Protal 7200 Pipeline Coating Aid

DRAFT VERSION 5 - 7 May 2010

This job aid is a quick reference and helpful hints for the application of Protal 7200 2 part epoxy pipeline coating. This material is difficult to apply and this aid attempts to gather together the best lessons learned from field experience.

Tools and Material

- Protal part A and B material
- Stirring stick for mixing
- Disposable paint brushes
- Mohair roller 3/8 inch nap
- Trowel
- Canvas as needed to protect surfaces
- Sand blasting sand and equipment
- Tape of a known thickness
- Coating measurement tool kit

References

- Gas Standard E-35
- Gas Information Bulletin 191

(portions of 191 superseded by this document)

1 Procedural Steps – Preparation

1.1 Verify the Material

Confirm the product has been properly stored in a cool dry location (less than 100 degrees F) and that the two part containers have not passed the expiration date. This has significant impact on product application and performance.

CAUTION: Expired or poorly stored product may be difficult to mix and may fail to bond as designed.

Tip: *Store the 2 part containers in an air-conditioned area to promote shelf life.*
To slow hardening time during hot weather, transport the Part A resin containers inside a cooler with ice. Avoid cooling the Part A resin below 50 degrees F to maintain best workability. Both A & B parts can be cooled to the same temperature, as conditioned space is available.

1.2 Plan the Material to Use

Plan appropriately for the amount of Protal needed. At the required thickness 40 mils, calculate 1 liter of Protal for every 10 square feet of estimated coverage. It is very important to plan the quantity for smaller diameter pipes.

Tip: *Only acquire enough Protal for a few weeks of anticipated work and reorder frequently in small supplies.*

Square Feet of Coverage Required				
	Inches of Pipe Length to be Covered:			
Pipe Diameter	6	8	10	12
4	0.52	0.70	0.87	1.05
6	0.79	1.05	1.31	1.57
8	1.05	1.40	1.74	2.09
10	1.31	1.74	2.18	2.62
12	1.57	2.09	2.62	3.14
14	1.83	2.44	3.05	3.66
16	2.09	2.79	3.49	4.19
18	2.36	3.14	3.93	4.71
20	2.62	3.49	4.36	5.23
22	2.88	3.84	4.80	5.76
24	3.14	4.19	5.23	6.28
26	3.40	4.54	5.67	6.80
28	3.66	4.88	6.11	7.33
30	3.93	5.23	6.54	7.85
32	4.19	5.58	6.98	8.37
34	4.45	5.93	7.41	8.90
36	4.71	6.28	7.85	9.42

For example if you have 2 – 24" diameter girth welds to coat with 3 inches of bare pipe on each side of the weld and 1 inch of over-lap on the FBE coating for a total of 8 inches of pipe to coat at each weld. You will need to cover:

4.19 x 2 = 8.38 square feet

This should use most of a 1liter container of Protal, assuming you will use only one coat to reach 40 mil thickness. If you have enough time to wait for the material to solidify it is best practice to use 2 – 20 mil coats of Protal, this helps to ensure that any problems in the first coat, such as air pockets or thin spots, are covered by the second coat.

It is recommended that you store the material in an ice chest on the job site during hot weather (greater than 80 degrees F). Both the base and hardener should be stored at the same temperature. Storing them in an ice chest will keep the material cooler and will allow you more working time before the material solidifies.

1.2.1 Use Cartridges

Protal Cartridges are available in 400 mL and 50 mL cartridges. It is recommended that you utilize the 400 mL cartridges when working on smaller diameter pipes and in hot weather.

If you mix an entire liter of Protal in hot weather it will solidify or harden in as little as 15 minutes. This can make it very difficult to accurately coat more than one weld or area of a piping system before the material is un-workable.

Using the cartridges will allow you to mix just the amount you need for one girth weld or area at a time, giving you time to properly work the material into this small area and creating less Protal waste.

The cartridge will also help in measuring out the smaller quantities required on the smaller diameter pipes. For example if you are working on girth welds for 12" pipe and planning on 2 – 20 mil coats of Protal. The bare pipe is usually 2 inches with 1 inch of over-lap on to the FBE giving a total of 6 inches of pipe to cover for each weld.

