# PACIFIC GAS AND ELECTRIC COMPANY

ASSET AND RISK MANAGEMENT
DISTRIBUTION INTEGRITY MANAGEMENT


Attachment J

Rev 0

# Leak Repair Data Reformatting and Scrub Process

3/14/2014

## Contents

1. Purpose
   1.1. This process was developed to improve the consistency of key leak repair data field values for use in Distribution Integrity Management Program (DIMP) risk analysis and Pipeline and Hazardous Material Safety Administration (PHMSA) 7100.1-1 Annual Report submission.

   The review of leak repair data reported by Company employees in prior years indicates that some selections made on the leak repair form are not always consistent with other values selected on the form or with the free-form comments that employees provide. For example, the selection of 'Corrosion' as the Leak Cause for a plastic main or service line is one example of inconsistent reporting. This process seeks to identify the most accurate values for the Leak Cause, Line Use, Leak Source, and Line Material by utilizing the available information in the employee comments and other relevant data fields. Use of the scrubbed data for both the risk analysis and 7100.1-1 report should provide the most accurate data available and more closely represent the true results rather than relying on the leak repair data only as reported.

2. Process Overview
   2.1. The following is an overview of the scrub process steps. There is further discussion in the relevant section below:
   2.2. Initial data extraction from leak management system (Integrated Gas Information System (IGIS) or SAP)
   2.3. Reformat data set to prepare for scrubbing
   2.4. Identify Transmission and Gathering leaks
   2.5. Determine reportable and non-reportable leaks
   2.6. Apply data normalization values
   2.7. Review leaks with inconsistent values as well as leaks with "unknown" and "other" values
   2.8. QC the final scrubbed data set based on the Final Data Set Review
   2.9. Perform Independent QC Review
   2.10. Perform final reformatting
   2.11. Archiving and Final Deliverables

3. Initial Data Extraction
   3.1. Contact Gas Tech Specialist from DIMP Risk Management to extract IGIS leak data (a process will be developed for SAP once requirements are known) using the following SQL statement:

```
select  l.leakno "Leak Number", d.div_l_name "Division Name", a.dist_name
"District Name", l.city "City",

d.division "Division Number", a.dist_num "District Number", l.map "Map",
l.plat "Plat", l.block "Block",
l.cparea "CP Area", u.line_use_desc "Line Use of Inspected Pipe", l.yearcon
"Year Installed", l.grade "Current Grade",
h.new_grade "Initial Grade", c.cause_desc "Reported Cause", s.sourcedesc
"Reported Leak Source", i.remarks "Inspection Remarks",
r.repair_loc "Repair Location", r.remarks "Repair Remarks",
i.tee_cap_cracking "Tee Cap Cracking",
```

```
m.mat_desc "Line Material (Pipe Data)", f.mat_desc "Line Material
(Inspection)", g.mat_desc "Line Material (Repair Data)",
l.pres_code "Pressure", l.mop "MOP", l.diameter "Diameter (Pipe Data)",
i.diameter "Diameter (Inspection)",
k.description "Surface Over Pipe (Inspection)", kk.description "Surface at
Read Location", l.wall2wall "Wall-Wall",
l.location "Leak Location", l.above_grnd "Pipe Exposed", w.reportfrom
"Reported By", trunc(l.date_reptd) "Reported",
trunc(r.repaired) "Repaired", l.high_consequence_area "HCA", i.nearpublic
"Near Public Assembly", l.fedrl_land "Federal Land",
l.emp_injury "Employee Injury", l.oth_injury "Other Injury", l.damage "Damage
($)", l.emp_fatal "Fatality Employee",
l.oth_fatal "Fatality Other", l.inci_cause "Incident Cause",
trunc(l.usa_date) "USA Date", l.usa_called "USA Called"
from leaks_in l, repair_in r, insepct_in i, division d, district a, line_use
u, leak_cause c,
leaksource s, material m, material f, material g, reported w, surface kk,
surface k, check_in h
where l.leakno = r.leakno
and l.leakno = h.leakno
and h.check_num = 0
and l.leakno = i.leakno (+)
and l.division = d.division
and l.dist_num = a.dist_num
and l.line_use = u.line_use
and l.cause = c.cause
and l.source = s.source
and r.repl_with = g.mat_code (+)
and l.mat_code = m.mat_code
and i.mat_code = f.mat_code (+)
and i.surface = k.code (+)
and l.surface = kk.code (+)
and l.reportby = w.reportby
and r.repaired >= '1-September-2013'
and r.repaired < '2-September-2013'
and r.repair_num = '1'
and i.insplineno (+) = 1
order by d.div_l_name, a.dist_name, l.leakno
```

Note: SQL code must be updated for desired date repaired range.

3.2. Receive data in Excel format and name file "All Lks Repair_YearMonthDay_YearMonthDay", where "YearMonthDay" refers to the date range of the data.

