CPUC Meeting Materials

MAOP Validation Methodology

FEBRUARY 18, 2011

Discussion Topics

- Pressure Test Records Criteria
  - **–Verifiable, Traceable and Complete**

- MAOP Validation Methodology

Pressure Test Records Criteria

Verifiable, Traceable and Complete

VERIFIABLE	TRACEABLE	COMPLETE
INITIAL PASS		
Criteria: ▪ Pressure test record (e.g. STPR[1], chart) exists ▪ Record has been collected and available for review	**Criteria:** ▪ Total pipeline footage that is pressure tested per the pressure test records correlates with information contained on the Job Estimate Face Sheet	**Criteria:** ▪ Pressure test record contains the following 4 elements required by current regulations (CFR Title 49, Part 192.517[2]): - Name of Operator - Test Pressure - Test Duration - Test Medium
ADDITIONAL ANALYSIS REQUIRED (One or more of the above criteria has not been met)		
Criteria: ▪ Other data sources need to be researched (e.g. test logs, As Builts, etc.)	**Criteria:** ▪ Other data sources need to be researched (e.g. As Builts, Bill of Materials, etc.)	**Criteria:** ▪ Other data sources need to be researched to identify 4 key elements above

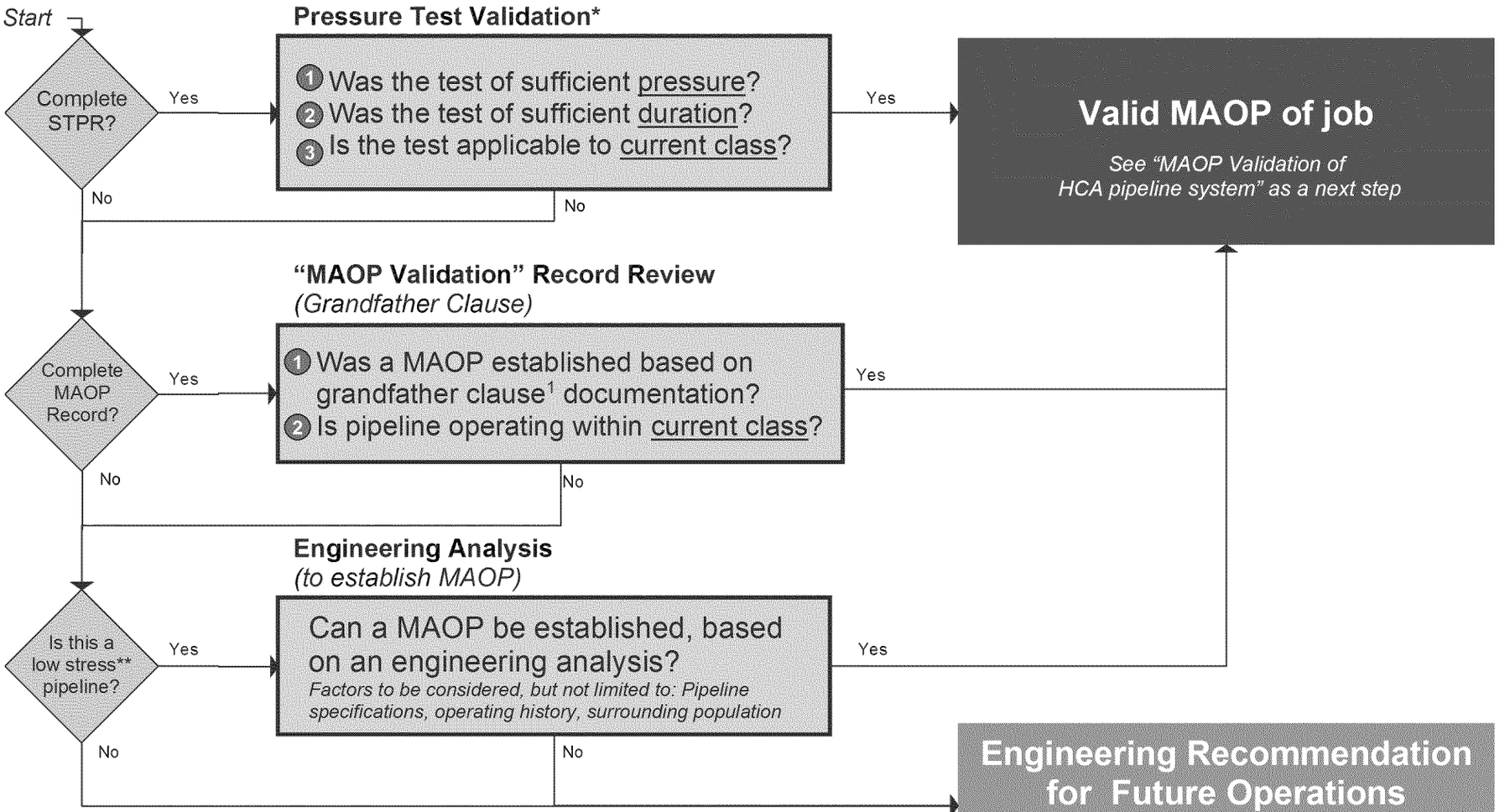
[1]Strength Test Pressure Report. Please refer to the Appendix for an example report.
[2]CFR Title 49, Part 192 includes 3 additional elements including pressure chart, elevation and leak and failure survey. These elements are being documented when available as part of the Data Validation Project.