Pipe Diameter (Inch) * 3.14 * Pipe Length (Inch) * Coating Thickness (Inch) =
12.75 * 3.14 * 6 * .020 = 4.8 cubic inches of coating material

Cubic Inches * 16.387 = mL
4.8 * 16.387 = 79 mL or less than ¼ of a 400 mL cartridge

You should be able to put one 20 mil coat on 5 – 12" girth welds with one 400 mL cartridge of Protal, assuming you don't waste any material. Below is a chart indicating the percent of a 400 mL cartridge for coating various sizes.

Percentage of a 400 mL cartridge for 20 mil thickness				
	Inches of pipe length to be coated			
Pipe Diameter	6	8	10	12
6	10 %	14 %	17 %	20 %
8	13 %	18 %	22 %	27 %
10	17 %	22 %	28 %	33 %
12	20 %	26 %	33 %	39 %
16	25 %	33 %	41 %	49 %
18	28 %	37 %	46 %	56 %
20	31 %	41 %	51 %	62 %
22	34 %	45 %	57 %	68 %
24	37 %	49 %	62 %	74 %

1.2.2 Coating Long Sections of Pipe

Long sections of large diameter pipe can be manually coated with Protal. Typically sections up to 100 feet long are coated using rollers and multiple people. To accomplish this you should mark off the pipe in sections that match up to the containers of Protal that you will utilize.

For example, if you are coating 24 inch pipe and are using 1 liter containers, you should mark the pipe approximately every 20 inches. Mix one liter of material pour it on the top of the pipe and 2 people work it around the pipe for a single 20 inch section. Repeat this process to coat the entire section of pipe.

Marking the pipe in sections will help to ensure you get the correct thickness.

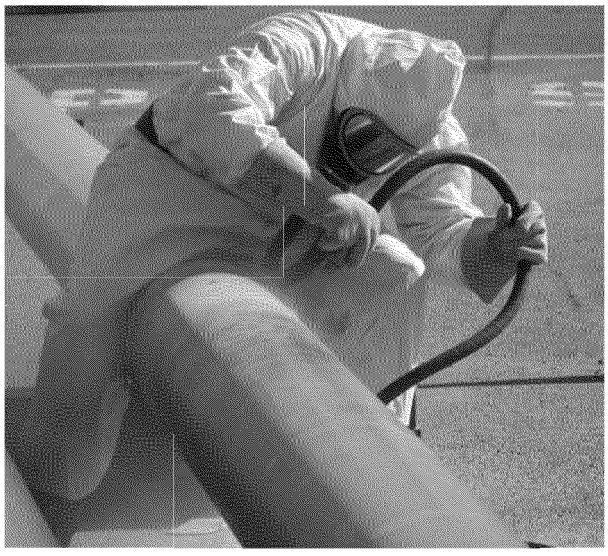
2 Procedural Steps – Surface Preparation

2.1 Sandblast

When the area to be coated is more than 10 square inches it should be cleaned by sandblasting, to "near-white" metal (SSPC-SP10) within four hours of coating. In addition, the blast should leave a profile of 2 to 4 mils on the pipe surface. The coating will bond best to a rough surface, you must make sure the resulting cleaned surface is within the specification using approved measurement tools, (Press-O-Film gauge). If the blast material is too soft it will not create the correct roughness on the pipe.

Protal will not adhere or stick correctly to surfaces that are not rough. This includes other coating materials. When sand blasting you should taper or sweep blast the surrounding Fusion Bonded Epoxy or previous Protal coating for a minimum of 1 inch in order to roughen the surface.

On directional bores or other applications where the coating will be subjected to significant friction, grit blast material should be utilized to provider a deeper, more optimum surface profile of 4 – 5 mils, (Sand-blasting does not etch as deeply).



2.2 Rough Up Small Areas

If the area to be coated is less than 10 square inches it may be roughed up with 80 grit sand paper and carefully cleaned. Use a flap disk on a 4 inch grinder to rough up the pipe surface and surrounding coating material for a minimum of 1 inch in all directions.