3.3. Archive file to \DIMP\1. System Knowledge\ IGIS\ 'Year' \Scrub raw

3.4. Save working file to \DIMP\ 2. DIMP Compliance\ 2. Threat Identification\ 'Year' \Known Threats\ IGIS\Scrub Working

4. Reformat Data Set

4.1. Add columns for population during the scrub process, including:

4.1.1. DMP (Division-Map-Plat)

4.1.1.1. Concatenate values from Division, Map, and Plat fields using the equation: =CONCATENATE( Division , "-" Map , "-" Plat )

4.1.1.2. Copy the resultant values in the BMP column and paste values in the same column. This will remove the equation.
4.1.1.3. Scrub the data for Map/Plat/Block consistency (i.e. Map should read 0001 instead of __1)
4.1.2. Cause
4.1.3. Line Use
4.1.4. Leak Source
4.1.5. Material
4.1.6. Diameter
4.1.7. Grade
4.1.8. Response Time
4.1.9. Surface
4.1.10. Near Public
4.1.11. Near Public (GIS)
4.1.12. Damage Risk
4.1.13. Damage Final
4.1.14. Injury Risk
4.1.15. Injury Other Final
4.1.16. Fatality Risk
4.1.17. Fatality Other Final
4.1.18. TLA
4.1.19. Cause Change?
4.1.20. Line Use Change?
4.1.21. Leak source Change?
4.1.22. Grade Change?
4.1.23. Material Change?

4.2. Change Grade "2+" leaks to Grade "1.5"

4.3. For leaks where "Surface Over Pipe" or "Surface at Read Location" is reported as "Unsurfaced", change the value to "Soil (Previously Unsurfaced)".

5. Identify Transmission and Gathering Leaks and Distribution Main > 60 psig
5.1. Identify "Line Use" of "Transmission" from the Transmission Integrity Management Program (TIMP) data Extract
5.1.1. Extract "Leaks" feature class from TIMP Geographic Information System (GIS).
5.1.2. Extract "Denormalized Transmission Main" feature class from TIMP GIS.
5.1.3. Querying transmission leaks:
5.1.3.1. Spatially join leaks and mains using the Closest method.
5.1.3.2. Based on the leak table attribute "IMSTATUS", filter on:
5.1.3.2.1. Null
5.1.3.2.2. GPS Leak Active Pipe
5.1.3.2.3. GPS Leak Deactivated
5.1.3.2.4. GPS Leak Active Pipe Assumed
5.1.3.2.5. GPS Non-Leak
5.1.4. Based on the leak table attribute "TransDef", filter on any value that begins with a 'T'.

5.1.5. Based on the mains table attribute "TransDef", filter on any value that begins with a 'T'.
5.1.6. Use VLOOKUP to assign Line Use as "Transmission" for matching leaks.
5.1.7. The lines determined to be Transmission shall be removed from the Data Scrub and copied into a new sheet titled "Transmission Leaks".

5.2. Further identify "Line Use" of "Distribution Main>60 psig" from TIMP data extract
5.2.1. Extract transmission main leaks from TIMP GIS.
5.2.2. Extract denormalized transmission mains from TIMP GIS.
5.2.3. Query out Distribution Main >60psig leaks
5.2.3.1. Spatially join leaks and mains.
5.2.3.2. Based on the leak table attribute "IMSTATUS", filter on:
5.2.3.2.1. NULL
5.2.3.2.2. 60psi Leak
5.2.3.2.3. GPS Leak Active Pipe Assumed, and
5.2.3.2.4. GPS Non-Leak
5.2.3.3. Based on the leak table attribute "TransDef, filter on:
5.2.3.3.1. NULL
5.2.3.3.2. D, or
5.2.3.3.3. DI
5.2.3.4. Based on the centerline table attribute "TransDef", filter on:
5.2.3.4.1. NULL
5.2.3.4.2. D, or
5.2.3.4.3. DI.
5.2.3.5. Use VLOOKUP to assign Line Use as Distribution Main>60 psig

6. Determine Reportable and Non-Reportable Leaks

6.1. PG&E uses Tighten, Lubricate, or Adjust (TLA) Codes as a method to classify which repaired leaks fit the PHMSA definition of "reportable". Reportable leaks are given TLA Codes 2 ar (see further definition below) and will be included in the risk evaluation. Non-reportable leaks are assigned TLA Code 1 and are also included in the risk evaluation and used during root cause analysis.

6.2. Table 1 below contains TLA code examples that are used during the scrub process. If during the scrub process more examples are found they shall be added to the Table 1 list.

6.3. All Grade 1 leaks are reportable and shall be classified as a TLA code2.

6.4. Code 1 is assigned to leak repairs that are not reportable to PHMSA.
6.4.1. Assign Code 1 if there are repair remarks such as:
6.4.1.1. "tight", "tighten"
6.4.1.2. "adjust"
6.4.1.3. "lubed"
6.4.1.4. "grease"

6.4.1.5. "operated"
6.4.1.6. "removed, doped and tightened"
6.4.1.7. "removed, doped and replaced same".

