~~

This dashboard combines the previous 3 worksheets into one display.

- 2.3.4.1. Click on the “New Dashboard” tab at the right of the tab toolbar.
- 2.3.4.2. Drag the Risk by District/Line Use/Leak Source, Medium Risk, and High Risk worksheets into the dashboard.
- 2.3.4.3. Set the following QuickFilters to “Apply to Selected Worksheets” i, ii, and iii above:
 - 2.3.4.3.1. Case
 - 2.3.4.3.2. YearRepaired (filter: target year(s) only)
 - 2.3.4.3.3. Division
 - 2.3.4.3.4. District
 - 2.3.4.3.5. LineUse
 - 2.3.4.3.6. LeakSource
- 2.3.4.4. Ensure that the $\text{Sum}(\text{Risk_Fav})$ QuickFilters apply only to the respective worksheets of Medium Risk and High Risk.

2.3.5. ~~Medium and High Risk~~

This worksheet combines the medium and high risk City/Line Use combinations into one list. This will enable the creation of the interactive “Risk / Performance” dashboard.

- 2.3.5.1. Add variables to Columns:
 - 2.3.5.1.1. $\text{Sum}(\text{Risk_Fav})$ (filter: lower limit = lower bound of medium risk range, no upper limit)
 - 2.3.5.1.2. $\text{Count}(\text{Risk_Fav})$
 - 2.3.5.1.3. Label data with its corresponding value.
- 2.3.5.2. Add variables to Rows:
 - 2.3.5.2.1. City
 - 2.3.5.2.2. Case (filter for Excavation only)
 - 2.3.5.2.3. LineUse (filter out Distribution Main>60psig and Unknown)
- 2.3.5.3. Add other QuickFilters:
 - 2.3.5.3.1. Division: exclude Gas Transmission
 - 2.3.5.3.2. YearRepaired: target year(s) only
- 2.3.5.4. Add Reference Lines for Medium and High Risk:
 - 2.3.5.4.1. Right-click on $\text{Sum}(\text{Risk_Fav})$ and then “Add a Reference Line”
 - 2.3.5.4.2. Select the “Band” box.
 - 2.3.5.4.3. Select “Entire Table” under Scope.
 - 2.3.5.4.4. Input the two band constants reflecting the lower bound of Medium and lower bound of High Risk as outlined in RMP-15, Section 6.6.

2.3.6. ~~Performance~~

This worksheet displays the trend of leak counts repaired from the most recent 5 years of

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data and the regression line of the leak history for specific combinations of City/Line Use.

This allows for the determination of Good, Fair, and Poor performance.

- 2.3.6.1. Add variables to Columns:
 - 2.3.6.1.1. City
 - 2.3.6.1.2. Cause (filter: Excavation only)
 - 2.3.6.1.3. LineUse
 - 2.3.6.1.4. YearRepaired (filter: include previous 5 years of repaired leaks)
- 2.3.6.2. Add variables to Rows:
 - 2.3.6.2.1. Count (Risk_Fav)
 - 2.3.6.2.2. Label data with its corresponding value.
 - 2.3.6.2.3. Right click on any data point and add a linear trend line.
- 2.3.6.3. Add other QuickFilters:
 - 2.3.6.3.1. Division: exclude Gas Transmission

2.3. Risk / Performance Analysis

This dashboard combines the worksheets of Medium and High Risk, and Performance. This allows for an interactive display to determine which Medium and High Risk combinations have Fair or Poor performance, which will result in the list of 2014 Root Cause Analysis areas.