2.3 Clean

You must ensure the surface is clean before applying the coating. Use compressed air and/or denatured alcohol/MEK to remove any possible contamination from the surface. If you sweat on the surface you should blow it clean with compressed air. Protal 7200 will not stick to liquids or other contamination.

Metal areas that develop flash rust due to exposure to rain or moisture shall be given a sweep blast to return them to their originally blasted condition.

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3 Procedural Steps – Application

3.1 Check the environment

Protal 7200 is very sensitive to the moisture and temperature.
Before painting in cool or humid conditions, use approved thermometers to verify the pipe temperature is greater than 50 degrees F and at least 5 degrees F above dew point. Conditions that are too cold or too damp will adversely affect bonding. Pipe temperature should not be more than 185 degrees F.

Tip: If weather is below 60 degrees F, heat the pipe with a propane flame to a higher temperature that will prevent surface moisture and promote faster hardening.

If the air temperature is below 70 F you should consider mixing the material and then pausing for 3 minutes to allow the epoxy to react before starting to apply to the pipe. This will reduce the amount of time you must work the material on the pipe.

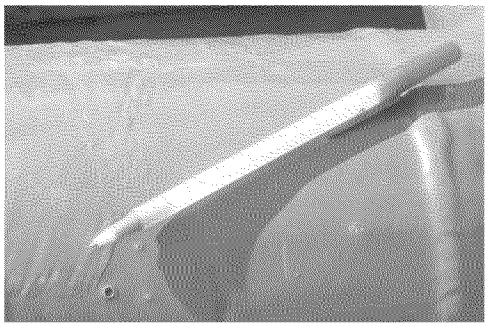
3.2 Mix the Material

Always mix the proper ratio of Protal base and hardener. (i.e. either consume the complete contents of measured tubs or use a Protal syringe for exact ratios). Varying the hardener ratio in even small amounts can have adverse effects on Protal.

CAUTION: Protal must always be mixed in full containers (1 or 2 liters, matched tubs), or use Protal from a cartridge gun containing both base and hardener.

Mix the base and hardener together completely, without streaks of different colors and without trapped air. Allow 2 minutes to thoroughly mix the material. The manufacturer (Denso) recommends plastic impellers on slow speed drills as mixing devices. Recommend Werner Tool Products 1 gal Hurricane Paint Mixer #10330.

CAUTION: DO NOT use high speed mixing. DO NOT use solid multi bladed mixing paddles. High speed mixing will cause air bubbles to be trapped in the epoxy coating. This causes voids and pits in the pipe coating. Often the air pockets remain below the surface of the Protal.



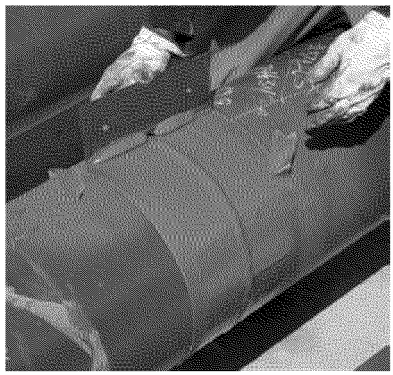
The plastic impellers will mix the majority of the material, but you must still use a stirring stick to manually mix the material along the walls and bottom of the containers. During cold weather the material will be thicker and more difficult to mix. During warm weather the material will be easier to mix, but will solidify much quicker. You may clean the plastic impellers with Acetone or MEK. Do not attempt to clean up rollers, brushes or pads. Allow them to solidify then place them in the trash.

The mixed Protal should be a green color, if the color comes out blue do not use the material. Fill out a "Material Problem Report" and retain the container of material for investigation.

3.3 Applying Protal Manually

All application tools should be disposable. You should always have disposable paint brushes ready for use with this material; however, experience has shown the using paint rollers on larger surfaces will result in a more consistent and level coating.

When working on girth welds on straight pipe you can use tape of a known thickness built up to 50 mils at both edges of your sand blasted area. Then use a flat trowel that is notched to fit over the weld and is long enough to span between the built up tape areas. The Protal is expected to drag 20 mils of material, so at 50 mils this is expected to give you a 30 mil coating thickness when dry. This technique can help to get a smooth and even surface finish, but is optional.