6.5. Code 2 is assigned to reportable leaks. This includes replacement of assets and other leak repairs such as welds.
6.5.1. Assign Code 2 if repair remarks include something similar to:
6.5.1.1. "Removed, doped and replaced"
6.5.1.2. "removed and replaced".
6.5.2. Examples:
6.5.2.1. Replaced service valve.
6.5.2.2. Replace valve/plug/plastic tee cap and rebuilt meter set and/or irons and/or regulator
6.5.2.3. Clamps
6.5.2.4. Welds
6.5.2.5. Replace entire service

6.6. Code 3 – Data inconclusive
6.6.1. Assign Code 3 if the repair cannot be clearly assigned to any of the other codes. Usually used when Cause/Source/Repair/Remarks= Other or Unknown.

Table 1 – TLA Code Examples

| Data Keywords | TLA Code |
|---|---|
| Reinstalled service valve or riser valve | 1 |
| Tight or tighten | 1 |
| Adjust | 1 |
| Lubed or Greased | 1 |
| Operated | 1 |
| Removed, doped and tightened | 1 |
| Replace same | 1 |
| | |
| Bell Joint | 2 |
| Deactivate | 2 |
| Replacing Tees | 2 |
| Trident Seal | 2 |
| Soap/Tape | 2 |
| Aquawrap | 2 |
| Replumb | 2 |
| SPJC = Skimmer Pipe Joint Clamp | 2 |

| | | |
|---|---|---|
| Repair Description: Replace Main Valve < 2 inch – Replace or Replace Main Valve >= 2 inch | | 2 |
| Install service valve or riser valve | | 2 |
| Weld | 2 | |
| Peened | 2 | |
| Replace | 2 | |
| Change nipple | 2 | |
| Installed new plug | 2 | |
| Replace bell reducer | 2 | |
| Replace fitting and tighten valve | | 2 |
| Replaced bypass T | 2 | |
| Replaced Riser, bell reducer | | 2 |
| Replaced elbow | 2 | |
| Replace Main/Curb valve | 2 | |
| Installed new clamp | 2 | |
| Replaced old clamp | 2 | |
| Replace section of pipe | 2 | |
| Deactivate or "install dead end" | | 2 |
| | | |
| Blank | 3 | |
| No leak found | 3 | |
| Other or Unknown | 3 | |

7. Leak Data Normalization
   7.1. Use the tables below to populate the Risk Algorithm (RA) columns of the spreadsheet prior to in-depth review. Allowable entries for Cause, Line Use, Leak Source, and Material can be found in Table 2.

   7.2. Mark "Yes" in the "Cause Change?", "Line Use Change?", "Leak Source Change?", or "Material Change?" columns if the final Cause, Line Use, Leak Source, or Material, respectively, differ from the values shown in Table 3 - Table 6.

Table 2 – Leak Data Normalization Allowable Entries

| Line Use |
|---|
| Main |
| Service |
| Distribution Main >60 psig |
| Above Ground Facility |
| Riser Below Ground |
| Unknown |

| Material |
|---|
| Plastic |
| Steel |
| Copper |
| Wrought Iron |
| Cast Iron |
| Unknown |

| Ductile Iron |
|---|

| Leak Source |
|---|
| Riser |
| Fitting |
| Valve |
| Plastic Tee Cap |
| Pipe |
| Regulator |
| Unknown |

| Cause |
|---|
| Excavation |
| Corrosion |
| Incorrect Operation |
| Equipment |
| Material or Welds |
| Natural Force |
| Other Outside Force |
| Other |

Table 3 – Leak Data Normalization – Leak Cause

| | IGIS or SAP Leak Cause Value | Risk Assessment (RA) Database Field Value |
|---|---|---|
| | Atmospheric Corrosion | Corrosion |
| | External Corrosion | Corrosion |
| | Internal Corrosion | Corrosion |
| | Stress Corrosion Cracking | Corrosion |
| | Earthquake | Natural Force |
| | Damage by Earth Movement | Natural Force |
| | Damage by Heavy Rains / Flood | Natural Force |
| | Other Natural Forces | Natural Force |
| | Lightning | Natural Force |
| | Root Damage | Natural Force |
| | Dig-In / Excavation | Excavation |
| | Damage by 3rd Party (if Above Ground) | Other Outside Force |
| | Damage by 3rd Party (if Below Ground) | Excavation |
| | Damage by Electrical Facility | Other Outside Force |
| | Deliberate Acts \ Vandalism | Other Outside Force |
| | Fire or Explosion on Customer Facilities | Other Outside Force |
| | Fire or Explosion on Company Facilities | Other Outside Force |
| | Vehicle | Other Outside Force |
| | Rodent | Other Outside Force |

| | | |
|---|---|---|
| | Compression Coupling | Material or Welds |
| | Material Failure | Material or Welds |
| | Plastic Crack Failure | Material or Welds |
| | Plastic Embrittlement | Material or Welds |
| | Weld Failure | Material or Welds |
| | Equipment Malfunction | Equipment |
| | Leak Source = Valve, Regulator & Reported Cause = Construction Defect | Equipment (otherwise Construction Defect = Material or Weld) |
| | Incorrect Operation | Incorrect Operation |
| | No/Deteriorated Pipe Dope | Other |
| | Other | Other |
| | Previously Damaged (If above ground) | Other Outside Force |
| | Previously Damaged (If below ground) | Excavation |
| | Unknown (Incl. Replaced facility) | Other |
| | Cast Iron Fractures | Material or Welds |
| | None Recorded | Other |