- 2.3.7.1. Click on the "New Dashboard" tab at the right of the tab toolbar.
- 2.3.7.2. Drag the Medium and High Risk and Performance worksheets into the dashboard, displayed side by side.
- 2.3.7.3. Add a Cause QuickFilter that applies only to the Medium and High Risk worksheet.
- 2.3.7.4. Add the following QuickFilters that apply only to the Performance worksheet:
 - 2.3.7.4.1. City
 - 2.3.7.4.2. Cause
 - 2.3.7.4.3. LineUse
 - 2.3.7.4.4. LeakSource
 - 2.3.7.4.5. YearRepaired
- 2.3.7.5. Add an Action Filter that shows the Performance graphs of selected areas from the Medium and High Risk worksheet:
 - 2.3.7.5.1. Click on the Dashboard menu, then select Actions
 - 2.3.7.5.2. Click Add Action -> Filter
 - 2.3.7.5.3. Under Source Sheets,
 - 2.3.7.5.3.1. Check only Medium and High Risk
 - 2.3.7.5.3.2. Check Run Action on Select
 - 2.3.7.5.4. Under Target Sheets,
 - 2.3.7.5.4.1. Check only Performance
 - 2.3.7.5.4.2. Check Clearing the selection will Show all values

Known Threat Identification and Known and Potential Threat Risk Evaluation

2.3.7.5.5. Under Target Filters, add Filters:

2.3.7.5.5.1 City

2.3.7.5.5.2 Line Use

2.4.2014 DIMP Risk Analysis – Other only – District.twb

2.4. Risk by District / Line Use / Leak Source

This worksheet provides an overview of the risk scores for the cause of Other in each district.

2.4.1.1. Add variables to Columns:

2.4.1.1.1. Sum(Risk_Faw)

2.4.1.1.2. Avg(Risk_Faw)

2.4.1.1.3. Count(Risk_Faw)

2.4.1.1.4. Label data with its corresponding value.

2.4.1.2. Add variables to Rows:

2.4.1.2.1. District

2.4.1.2.2. Line Use (filter out Distribution Main > 6 sig and Unknown)

2.4.1.2.3. Leak Source

2.4.1.3. Add other QuickFilters:

2.4.1.3.1. Cause: Other only

2.4.1.3.2. Division: exclude Gas Transmission

2.4.1.3.3. Year Repaired: target year(s) only

2.4.1.3.4. Exclude the data combinations of Other, Above Ground Facility, Valve, and Grades 1.5, 2, and 3.

2.4.1.4. Add Reference Lines for Medium and High Risk:

2.4.1.4.1. Right-click on Sum(Risk_Faw) and then "Add a Reference Line"

2.4.1.4.2. Select the "Distribution" box.

2.4.1.4.3. Select "Entire Table" under Scope.

2.4.1.4.4. Under Computation, input the values reflecting the criteria for Medium and High Risk as outlined in RMP-15, Section 6.6.

2.4. Medium Risk

This worksheet displays the District/Cause/Line Use/Leak Source combinations that meet the medium risk criterion.

2.4.2.1. Add variables to Columns:

2.4.2.1.1. Sum(Risk_Faw) (filter: values of medium risk range - lower limit inclusive, upper limit exclusive)

2.4.2.1.2. Count(Risk_Faw)

2.4.2.1.3. Label data with its corresponding value.

2.4.2.2. Add variables to Rows:

2.4.2.2.1. District

2.4.2.2.2. Line Use (filter out Distribution Main > 6 sig and Unknown)

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2.4.2.2.3. LeakSource

2.4.2.3. Add other QuickFilters:

2.4.2.3.1. Cause: Other only

2.4.2.3.2. Division: exclude Gas Transmission

2.4.2.3.3. YearRepaired: target year(s) only

2.4.2.3.4. Exclude the data combinations of Other, Above Ground Facility, Valve, and Grades 1.5, 2, and 3.

2.4.3. High Risk

This worksheet displays the District/Cause/Line Use/Leak Source combinations that meet the high risk criterion.

2.4.3.1. Add variables to Columns:

2.4.3.1.1. Sum(Risk_Faw) (filter: values of high risk range - lower limit inclusive, upper limit inclusive)

2.4.3.1.2. Count(Risk_Faw)

2.4.3.1.3. Label data with its corresponding value.

2.4.3.2. Add variables to Rows:

2.4.3.2.1. District

2.4.3.2.2. LineUse (filter out Distribution Main60psig and Unknown)

2.4.3.2.3. LeakSource

2.4.3.3. Add other QuickFilters:

2.4.3.3.1. Cause: Other only

2.4.3.3.2. Division: exclude Gas Transmission

2.4.3.3.3. YearRepaired: target year(s) only

2.4.3.3.4. Exclude the data combinations of Other, Above Ground Facility, Valve, and Grades 1.5, 2, and 3.

2.4.4. Med & High Risk Selection

This dashboard combines the previous 3 worksheets into one display.