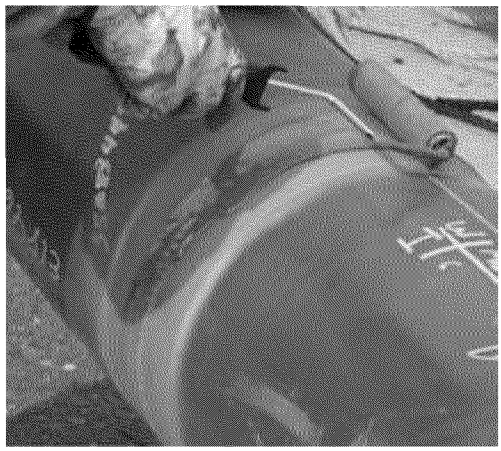
3.3.1 Pour and roll

Application shall take place immediately after mixing. Pour the product onto the surface and spread down and around the surface in bands beginning from the leading edge of the material to as far under the pipe as can be reached. Overlap the bands and onto the existing coating a minimum of 1 inch. DO NOT place Protal over a surface that has not be roughened, it is best to leave a little roughened area exposed than to coat on to the slick surface.

Use a brush to work the coating material into welds, bottom surfaces and un-even areas. Concentrate on even smooth movements and pressure on the roller to

encourage consistent thickness. Use a brush to smooth out any obvious sags, rough edges or drips. Special attention should be given to weld caps and bottom surfaces.

Tip: If icicles and sags appear on the bottom of the pipe smooth them out with a brush that is moved along the length of the pipe instead of around the pipe. Push the icicle longitudinally along the pipe surface. If you must push the icicle over cured coating that is not rough, you should wipe the Protal off of the coating.



When the temperature is between 50 to 60 degrees F, drywall trowels may help to spread the coating material.

The manufacturer lists the optimum Protal thickness as 20-40 mils. We have found this very difficult to maintain. A more reasonable range that you should be able to obtain is 20 – 60 mils. You should attempt to apply a single coat that is between 35-40 mil thick. If done carefully this will result in a coating between 20 and 60 mils.

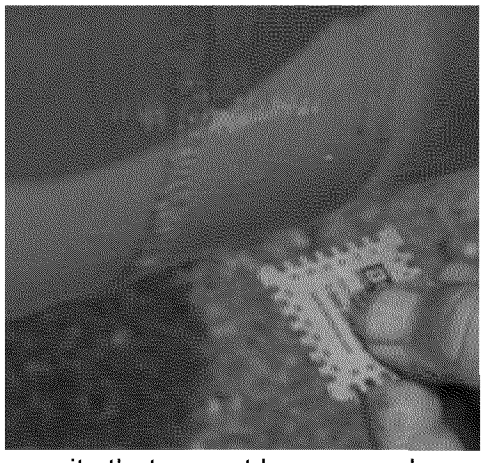
On larger diameter pipe, (greater then 8 inch) it may be helpful if two people roll the material, one on either side of the pipe.

CAUTION: Do not spread Protal with a gloved hand. Thickness is too difficult to maintain.

Once the Protal shows any sign of thickening and solidification, stop using it. Put the material aside in an open area. It will normally start smoking as the remainder of the container heats up and reacts to form a solid.

3.3.2 Check Thickness

The thickness of the coating should be checked with a wet film gauge only after the material is distributed all the way around the pipe. Experience shows that wet film gauges are notoriously inaccurate compared to a dry film magnetic gauge. You should attempt to get 35-40 mils of thickness with the wet film gauge.



It is best to spend your time trying to get an even coat and less time measuring with the wet film gauge. The small pits or holes left by the wet film gauge must be painted over with a brush. Once the material starts to harden do not use the wet film gauge, it will leave pits that cannot be removed.

Once the surface of the coating is tack dry you can attempt to use a magnetic/electronic dry film thickness gauge. Be careful that the material is dry enough to avoid sticking to the instrument. Check the surface in a variety of spots. For quality control purposes you want to identify the highest thickness and the lowest thickness for each quarter of the pipe.