1. **MAOP Validation of the Job**
   - Establishes MAOP of the pipe segment

2. **MAOP Validation of the HCA Pipeline System**
   - Establishes MAOP of the pipeline system based on the lowest MAOP of the HCA pipe segment or component

MAOP Validation Methodology

1. MAOP Validation of Job



Notes:
*Validation in accordance with the code requirements relevant at the time the test was conducted
**Low stress is defined as pipelines operating ≤ 20% SMYS
[1]MAOP can be established using the grandfather clause (highest actual operating pressure to which the segment was subjected during the 5 years preceding July 1, 1970) per CFR Title 49, Part 192.619

MAOP Validation Methodology

2. MAOP Validation of HCA Pipeline System

Establish MAOP of the Job *(prior step)*

Develop comprehensive Pipeline Features List (PFL)

Follow 1998 PHMSA guideline, Determination of MAOP in Natural Gas Pipelines

Determine valid MAOP of HCA pipeline system

Components include (*but not limited to*):

- Pipe
- Valves
- Fittings
- Overpressure Protection Devices
- *Other*

PHMSA References

- Based on requirements as outlined in CFR Title 49, Part 192

PHMSA Guideline

- Determine the appropriate pressure limit for each pipeline component
- Lowest value of the component establishes the MAOP of the pipeline system