Table 4 – Leak Data Normalization – Line Use

| | IGIS or SAP Line Use Description | Risk Assessment (RA) Database Field Value |
|---|---|---|
| | All Branch Service and Single Service | Service |
| | All Dist Main | Main |
| | If Line Use Description: Blank | Unknown |
| | Transmission | Distribution Main >60 psig |
| | Gathering | Distribution Main >60 psig |
| | Distr Main (>60 PSI & <20 PSI) | Distribution Main >60 psig |
| | If "Leak Location" = Above Ground And if "Surface Over Pipe" (Inspection) = Above Ground | Above Ground Facility |
| | IGIS or SAP Leak Cause Value = Vehicle | Above Ground Facility |

Table 5 – Leak Data Normalization – Leak Source

| | IGIS or SAP Leak Source Value | RA Database Field Value |
|---|---|---|

| | |
|---|---|
| Bell Joint | Pipe |
| Body of Pipe | Pipe |
| Clamp | Pipe |
| Compression Coupling Steel | Fitting |
| Compression Coupling SS | Fitting |
| Compression Coupling | Fitting |
| Compression Coupling Plastic | Fitting |
| Curb Valve | Valve |
| Drip | Fitting |
| Encapsulation | Fitting |
| Fitting | Fitting |
| Fusion Joint | Pipe |
| Girth Weld | Pipe |
| Line Valve | Valve |
| Longitudinal Weld | Pipe |
| Mechanical Joint | Fitting |
| Non-corrodible prefab riser | Riser |
| Not Recorded | Unknown |
| Other | Unknown |
| Other Mechanical Joint | Fitting |
| Other Welds | Pipe |
| Plastic Tee Cap | Plastic Tee Cap |
| Pressure Control Fittings | Fitting |
| Regulator/Pilot | Regulator |
| Riser | Riser |
| Riser Inset Kit | Riser |
| Riser Valve Threads | Riser |
| Stab Type Fittings | Fitting |
| Tap Connection | Fitting |
| Threads (on Service or Above Ground Facility) | Riser |
| Threads (Main or Distribution Main) | Pipe |
| Unknown | Unknown |
| Valve | Valve |
| IGIS or SAP Leak Cause Value = Excavation | Pipe |

EXCAVATION

Table 6 – Leak Data Normalization – Line Material

| TABLE LAYOUT | IGIS or SAP Line Material (Pipe Data) & Line Material (Inspection) Values | Risk Assessment (RA) Database Field Value |
|---|---|---|
| | If both column values match | IGIS or SAP Line Material (Pipe Data) |

| | | |
|---|---|---|
| | If columns do not match - Line Material (Pipe Data) takes precedence | IGIS or SAP Line Material (Pipe Data) |
| | If "Line Material (Pipe Data)" is blank | IGIS or SAP Line Material (Inspection) |
| | If all Line Material columns are blank | Unknown |
| | If columns do not match, but each has a plastic value | Plastic |
| | IGIS or SAP Leak Cause Value = Excavation | IGIS or SAP Line Material (Pipe Data) |
| | Aldyl A | Plastic |
| | Casing | Unknown |
| | Cast Iron | Cast Iron |
| | Cast/Ductile Iron | Cast Iron |
| | Copper | Copper |
| | Ductile Iron | Ductile Iron |
| | Other | Unknown |
| | Other Plastic | Plastic |
| | PE 2406 (Orange) | Plastic |
| | PE 2406/2708 (Yellow) | Plastic |
| | PE 3408 (Black) | Plastic |
| | PE 4710 (Black) | Plastic |
| | Steel | Steel |
| | Wrought Iron | Wrought Iron |
| | Steel/Wrought Iron | Steel |
| | IGIS or SAP Leak Source Value = Regulator | Steel |
| | IGIS or SAP Leak Source Value = Plastic Tee Cap & reported material is metallic | Plastic |

7.3. Secondary Data Sources

In the case of missing data use Table 7 to utilize secondary data sources.