If you are working on a sunny day the temperature between the sunny and shady sides of the pipe can be up to 30 degrees, this can cause the Protal to solidify quicker on the sunny side and more slowly on the shady side. Keep this difference in mind when you are rolling on the material and checking the thickness.

3.3.3 Evaluate the results

It is critical that no areas are less than 16 mils thick. This is 80% of the manufacturer's 20 mil recommended thickness. These areas must be re-coated with additional material. You must re-apply the coating within the "thumbnail test window" or you must sand blast or sand and then re-apply the coating.

When measuring the thickness, do not write on the pipe with any markers containing grease. Any grease on the pipe must be removed with a solvent before sand blasting.

Use ink markers if necessary to indicate the depth of the pipeline coating. If you are within the "thumb nail test window" and less than 2 hours from the last application of Protal, you may mark **around** the areas to be re-coated, so you don't have to sand off the ink marks. These ink marks should never be coated over with Protal. The surface should be sanded or sand blasted to remove the writing before coating with Protal.

If small areas (10 sq inches) or icicles are over 100 mils the thickness should be reduced to approximately 60 mils. See the Protal Removal Aid document for more information on removal.

CAUTION: Protal applied too thickly has been observed to crack and leave holidays after being hydrostatically tested. Do not apply too thickly.

3.3.4 Re-apply Coating

Use the Thumbnail test to determine if a new coat of Protal can be applied over existing Protal without sandblasting the surface again, (Usually less than 2 hours after the first coat.). If the thumbnail does not dent and leave a mark, then the existing Protal surface should be brush blasted to create a binding surface before recoating.

Never apply Protal over any kind of writing or marks on the pipe. Any writing must be sanded off before applying Protal.

> *CAUTION: To patch holidays, never apply melt sticks over Protal. This is not an approved coating combination.*

When you re-apply Protal, you may utilize the 1 liter container, the 400 mL cartridge or the small 50 mL cartridge gun. The small cartridge is useful for small areas of low thickness or pits. You still must be careful to not allow the total thickness to exceed 60 mils.

3.3.5 Don't Install Until it is Cured

Protal has a short cure time relative other high performance coating alternatives. However, you should not handle or install the coated pipe until it has cured properly. The following chart give approximate cure times and this gives you an idea of how fast the product will solidify when applying it to hot pipe surfaces.

Protal 7200 Cure Times			
Pipe Surface Temp	Tack-Free Time	Backfill Time	Directional Bore Time
50 F	2 to 3 hours	6 to 9 hours	8 to 12 hours
60 F	60 to 90 minutes	3 to 4.5 hours	4 to 6 hours
70 F	30 to 45 minutes	1.5 to 2 hours	2 to 2.5 hours
80 F	20 to 30 minutes	1 to 1.5 hours	75 to 120 minutes
90 F	15 to 20 minutes	45 to 60 minutes	60 to 75 minutes
110 F	12 to 15 minutes	30 to 45 minutes	40 to 60 minutes
130 F	9 to 12 minutes	25 to 30 minutes	30 to 40 minutes
150 F	7 to 9 minutes	20 to 25 minutes	25 to 30 minutes
170 F	5 to 7 minutes	15 to 20 minutes	20 to 25 minutes

3.3.6 Clean up

Pour a small amount of Protal back into the empty can of hardener and mix it up. This will solidify remains of the hardener and allow it to be thrown in the trash instead of hazardous waste.

Allow brushes, rollers, pads and excess Protal to harden then deposit in the trash.

3.4 Applying Protal by Cartridge Spray Gun

There is a cartridge based spray gun sold by the manufacturer to apply Protal. As of May 2010 testing has shown that this system does not reliably mix the coating materials. This method is not an approved method for applying Protal.