Appendix

STPR EXAMPLE

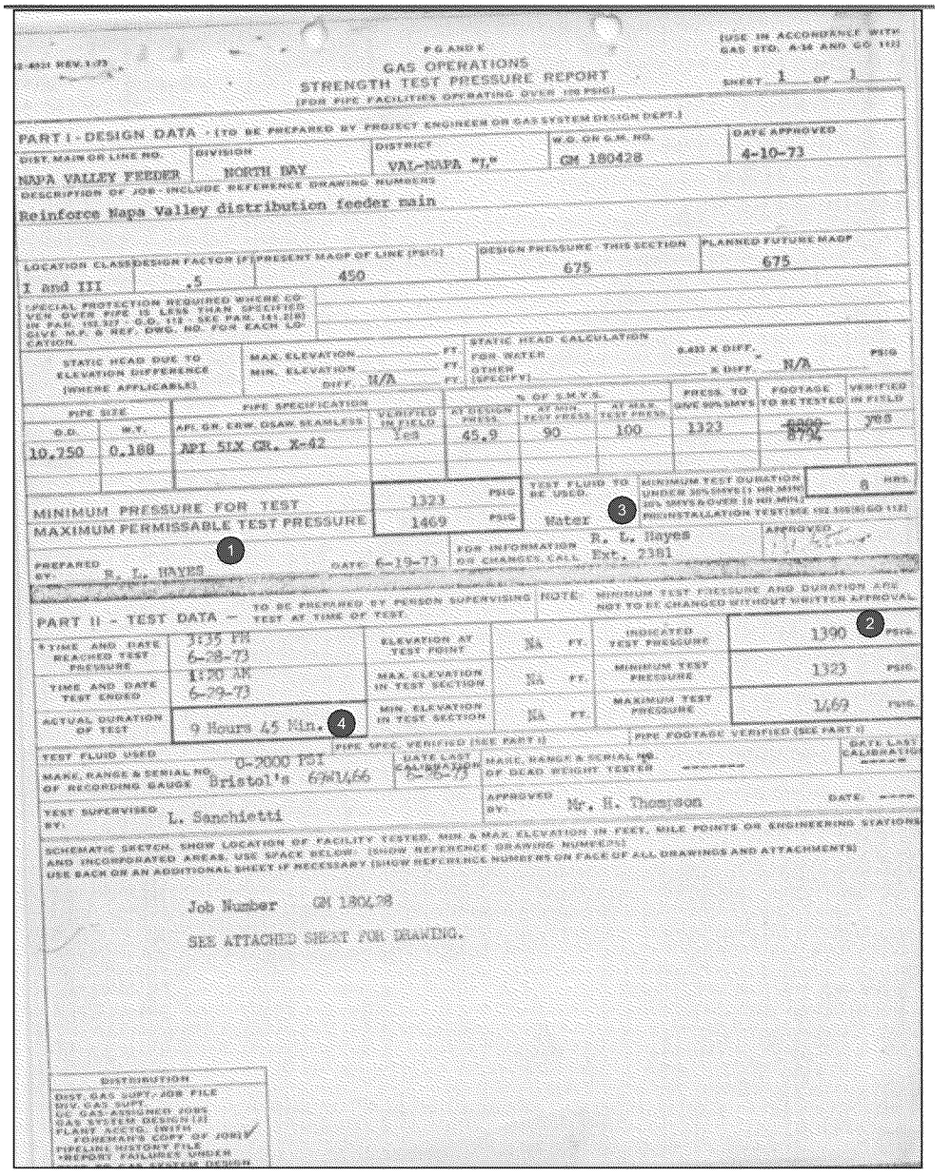
MAOP VALIDATION METHODOLOGY DETAILS

STPR Example

Criteria for Complete

- Four key elements:
  1. Operator name
  2. Test pressure
  3. Test medium
  4. Test duration

- Additional information (captured if available):
  - Elevation variation
  - Pressure charts
  - Leaks and failures



P G AND E
GAS OPERATIONS
STRENGTH TEST PRESSURE REPORT
(FOR PIPE FACILITIES OPERATING OVER 100 PSIG)

(USE IN ACCORDANCE WITH GAS STD. A-34 AND GO 112)

SHEET 1 OF 1

PART I - DESIGN DATA - (TO BE PREPARED BY PROJECT ENGINEER OR GAS SYSTEM DESIGN DEPT.)

DIST. MAIN OR LINE NO.	DIVISION	DISTRICT	W.O. OR G.M. NO.	DATE APPROVED
NAPA VALLEY FEEDER	NORTH BAY	VAL-NAPA "I"	GM 180428	4-10-73

DESCRIPTION OF JOB - INCLUDE REFERENCE DRAWING NUMBERS
Reinforce Napa Valley distribution feeder main

LOCATION CLASS	DESIGN FACTOR (F)	PRESENT MAOP OF LINE (PSIG)	DESIGN PRESSURE THIS SECTION	PLANNED FUTURE MAOP
I and III	.5	450	675	675

SPECIAL PROTECTION REQUIRED WHERE CONCRETE OVER PIPE IS LESS THAN SPECIFIED OR PAR. 192.327 - G.O. 112 - SEE PAR. 181.2(B) GIVE M.P. & REF. DWG. NO. FOR EACH LOCATION.