Table 7 – Secondary Data Sources to Supplement Missing Data

| Column Heading | Primary data source | Secondary data source |
|---|---|---|
| Leak Number | IGIS or SAP | n/a |
| Division | IGIS or SAP | Pathfinder GIS |
| District | IGIS or SAP | Pathfinder GIS |
| City | IGIS or SAP | Pathfinder GIS |
| Line Use | IGIS or SAP | Plat sheet |
| Leak grade | IGIS or SAP | n/a |
| Reported Leak Cause | IGIS or SAP | n/a |

| | | |
|---|---|---|
| Leak Source | IGIS or SAP | n/a |
| Material of Leaking Component | IGIS or SAP (Pipe Data) | IGIS or SAP Line Material (Inspection) |
| Pressure | IGIS or SAP | SynerGEE |
| Diameter | IGIS or SAP (Pipe) | IGIS Diameter (Inspection) |
| Surface Over Pipe | IGIS or SAP (Inspection) | IGIS or SAP - (Surface Over Read Location) |
| Repair Date | IGIS or SAP | n/a |
| Report Date | IGIS or SAP | n/a |
| Proximity to Areas of Public Assembly | IGIS or SAP | GIS Public Assembly Data |
| Employee & Other Injury | RiskMaster | IGIS or SAP |
| Employee & Other Fatality | RiskMaster | IGIS or SAP |
| Damage Cost | RiskMaster | IGIS or SAP |
| Wall to Wall Paving | IGIS or SAP | n/a |

7.4. Procedure to fill in any missing Near Public data. Sensitivity analysis indicates this data field requires a procedure to fill in missing data.

7.4.1. Identify list of leaks with missing near public data.

7.4.2. LOAD this list of leak data into a new geodatabase table.

7.4.3. RELATE the leak data table to the latest IGIS or SAP leak feature class.

7.4.4. EXPORT the selection as a new feature class; this will create a spatially-enabled layer of leaks without near public data.

7.4.5. Using the SELECT BY LOCATION tool, select leaks that are within 100 feet of the point features from "PublicAssembly_yearmonthday".

7.4.6. FIELD CALCULATE the "NearPublic" field with the value "Y".

7.4.7. Using the SELECT BY ATTRIBUTE tool, select those leaks where the "NearPublic" does not have the value "Y".

7.4.8. FIELD CALCULATE the "NearPublic" field with the value "N".

7.4.9. Using SELECT BY ATTRIBUTES verify there are no null, blank, or unknown values in the "NearPublic" field, using "Get Unique Values".

7.4.10. EXPORT the updated data as a .dbf.

7.4.11. Overwrite "NearPublic(GIS)" field in scrubbed data set with updated data export.

7.4.12. Populate the "Near Public" column with data from the "Near Public Assembly" column, if this is blank use the "NearPublic(GIS)" column

7.5. For other fields, a specific procedure will be developed if missing data is observed via the QC data review outlined in Attachment H.

7.6. Additional Data Normalization

7.6.1. If "Leak Source" equals 'Riser" and "Surface Over Pipe" does not equal "Above Ground" or "Exposed Facility" And "Leak Location" equals "B" then populate "Line Use" column as 'Riser Below Ground"

| Surface Over Pipe And Leak Location / Leak Source | Line Use RA Value |
|---|---|
| "Surface Over Pipe" Is not "Above Ground" or "Exposed Facility" And "Leak Location" = "B" and "Leak Source" = 'Riser" | Riser Below Ground |

7.6.2. Change Leak Source to 'Riser" if the pre-populated RA field for Leak Source is populated with 'Pipe" and "Line Use" is populated with "Above Ground Facility"

| Original RA Leak Source & Line Use Values | Leak Source RA Value |
|---|---|
| Leak Source = 'Pipe" and<br>Line Use = "Above Ground Facility" | Riser |

7.6.3. Change "Line Use" to 'Service" if the RA field for "Line Use" is populated with 'Main" and "Leak Source" is populated with 'Plastic Tee Cap"

| Original RA Leak Source & Line Use Values | Line Use RA Value |
|---|---|
| Leak Source = 'Plastic Tee Cap" and<br>Line Use = 'Main" | Service |

7.6.4. If IGIS or SAP Leak Cause = Corrosion (any type) and all reported material fields indicate non-metallic, perform a more detailed review of 'Repair Location," 'Repair Remarks," or "Inspection Remarks" columns, to determine if cause was actually corrosion. If remarks indicate work was done on riser or if the "Leak Source" is populated with 'Riser", change 'Material" to 'Steel", otherwise change 'Cause" to "Other".

7.6.5. Populate the RA Diameter column from 'Diameter (Pipe)", for leaks where there is no data in the 'Diameter (Pipe)" field, use data from the 'Diameter (Inspection)" field to populate the RA 'Diameter" column.

7.6.6. Populate the Surface column from 'Surface Over Pipe (Inspection)", for leaks where there is no data in the 'Surface Over Pipe (Inspection)" field, use data from the 'Surface at Read Location" field

7.6.7. Populate the RA "Grade" column using the "Initial Grade" data for the case where "Initial Grade" has been downgraded from a 1 or 1.5. For all other cases populate the "Grade" column using 'Current Grade" data. For the cases where

"Initial Grade" is used instead of "Current Grade" place a "Yes" in the "Grade Change?" column.