Redacted

From: Redacted (GT&D) Redacted
Sent: Monday, June 06, 2011 2:02 PM
To: Redacted
Cc: Redacted; Mark Cabral; Redacted (GT&D)
Subject: RE: Request Approval for Tape at Coating Transitions

Redacted

Since these transitions from Protal 7200 to existing coatings are in a roadway the use of wax tape should be avoided as you indicated. The tie-in from the Protal 7200 to polyethylene tape should be made with polyethylene tape. The transition from Protal 7200 to asphalt coating should be made by grinding the asphalt coating to provide a taper of about 3 to 1 down to the thickness of the Protal 7200 then over lapping Protal 7200 onto the asphalt coating at least one inch beyond the tapered portion of the asphalt coating. If the asphalt coating is not adhered to the pipe sufficiently to allow overlapping with Protal 7200 then make the transition from Protal 7200 to asphalt using polyethylene tape. Even when using polyethylene tape to transition from Protal 7200 to the asphalt the asphalt coating should be tapered as much as possible in order not to leave any air under the polyethylene tape.

Redacted

From Redacted
Sent: Friday, June 03, 2011 4:20 PM
To: Redacted
Cc: Mark Cabral
Subject: Request Approval for Tape at Coating Transitions

Glen

A certified coating inspector contracting on the Hydrostatic Test Program has been working on a hydro test location in the street. The tie in pipe at one location will have coating transitions from Protal 7200 (newly applied at tie in girth weld) to pre-existing Polyken tape on one side and pre-existing asphalt on the other side. As you and I have discussed, QAQC have directed contractors that the approved coating treatment at the Polyken transition is to:
1) limit Protal coverage to the prepared bare metal at the girth weld (applied close to the Polyken), and
2) wrap the Protal to Polyken tape transition with wax tape.

The coating inspector observed that PG&E Standard E-35 (Table 2 – Tie Ins) prohibits the use of wax tape in the roadway and in clay soils. The contractor also noted that Table 2 offers that poly tape is an approved option, albeit less preferred. Footnote number 7 of Table 2 instructs this specific transition to be covered using poly tape. This recommended use of poly tape is also repeated in page 2, General Information, item 4. It is further specified as the required transition coating solution in page 5, section 2, item E. Based on these references, the contractor has asked for approval to use poly tape for these buried transitions.

The opposite end, asphalt transition is anticipated to follow E-35 with ½ inch of portal applied over a feathered,

well-adhered asphalt edge. However, if it is impossible to uncover sufficiently adhered pre-existing coating, would you suggest to use the same ploy tape to wrap the Protal to loose coating transition (again in lieu of wax tape in the roadway)?

From your assessment of E-35, *please 1) confirm the poly tape solution is approved over pre-existing Polyken, and 2) recommend the best roadway transition wrap for Protal to loose coating (asphalt or otherwise).* If this needs more detail or discussion, please let me know.

Regards,

Redacted

Pacific Gas and Electric Company	**PG&E Line L- , T- Hydrostatic Test Procedure**	Page 1 of 20

GENERAL INFORMATION

1. Test No.	2. Revision No.	3. Revision Date / Time	4. Orig Date Sent
T-	0		

5. Gas Control Center	6. District/Division	7. Job No.

8. Test Supervisor	9. Office Tel No.	10. Cell No.

11. Hydrostatic Test Emergency Center Activation No.
(415) 973-9999 OR (925) 746-9798

12. Design Drawings	13. Strength Test Pressure Records
Sheets 1 –	Sheets 1 -

TEST CRITERIA

14. Fill Volume	15. Fill Date	16. Test Date
gallons		

17. Minimum Test Pressure (STPR)	18. Maximum Test Pressure (STPR)
psig	psig

REFERENCE DETAILS

LOCATION	R STA	ELEVATION	RAMP PSIG	MIN PSIG	MAX PSIG
Min Pressure Control Point					
Max Pressure Control Point					
Location _ (Test Station)					
Location _ (Verification Station)					

19. Purpose

This test meets the requirements set forth in Pacific Gas and Electric Gas Standard and Specification Numbered Document A-37, "Hydrostatic Testing Procedure," Rev 00 issued 11/22/04.

This test procedure verifies the integrity of the tested pipeline segment and establishes a maximum allowable operating pressure (MAOP) per the requirements set forth in Code of Federal Regulation (CFR) 49, Part 192, Subpart J—Test Requirements.