STATIC HEAD DUE TO ELEVATION DIFFERENCE (WHERE APPLICABLE)
MAX. ELEVATION ____ FT.
MIN. ELEVATION ____ FT.
DIFF. N/A FT.
STATIC HEAD CALCULATION
0.433 X DIFF. FOR WATER ____ PSIG
OTHER (SPECIFY) ____ X DIFF. N/A PSIG

PIPE SIZE O.D.	PIPE SIZE W.T.	PIPE SPECIFICATION (API, GR, CRW, DSAW, SEAMLESS)	VERIFIED IN FIELD	% OF S.M.Y.S. AT DESIGN PRESS.	% OF S.M.Y.S. AT MIN. TEST PRESS.	% OF S.M.Y.S. AT MAX. TEST PRESS.	PRESS. TO GIVE 90% SMYS	FOOTAGE TO BE TESTED	VERIFIED IN FIELD
10.750	0.188	API 5LX GR. X-42	Yes	45.9	90	100	1323	~~8000~~ 8794	Yes

MINIMUM PRESSURE FOR TEST 1323 PSIG
MAXIMUM PERMISSABLE TEST PRESSURE 1469 PSIG
TEST FLUID TO BE USED: Water (3)
MINIMUM TEST DURATION UNDER 30% SMYS (1 HR MIN.) OR 30% SMYS & OVER (8 HR MIN.) PRE-INSTALLATION TEST (SEE 192.505(B) OR (C)): 8 HRS.

PREPARED BY: R. L. HAYES (1) DATE: 6-19-73
FOR INFORMATION OR CHANGES, CALL: R. L. Hayes Ext. 2381
APPROVED

PART II - TEST DATA - (TO BE PREPARED BY PERSON SUPERVISING TEST AT TIME OF TEST.)
NOTE: MINIMUM TEST PRESSURE AND DURATION ARE NOT TO BE CHANGED WITHOUT WRITTEN APPROVAL.

TIME AND DATE REACHED TEST PRESSURE	3:35 PM 6-28-73	ELEVATION AT TEST POINT	NA FT.	INDICATED TEST PRESSURE: 1390 (2) PSIG
TIME AND DATE TEST ENDED	1:20 AM 6-29-73	MAX. ELEVATION IN TEST SECTION	NA FT.	MINIMUM TEST PRESSURE: 1323 PSIG
ACTUAL DURATION OF TEST	9 Hours 45 Min. (4)	MIN. ELEVATION IN TEST SECTION	NA FT.	MAXIMUM TEST PRESSURE: 1469 PSIG

TEST FLUID USED: Water
PIPE SPEC. VERIFIED (SEE PART I)
PIPE FOOTAGE VERIFIED (SEE PART I)
MAKE, RANGE & SERIAL NO. OF RECORDING GAUGE: Bristol's 69W466
DATE LAST CALIBRATION: 6-26-73
MAKE, RANGE & SERIAL NO. OF DEAD WEIGHT TESTER: ------
DATE LAST CALIBRATION: ------
TEST SUPERVISED BY: L. Sanchietti
APPROVED BY: Mr. H. Thompson
DATE: ------

SCHEMATIC SKETCH: SHOW LOCATION OF FACILITY TESTED, MIN. & MAX. ELEVATION IN FEET, MILE POINTS OR ENGINEERING STATIONS AND INCORPORATED AREAS. USE SPACE BELOW. (SHOW REFERENCE DRAWING NUMBERS) USE BACK OR AN ADDITIONAL SHEET IF NECESSARY (SHOW REFERENCE NUMBERS ON FACE OF ALL DRAWINGS AND ATTACHMENTS)

Job Number GM 180428

SEE ATTACHED SHEET FOR DRAWING.