7.6.8. RiskMaster Update

7.6.8.1. Obtain RiskMaster data for "Event Injury", "Event Fatality" and "Billed Amount" from the Damage Prevention Group.

7.6.8.2. Populate the "Injury Risk", "Fatality Risk" and "Damage Risk" columns using VLOOKUP to import data from the RiskMaster data set.

7.6.8.3. Populate the RA "Damage Final" column using data from "Damage Risk", for leaks where there is no data for "Damage Risk" use data from "Damage ($)"

7.6.8.4. Populate the RA "Injury Other Final" column using data from "Injury Risk", for leaks where there is no data in "Injury Risk" use data from "Injury Other".

7.6.8.5. Populate the RA "Fatality Other Final" column using data from "Fatality Risk", for leaks where there is no data in "Fatality Risk" use data from "Fatality Other".

8. Additional Review of Leak Data

The intent of this section is to provide a more detailed review of leaks where "Unknown" or "Other" were entered in the Risk Assessment (RA) Cause, Leak source, Line Use, or Material column.

8.1. Begin review for Cause information. A breakdown of repair information to identify Cause RA Field is listed in Table 8.

8.1.1. If Cause is "Other"

8.1.1.1. Change to "Corrosion" if remarks indicate pitting, rust, etc. and leak source is metallic.

8.1.1.2. Change to "Excavation" if remarks indicate mechanical damage and leak source is below ground (if it is unclear if leak source is above or below ground, assume below ground, therefore cause is "excavation").

8.1.1.3. Change to "Equipment" if remarks indicate equipment (valve, regulator, coupling, union, o-ring, gasket, etc.) is leaking. Change to "Material / Weld" if remarks indicate cracking, defect, failure, repair weld, etc. (if remarks indicate defect or failure and leak source is equipment, cause may be Equipment)

8.1.1.4. Change to "Other Outside Force" if remarks indicate mechanical damage and leak source is above ground (if it is unclear if leak source is above or below ground, assume below ground, therefore cause is "excavation").

8.1.1.5. Change to "Incorrect Operation" if remarks indicate improper installation or maintenance caused the leak.

8.1.1.6. Change to "Natural Force" if remarks indicate land movement, flood, etc.

8.1.1.7. For all remaining leaks where insufficient information is available to make a more accurate cause determination, leave cause as "Other".

Table 8 – Review of Repair Information to Populate Cause Risk Assessment (RA) Field

| Repair location / Repair Remarks / Inspection Remarks | Cause Risk Assessment (RA) Field |
|---|---|
| Pitting, rust, corrosion | Corrosion |
| Mechanical damage and leak source is below ground or not clear | Excavation |
| Leaking valve, regulator, coupling, union, o-ring, gasket | Equipment |
| Crack, defect, failure | Material or Weld |
| Crack, defect, failure and leak source is equipment | Equipment |
| Mechanical damage and leak source is clearly above ground | Other Outside Force |
| Improper installation or maintenance | Incorrect Operation |
| Land movement, flood | Natural Force |
| Blank or insufficient information | Other |

8.2. Begin review for Line Use Information

8.2.1. If Line Use is "Unknown", perform a more detailed review of "Repair Location," "Repair Remarks," or "Inspection Remarks" columns, to more accurately classify "Line Use"

8.2.2. If any rows remain for which sufficient data is unavailable to make a Line Use determination , place "Unknown" in the RA "Line Use" column.

8.3. Begin Review for Leak Source information

8.3.1. If the leak source is "Unknown", perform a search in "Repair Location", Repair Remarks", or "Inspection Remarks" for the following key words: Riser, Fitting, Valve, Plastic Tee Cap, Regulator, or pipe. If there is a clear indication that a specific part was leaking (e.g. "leaking valve"), place the respective part identification (riser, fitting, etc.) in the RA "Leak Source" column.

8.3.2. If there is not a clear indication the part is leaking, leave as "Unknown".

8.4. Begin review for Material information

8.4.1. If the RA Line Material is "Unknown", use information in "Repair Location," "Repair Remarks," or "Inspection Remarks" columns to determine the material of the leaking component.

8.4.2. Verify that materials listed as "Wrought Iron" or "Ductile Iron" are not actually steel using the "Repair Location," "Repair Remarks," or "Inspection Remarks" columns, change material to "steel" if the information in these columns indicates the failing part is made of steel.

8.4.3. If the line material is "Casing" or "Other", use the "Repair Location," "Repair Remarks," or "Inspection Remarks" columns to determine the actual material type

8.4.3.1. "Casing" is not an option on the A-form. If "Casing" is the reported material and no additional information is available, Change Material to "Unknown".