2.4.4.1. Click on the "New Dashboard" tab at the right of the tab toolbar.

2.4.4.2. Drag the Risk by District/Line Use/Leak Source, Medium Risk, and High Risk worksheets into the dashboard.

2.4.4.3. Set the following QuickFilters to "Apply to Selected Worksheets" i, ii, and iii above:

2.4.4.3.1. Cause

2.4.4.3.2. YearRepaired (filter: target year(s) only)

2.4.4.3.3. Division

2.4.4.3.4. District

2.4.4.3.5. LineUse

2.4.4.3.6. LeakSource

2.4.4.4. Ensure that the Sum(Risk_Faw) QuickFilters apply only to the respective worksheets of Medium Risk and High Risk.

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2.4.5. Medium and High Risk

This worksheet combines the medium and high risk District/Cause/LineUse/LeakSource combinations into one list. This will enable the creation of the interactive "Risk / Performance" dashboard.

2.4.5.1. Add variables to Columns:

2.4.5.1.1. Sum(Risk_Fav) (filter: lower limit = lower bound of medium risk range, no upper limit)

2.4.5.1.2. Count(Risk_Fav)

2.4.5.1.3. Label data with its corresponding value.

2.4.5.2. Add variables to Rows:

2.4.5.2.1. District

2.4.5.2.2. LineUse (filter out Distribution Main>60psig and Unknown)

2.4.5.2.3. LeakSource

2.4.5.3. Add other QuickFilters:

2.4.5.3.1. Division: exclude Gas Transmission

2.4.5.3.2. YearRepaired: target year(s) only

2.4.5.3.3. Cause (filter for Other only)

2.4.5.3.4. Exclude the data combinations of Other, Above Ground Facility, Valve, and Grades 1.5, 2, and 3.

2.4.5.4. Add Reference Lines for Medium and High Risk:

2.4.5.4.1. Right-click on Sum(Risk_Fav) and then "Add a Reference Line"

2.4.5.4.2. Select the "Band" box.

2.4.5.4.3. Select "Entire Table" under Scope.

2.4.5.4.4. Input the two band constants reflecting the lower bound of Medium and lower bound of High Risk as outlined in RMP-15, Section 6.6.

2.4.6. Performance

This worksheet displays the trend of leak counts repaired from 2008 to 2012 and the regression line of the leak history for specific combinations of District/Cause/LineUse/LeakSource. This allows for the determination of Good, Fair, and Poor performance.

2.4.6.1. Add variables to Columns:

2.4.6.1.1. District

2.4.6.1.2. Cause (filter: Other only)

2.4.6.1.3. LineUse

2.4.6.1.4. LeakSource

2.4.6.1.5. YearRepaired (filter: include previous 5 years of repaired leaks)

2.4.6.2. Add variables to Rows:

2.4.6.2.1. Count(Risk_Fav)

2.4.6.2.2. Label data with its corresponding value.

2.4.6.3. Add other QuickFilters:

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2.4.6.3.1. Division: exclude Gas Transmission

2.4.6.3.2. Exclude the data combinations of Other, Above Ground Facility, Valve, and Grades 1.5, 2, and 3.

2.4.6.4. Right click on any data point and add a Linear trend line.

2.4. Risk / Performance Analysis

This dashboard combines the worksheets of Medium and High Risk, and Performance. This allows for an interactive display to determine which Medium and High Risk combinations have Fair or Poor performance, which will result in the list of 2014 Root Cause Analysis areas.