DISTRIBUTION
DIST. GAS SUPT. JOB FILE
DIV. GAS SUPT.
U.C. GAS ASSIGNED JOBS
GAS SYSTEM DESIGN (2)
PLANT ACCTG. (WITH FOREMAN'S COPY OF JOB)
PIPELINE HISTORY FILE
*REPORT FAILURES UNDER

Job Estimate Face Sheet Example

Criteria for Complete

- Face sheet includes footage
- Used to correlate with footage on STPR's

PACIFIC GAS AND ELECTRIC COMPANY
ESTIMATE FOR AUTHORIZATION

RC#04-445

DATE OF ESTIMATE May 5, 1972
DEPARTMENT Gas DISTRICT Vjo.-Napa "L" DIVISION NAME North Bay NO. 04
NAMES OF APPLICANTS Pacific Gas & Electric Company ESTIMATE NO. G-40306
LOCATION Oakville to South of Rutherford, Napa Rural COUNTY Napa
JOB TITLE Reinforce Napa Valley Distribution Feeder Main.
NECESSITY FOR PROPOSED WORK AND DESCRIPTION THEREOF:

In order to supply firm gas demands to North Napa Valley, (Calistoga, St. Helena, Sanitarium & Angwin), it is proposed to install 8350' of 10" HP gas main from south of Oakville to South of Rutherford along hwy. #29.

This reinforcement is recommended by Gas System Planning and is another portion of a master plan to maintain 150 PSI level to the Northern Napa Valley Area.

This extension will assure adequacy of supply into 1974.

CP Area NC-TP

RECOMMENDATION & RULE NO.
Company Expense

LINE EXTENSION DATA
TOTAL FEET
CO. ALLOW.
EXCESS FT.
$ PER FT.
ADVANCE REQD. $
EST. 1 YR. REV. $
EXTENSION BASIS AUTHORIZED
OTHER RELATED JOB AUTHORIZATIONS (INCLUDING G & C'S)
GSC LOCATION
ESTIMATOR NDeMaio
REQ'D. DATE OF OPER. 10- '72
BUDGET ITEM NO.
BUDGET AMOUNT $

ACCOUNT NO.	ACTIVITY ITEM NO.	LOCATION AND/OR ITEM NO.	ESTIMATE OF DIRECT COST ITEMS (FOR INVOLVED ESTIMATES GIVE SUMMARY HERE – DETAIL ON EXTRA SHEETS)	UNIT AMOUNT (WHEN REQD.)	LABOR	MATERIAL	OTHER	TOTAL
1224		1000	Install 8350'- 10" HP Gas Main		65628	32888	59040	157556
1224		2000	Install 35'-6" HP Gas Main		400	75		475
1224		3000	Install 6" Valve in F&C		400	1500		1900

PLANT TO BE REMOVED OR ABANDONED (SHOW JOB NO., PREDECESSOR COMPANY AND PERIOD OF INSTALLATION AS APPROPRIATE)

TOTAL DIRECT COST (EXCL. MAINT. & OPER.)	164,211
INDIRECT COSTS (EXCL. MAINT. & OPER.) %	32,675
SUB-TOTAL	196,886
GEN. OVERHEADS 8.938	17,598
APPROPRIATION (EXCL. MAINT. & OPER.)	214,484
MAINTENANCE & OPER.	-
AMOUNT AUTHORIZED	214,484
INSTALL AND/OR REMOVE REVOLVING STOCK (NET)	-
INSTALL AND/OR REMOVE SERVICES	-
DEDUCT SALVAGE AND/OR OTHER CREDITS	-
NET AMOUNT	214,484