8.4.4. If there is not enough information to make a material determination, enter "Unknown" in the Risk Assessment (RA) "Material" column

9. Final Data Set Review

9.1. Cause

9.1.1. Review Cause entries for all leaks to verify only the 8 primary causes are used.

9.1.2. Filter for Cause Change = Yes and check that the change made was correct.

9.1.3. Filter cause for "Corrosion", and then filter Material for "Plastic". Reconcile if Corrosion/Material are correct. Material must be metallic if cause = Corrosion.

9.1.4. Filter Reported Cause column for "Stress Corrosion Cracking" and send leak data for each of these leaks to Bryon Winget (BDWN), Corrosion Engineer, for further analysis.

9.1.5. Filter Reported Cause column for "Other", "No/Deteriorated Pipe Dope", and "Unknown" then filter out "Other" from Cause column and verify changes are correct.

9.2. Line Use

9.2.1. Review Line Use entries for all leaks to verify only valid Line Use entries are used per Table 2.

9.2.2. Filter for Line Use Change = Yes and check that changes made were correct.

9.3. Leak source

9.3.1. Review Leak Source entries to verify only the primary leak sources shown in Table 2.

9.3.2. Filter for Leak Source change = Yes and check that the change made was correct.

9.3.3. For Plastic Tee caps, verify material is plastic.

9.4. Material

9.4.1. Review Material entries for all leaks to verify only valid Material entries are used per Table 2.

9.4.2. Filter Material column for each possible entry (except "Unknown") and scan to make sure they are correct per Table 6.

9.4.3. Filter for Material Change = Yes and check that changes made were correct.

9.5. Final Deliverable

9.5.1. Format the columns based on Table 9 – Data Fields for DIMP, remove all columns not shown in this table.

9.5.2. Enter "NULL" in all blank cells with the exception of Map and Plat Data fields.

Table 9 – Data Fields for DIMP

| Workbook Column | Original Column Name | Final Column Name | Field Data Source | Final Field Format | Where used |
|---|---|---|---|---|---|
| A | LEAKNO | Leak Number | A-Form Initial Data | Number | RCA |
| B | Division Name | Division Name | A-Form Pipe ID | Text | RCA |
| C | District Name | District Name | A-Form Pipe ID | Text | RCA |
| D | City | City | A-Form Initial Data | Text | RCA |
| E | Division | Division Number | A-Form Pipe ID | Number | RCA, scrubbing |
| F | Map | Map | A-Form Mapping Data | Number | RCA, scrubbing |
| G | Plat | Plat | A-Form Mapping Data | Number | RCA, scrubbing |
| H | Block | Block | A-Form Mapping Data | Number | RCA |
| I | | DIMP | Calculated | Number | RCA |
| J | CPA | CP Area | A-Form Mapping Data | Number | RCA |
| K | Line Use of Inspected Pipe | Line Use of Inspected Pipe | A-Form Pipe Data | Text | RCA, scrubbing |
| L | YEARCON | Year Installed | A-Form Mapping Data | Number | RCA |
| M | | Initial Grade | A-Form Initial Data | Number | Scrubbing |
| N | Grade | Current Grade | A-Form Initial Data | Number | Scrubbing |
| O | | Grade | Scrubbed | Number | Risk Model, RCA |
| P | | Cause | Scrubbed | Text | Risk Model, RCA |
| Q | Leak Cause | Reported Cause | A-Form Pipe Data | Text | RCA |
| R | | Line Use | Scrubbed | Text | Risk Model, RCA |
| S | | Leak Source | Scrubbed | Text | RCA |
| T | Leak Source | Reported Leak Source | A-Form Pipe Data | Text | RCA |
| U | TEE_CAP_CRACKING | Tee Cap Cracking | A-Form Plastic Pipe Condition | Text | RCA |
| V | | Material | Scrubbed | Text | RCA |
| W | Line Material | Line Material (Pipe) | A-Form Pipe Data | Text | Scrubbin |
| X | Insp Material | Line Material (Inspection) | A-Form General Inspection Data) | Text | Scrubbing, RCA |
| Y | PRES_CODE | Pressure | A-Form Mapping Data | Text | Risk Model |
| Z | MOP | MOP | A-Form Mapping Data | Number | RCA |
| AA | Pipe DIAMETER | Diameter (Pipe) | A-Form Pipe Data | Number | Scrubbing, RCA |
| AB | Insp DIA | Diameter (Inspection) | A-Form General Inspection Data) | Number | Scrubbing, RCA |
| AC | | Surface | Scrubbed | Text | Risk Model |
| AD | Surface Over Pipe | Surface Over Pipe | A-Form General Inspection | Text | Risk Mod |