AUTHORIZATION OF PROCEDURE

	NAME / SIGNATURE	CONTACT NO	TODAY'S DATE
PREPARED BY:			
TEST SUPERVISOR:			
WATER QUALITY:	Redacted		
PROJECT ENGINEER:			
PG&E AUTHORIZATION:	Ben Campbell	(415) 971-5571	

REVISION HISTORY

Revision No.	Reason for Change
0	Initial Release

Name	Date & Time

LINE / TEST: L- / T-	REVISION:

NOTIFICATIONS REQUIRED *(Check those completed by Gas Control)*

AGENCY	CONTACT NUMBER	X *(all that apply)*	PERSON NOTIFIED	TIME NOTIFIED	NOTIFIED BY WHOM	VERIFIED BY WHOM
GAS CONTROL CTR		☐				
VRU/IVR (INTERACTIVE VOICE RESPONSE)		☐				
CALL CENTERS		☐				
CALIFORNIA HIGHWAY PATROL		☐				
FIRE DEPARTMENT		☐				
POLICE		☐				
LOCAL MEDIA RELATIONS		☐				
HTEC/EOC ON-CALL		☐	In the event of failure, notify HTEC immediately. See last two pages of this document for protocol and Failure Report form.			
CPUC		☐				
CAL-TRANS		☐				

DISTRIBUTION BY ORIGINATOR

AGENCY	NAME	LAN ID / EMAIL	MANDATORY
TEST SUPERVISOR			YES
CONSTRUCTION MANAGER			YES
CONTRACT SUPERVISOR			YES
TESTING COMPANY			YES
TEST CERTIFICATION COMPANY			YES
WATER SPECIALIST			YES

HOLD POINT

TEST DOES NOT PROCEED UNTIL SUPERVISOR APPROVAL

ALL PEOPLE (PG&E AND CONTRACTORS) PERFORMING COVERED TASK(S) ON THE RIGHT-OF WAY (ROW) ARE QUALIFIED IN ACCORDANCE WITH 49 CFR 192 SUBPART N.

TEST SUPERVISOR (THE OVERALL RESPONSIBLE PG&E EMPLOYEE) SIGNS NAME HERE FOR APPROVAL:

_____

SUPPORT OPERATIONS

SUPPORT OPERATION NOTES

NO.	REMARK	SUPERVISOR APPROVAL	TIME/ DATE
1.	Ensure each responder is familiar with the patrolling and incident reporting requirements.		

EMERGENCY RESPONSE

RESPONDER	NAME NUMBER	RADIO
INCIDENT COMMANDER		
EMERGENCY SPILL RESPONDERS		
PATROL LEAD		
TOTAL NUMBER OF PATROLMEN:		

PATROLLING AND INCIDENT REPORTING REQUIREMENTS

PATROLLING REQUIREMENTS

1. Patrolmen in place must maintain radio communication with the hydrostatic testing supervisor.
2. Patrolmen must patrol line and monitor intersections during entire test duration.

INCIDENT REPORTING REQUIREMENTS

1. Incident Commander to call EOC on-call at (415) 973-9999 OR (925) 746-9798 to report incident and to call 911 if incident poses public safety hazard.

HOLD POINT

TEST DOES NOT PROCEED UNTIL SUPERVISOR APPROVAL

SUPERVISOR HAS VERIFIED THAT ALL EMERGENCY RESPONDERS ARE ONSITE AND AWARE OF THEIR ROLE REQUIREMENTS.

TEST SUPERVISOR SIGNS NAME HERE FOR APPROVAL: _____

SPILL RESPONSE EQUIPMENT				
ITEM	**MATERIALS AND EQUIPMENT**	**LOCATION OF EQUIPMENT**	**SUPERVISOR APPROVAL**	**TIME/ DATE**
1.	_____ STRAW BALES			
2.	_____ FEET OF SILT FENCE			
3.	_____ VACUUM TRUCK(S) ON STANDBY (DURING FILL) _____ VACUUM TRUCK(S) ON STANDBY (DURING TEST)			
4.	_____ PALLETS OF SAND BAGS			
5.	_____ PALLETS OF STRAW WATTLE			
6.	_____ ROLLS OF PLASTIC SHEETING, APPROX. FIVE HUNDRED FT. (500') LONG BY TEN FT. (10') WIDE			
7.				
8.				
9.				
10.				