CHECK LIST	REQ'D.	SEC'D.	CHECK LIST	REQ'D.	SEC'D.
J.P./J.T. INTENTION			RIGHT OF WAY		
J.P./J.T. APPL. NO.			OVER 20% YIELD	Yes	
TREE TRIMMING			STRENGTH TEST	Yes	
CITY OR CO. PERMIT			PAVEMENT – SQ.FT.	25000	
HIWAY PERMIT		X	MACHINE TRENCH – FT.	9975	
R.R. X-ING PERMIT			MAN DAYS	1054	
OTHER PERMITS			COST REPORT REQUIRED	YES	NO X

PROGRESS REPORT CODES (ACCT'G. ONLY): CARD CODE, DIV'N., DIST., DEPT., CWIP 115; SUSP., VAL., ADV. SM'S., BILL ADV'S.

AUTHORIZATION – DIVISION OFFICE: RECOMMENDED R.H. JONES; APPROVED J.O. FOSTER; AUTHORIZED
GENERAL OFFICE: RECOMMENDED; APPROVED; AUTHORIZATION NUMBER GM

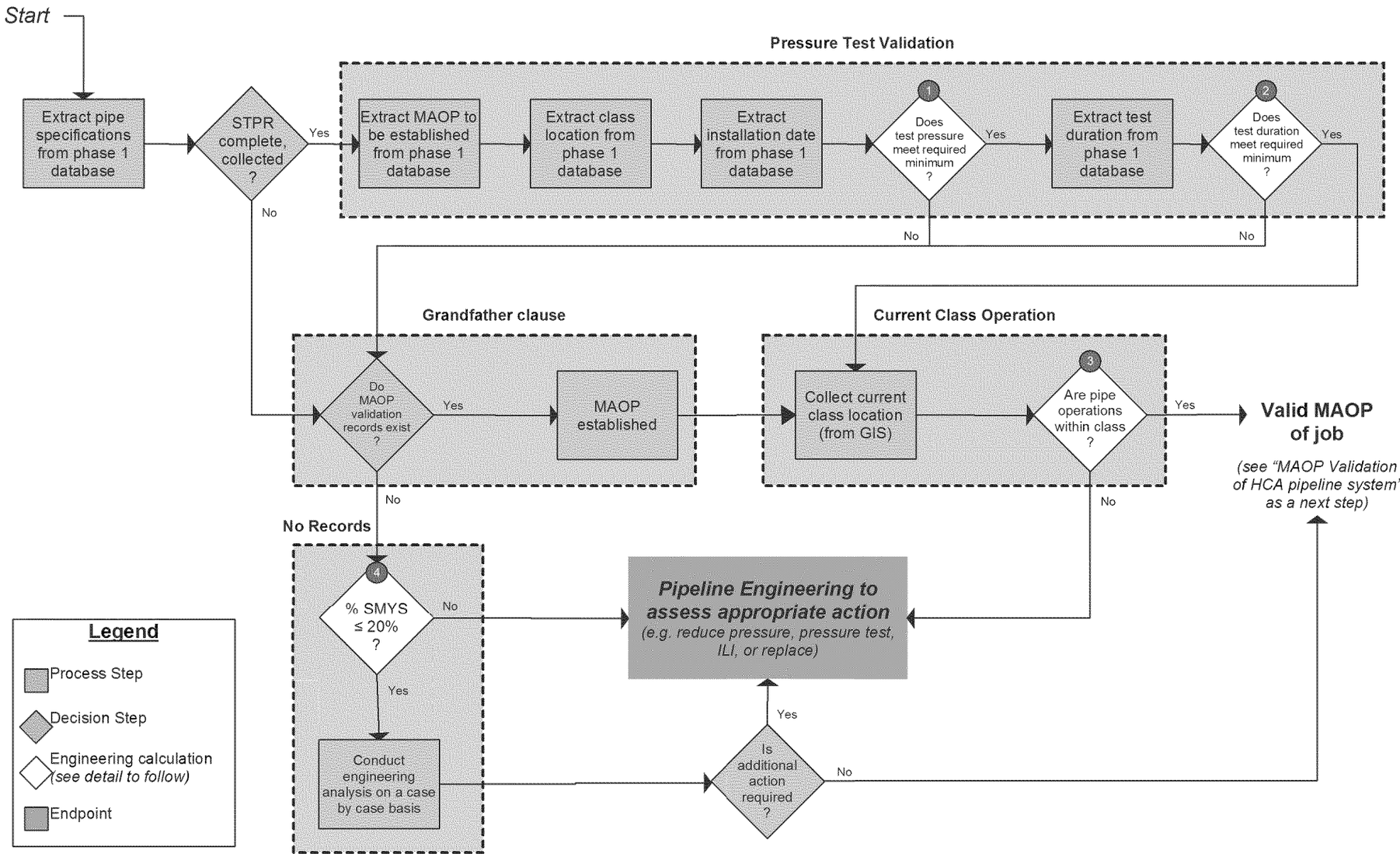
Appendix

STPR EXAMPLE

MAOP VALIDATION METHODOLOGY DETAILS

MAOP Validation Methodology Details

MAOP Validation of Job



MAOP Validation Methodology Details

1 Test Pressure Validation

Sufficient Pressure

[MAOP to be established] * [Pressure Test Class Factor] ≤ [Minimum Test Pressure]

Critical Inputs*
MAOP to be established
Class location
Minimum Test Pressure
Installation date

Class location	Pressure Test Class Factors		
	Installed before Nov. 12, 1970	Installed after Nov. 11, 1970	Converted under §192.14
1	1.1	1.1	1.25
2	1.25	1.25	1.25
3	1.4	1.5	1.5
4	1.4	1.5	1.5

* Note: See Appendix for sources
Code References: Operations (DOT § 192 Subpart L), MAOP (DOT § 192.619), Pressure Test (DOT § 192.619 paragraph [a,2,ii])

MAOP Validation Methodology Details

2 Test Duration Validation

Sufficient Duration