| | | | | | |
|---|---|---|---|---|---|
| | | | Data) | | RCA, Scrubbing |
| AE | Surface Over Read Location | Surface Over Read Location | A-Form Initial Data | Text | Scrubbing |
| AF | WALL2WALL | Wall-Wall | A-Form Pipe Data) | Text | Risk Model |
| AG | ABOVEGRND | Pipe Exposed | A-Form Pipe Data | Text | RCA |
| AH | Leak Location | Leak Location | A-Form Initial Data | Text | Scrubbing |
| AI | Reported By | Reported By | A-Form Initial Data | Text | RCA |
| AJ | DATE_REPTD | Reported | A-Form Initial Data | Date | Scrubbing |
| AK | REPAIRED | Repaired | A-Form Repair Data | Date | RCA, Scrubbing |
| AL | | Response Time | Scrubbed | Number | RCA |
| AM | | Near Public | Scrubbed | Text | Risk Model |
| AN | NEARPUBLIC | Near Public Assembly | A-Form General Inspection Data) | Text | Risk Model |
| AO | | Near Public (GIS) | GIS | Text | Scrubbing |
| AP | FEDRL_LAND | Federal Land | A-Form Mapping Data | Text | |
| AQ | EMP_INJURY | Injury Employee | A-Form Gas Quarterly Incident Data | Number | Risk Model |
| AR | | Injury Other Final | Scrubbed | Number | Risk Model |
| AS | | Injury Risk | RiskMaster | Number | Scrubbing |
| AT | OTH_INJURY | Injury Other | A-Form Gas Quarterly Incident Data | Number | Scrubbingl |
| AU | | Damage Final | Scrubbed | Number | Risk Model |
| AV | | Damage Risk | RiskMaster | Number | Scrubbing |
| AW | DAMAGE | Damage ($) | A-Form Gas Quarterly Incident Data | Number | Scrubbing |
| AX | EMP_FATAL | Fatality Employee | A-Form Gas Quarterly Incident Data | Number | Risk Model |
| AY | | Fatality Other Final | Scrubbed | Number | Risk Model |
| AZ | | Fatality Risk | RiskMaster | Number | Scrubbing |
| BA | OTH_FATAL | Fatality Other | A-Form Gas Quarterly Incident Data | Number | Scrubbing |
| BB | INCI_CAUSE | Incident Cause | A-Form Pipe Data | Text | RCA |
| BC | USA_DATE | USA Date | A-Form Initial Data | Date | RCA |
| BD | USA_CALLED | USA Called | A-Form Initial Data | Text | RCA |
| BE | District | District Number | A-Form Pipe ID | Number | RCA |
| BF | | Cause Change ? | Scrubbed | Text | RCA |
| BG | | Line Use Change? | Scrubbed | Text | RCA |
| BH | | Leak Source Change? | Scrubbed | Text | RCA |
| BI | | Material Change ? | Scrubbed | Text | RCA |
| BJ | | Grade Change? | Scrubbed | Text | RCA |
| BK | | Diameter | Scrubbed | Number | Risk Model RCA |
| BL | | TLA | Scrubbed | Number | RCA |

10. Independent QC Review

This part of the leak data scrub shall be completed by another DIMP team member.

10.1. Beginning with the raw data set, complete Steps 3-7 of this process.

10.2. Randomly select 10% of the remaining leaks and complete Step 8 on these leaks.

10.3. Compare the results of the scrubbed 10% with the same leaks in the complete scrubbed data set by reviewing the results in the following fields:

10.3.1. Cause

10.3.2. Line Use

10.3.3. Leak Source

10.3.4. Material

10.4. Where discrepancies between the two data sets exist, the first and second data reviewer must meet to determine the most accurate final value.

10.5. If data discrepancies cannot be resolved, document the percent discrepancies between the two scrubbed data sets for each field (Cause, Line Use, Leak Source, and Material)

10.6. Send this information to Supervisor of Risk Management for determination of whether or not an acceptable level of error exists.

10.7. Check for cases where Line Use = "Main" and Leak Source = "Riser". Record the number and percentage of these occurrences.

10.8. Check for cases where Line Use = "Above Ground Facility" and Leak Source = "Valve". Record the number and percentage of these occurrences.

11. Final Formatting of the Data Set

11.1. Remove the Repair Location, Repair Description, and Remarks columns, keeping only the columns shown in Table 9.

11.2. Remove extra spaces after text in the "Reported By" and "Incident Cause" columns.

11.3. Change final field format, as necessary, as shown in Table 9.

12. Archiving

The purpose of archiving is to be able to recreate the process used for data scrubbing

12.1. Create Word document describing Metadata for data scrubbing process including:

12.1.1. Description of files and what they were used for

12.1.2. Document any assumptions that were made

12.2. Store raw files at DIMP\2. DIMP Compliance\2. Threat Identification\"Year"\Known Threats\IGIS\Scrub Working.

13. Final Deliverables

13.1. Store Final scrubbed data set at DIMP\2. DIMP Compliance\2. Threat Identification\"Year"\Known Threats\IGIS\Scrub Final

13.2. Send e-mail to DIMP Risk Management team that scrub process is complete

13.3. Update ICAM, or equivalent tracking system, that scrub process is complete

14. References

14.1. A-Form Instruction, Job Aid TD-4110P-03-JA01