2.4.7.1. Click on the "NewDashboard" tab at the right of the tab toolbar.

2.4.7.2. Drag the Medium and High Risk and Performance worksheets into the dashboard, displayed side by side.

2.4.7.3. Add a QuickFilter that applies only to the Medium and High Risk worksheet.

2.4.7.4. Add the following QuickFilters that apply only to the Performance worksheet:

2.4.7.4.1. Cause

2.4.7.4.2. LinLe

2.4.7.4.3. LeakSource

2.4.7.4.4. YearRepaired

2.4.7.5. Add an ActionFilter that shows the Performance graphs of selected areas from the Medium and High Risk worksheet:

2.4.7.5.1. Click on the Dashboard menu, then select Actions

2.4.7.5.2. Click Add Action -> Filter

2.4.7.5.3. Under Source Sheets,

2.4.7.5.3.1 Check only Medium and High Risk

2.4.7.5.3.2 Check Run Action on Select

2.4.7.5.4. Under Target Sheets,

2.4.7.5.4.1 Check only Performance

2.4.7.5.4.2 Check Clearing the selection will Show all values

2.4.7.5.5. Under Target Filters, add Filters:

2.4.7.5.5.1 District

2.4.7.5.5.2 Cause

2.4.7.5.5.3 LinLe

2.4.7.5.5.4 LeakSource

2.5. Check that data inputs and, data filters and exclusions are applied consistently between workbooks (e.g. filters associated with Other should be applied to both 2014DMP Risk Analysis -Other only -District.twb and 2014DMP Risk Analysis -All Causes -Company -at or below 60psig.twb).

2.6. Performance Analysis

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2.6. Based on the risk and performance criteria specified in RMP-15, Section 6.6, use the Risk/Performance worksheets to determine the areas where its risk and performance categorization qualifies that area for Root Cause Analysis.

2.6.1.1. 2014 DMP Risk Analysis – All Causes Except Excavation and Other – District.twb

2.6.1.2. 2014 DMP Risk Analysis – Excavation only – City.twb

2.6.1.3. 2014 DMP Risk Analysis – Other only – District.twb

2.6. Compile the list of recommended RCAs from the three risk analyses in the Excel file titled

“2014 DMP RCA Recommendations.xlsx”. For all areas defined as Medium and High Risk, include columns for Cause, District, Line, Leak Source, Risk_Raw, Leak Count, Risk Level, Performance Trend (good, fair, or poor), and RCA candidate (yes/no).

Risk Evaluation of Potential Threats

1. Extract the list of potential threats from the Issue Investigation Process log.
2. For each potential threat, estimate the values for the risk factors described in Attachment L “Evaluation Approach” and document the assumptions of each estimated value.
3. In a hypothetical scenario of a potential threat causing a leak, the risk of the leak can be estimated. Compare the estimated leak risk scores with the average risk score of a leak from a known threat.
4. Based on the medium and high risk criteria specified in RMP-15, section 6.6, determine the range of average risk scores that meet the criteria.
5. If a potential threat with a risk score meets the medium or high risk criteria, it is recommended for Root Cause Analysis.
6. Compile the list of recommended potential threats for RCA in the Excel file titled “2014 DMP RCA Recommendations.xlsx”.

Approval and Documentation

1. Present results to the DMP Steering Committee to obtain approval of the RCA recommendations.
 - 1.1. Discuss risk model changes, risk/performance analysis changes, and the RCA list.
 - 1.2. Document discussion topics and proposed changes in meeting minutes.
 - 1.3. Revise and document approval of risk results.
2. Create Attachment B: Distribution Risk Evaluation after risk results are approved.
 - 2.1. Overview

Describe the purpose and content of Attachment B.
 - 2.2. Data Utilized

Describe the data used, including date range and assumptions.
 - 2.3. Risk Analysis

Detail the analysis methods and special considerations for the given cycle. Present the results and recommendations of the risk analysis.

Known Threat Identification and Known and Potential Threat Risk Evaluation

3. Store the completed documents here:

3.1. \\FFShare01-NAS\RiskMgmt\DMP2. DMP Compliance\3. Risk Evaluation\2014\2. Risk Calculations

3.1.1. Risk calculation spreadsheets and verification

3.2. \\FFShare01-NAS\RiskMgmt\DMP2. DMP Compliance\3. Risk Evaluation\2014\3. Analysis Output

3.2.1. Tableau workbooks

3.2.2. RFA recommendations: "2014 DMP RFA Recommendations.xlsx"

3.2.3. DMP Steering Committee meeting minutes

3.2.4. Attachment B

4. Communicate the approved RFA list to DMP Mitigation.