Test Date:	Prior to July 1, 1961	Between July 1, 1961 and Prior to March 12, 1971	March 12, 1971 and Beyond
Minimum Duration:	**No minimum threshold required**	**1 hour**	**1 hour** if %SMYS < 30% and P > 100 psig *- OR -* **8 hours** if %SMYS ≥30%

Critical Inputs*
Test Date
Test Duration
%SMYS

Where %SMYS = P / [(2 St / D) * E], and:

P = MAOP to be established

S = Yield strength in pounds per square inch

t = Nominal wall thickness of the pipe in inches

D = Nominal outside diameter of the pipe in inches

E = Longitudinal joint factor

* Note: See Appendix for sources

Code References: DOT § 192 Subpart J, DOT § 192.505 , DOT § 192.507, DOT § 192.105

Operating Within Current Class Location

[MAOP to be established] * [Pressure Test Class Factor] ≤ [Minimum Test Pressure]

Critical Inputs*
MAOP to be established
Class location
Minimum Test Pressure
Installation date

Class location	Pressure Test Class Factors		
	Installed before Nov. 12, 1970	Installed after Nov. 11, 1970	Converted under §192.14
1	1.1	1.1	1.25
2	1.25	1.25	1.25
3	1.4	1.5	1.5
4	1.4	1.5	1.5

* Note: See Appendix for sources
Code References: Operations (DOT § 192 Subpart L), MAOP (DOT § 192.619), Pressure Test (DOT § 192.619 paragraph [a,2,ii])

MAOP Validation Methodology Details

4 20% SMYS Calculation

%SMYS = [MOP from PG&E Engineering Drawing*] / [(2 St / D) * E]

MAOP OF NUMBERED TRANSMISSION LINES

Redacted

* Source: PG&E Engineering Drawing DWG 086868 Rev 20