HOLD POINT

TEST DOES NOT PROCEED UNTIL SUPERVISOR APPROVAL

SUPERVISOR HAS VERIFIED THAT EMERGENCY RESPONSE TEAM HAS BEEN BRIEFED ON ROLES, COMMUNICATION PLAN AND INCIDENT OBJECTIVES.

TEST SUPERVISOR SIGNS NAME HERE FOR APPROVAL:

_____

MINIMUM PIGGING EQUIPMENT				
SERVICE	EQUIPMENT	No.	SUPERVISOR APPROVAL	TIME/ DATE
Initial Run (Clear pipeline of liquids/debris)	Type of pig With tracking device	qty		
Pipeline Fill	Type of pig With tracking device	qty		
Drying Pigs	1LB Density Bare Swab Foam Pigs	qty		

TESTING EQUIPMENT PER NUMBERED DOCUMENT A-37					
NO.	**Type**	**Description**	**Calibration**	**Location**	**Approval/ Date**
1.	Deadweight Tester, Primary pressure recording device		Within 1 Year of test. Accuracy 0.5% Date:	Test Site: Location __.	
2.	Primary Temperature Recorder		Within 6 Months of test. Accuracy 1% Date:	Minimum of 100ft from Test Site: Location __.	
3.	Secondary Temperature Recorder		Within 6 months of test. Accuracy 1% Date:	Test Site: Location __.	
4.	Backup Temperature Recorder		Within 6 months of test. Accuracy 1% Date:	Test Site: Location __.	
5.	Pressure Recorder		Within 6 months of test. Accuracy 0.5% Date:	Test Site: Location __.	
6.	Pressure Gauge		Within 6 months of test. Accuracy 0.5% Date:	Verification Station: Location __.	
7.	Ambient Thermometer		Within 12 months of test. Accuracy 1°F Date:		
8.	Electronic Dew Point Meter	Extech RH300 (or equivalent)	Within 12 months of test. Date:		

Review and document the contractor-provided test equipment and calibration records per Numbered Document A-37 and the Hydrostatic Pressure Test Instruments in the 'Testing Equipment Per Numbered Document A-37' Table above. The deadweight tester must be compatible with the maximum test pressure (as identified on the strength test pressure report - STPR) with accuracy within 0.5%. Thermometers must have a range of between 0°F to 150°F with graduations readable to 1°F. Pressure and temperature charts shall be reviewed to verify they are appropriate for the recorder used and have appropriate range and gradations.

Also, per CPUC Requirements, all pressure recorder(s) and test gauges must have a range so that the minimum and maximum test pressure is between 20% and 80% of that range.

HOLD POINT

TEST DOES NOT PROCEED UNTIL SUPERVISOR APPROVAL

SUPERVISOR HAS VERIFIED THAT ALL EQUIPMENT IS ONSITE AND APPROVED.

TEST SUPERVISOR SIGNS NAME HERE FOR APPROVAL: _____

ROLES AND RESPONSIBILITIES

PERSONNEL	RESPONSIBILITY
Contractor: _____ Construction Foreman: _____ Cell Phone No. _____ Primary Contact: _____ Cell Phone No. _____ Alternate Contact: _____ Cell Phone No. _____	Provide water storage tanks, water pipe manifolds, pumps and associated equipment. Provide air compressors, air piping manifolds, dryers, and associated equipment. Provide hydrostatic test pump and pipeline drying equipment. Provide emergency response equipment (straw bales, silt fence, plastic sheeting, sand bags, vacuum trucks, straw wattle, etc.).
Test Contractor: _____ Primary Contact: _____ Cell Phone No. _____	Provide pressure charts, temperature charts, and dead weight tester for the hydrostatic testing. Furnish all certificates of calibration for equipment. Record all pressure and temperature readings for the hydrostatic test. Provide same to RCP for certification. Patrol line during test. Manage contract patrol team. Locate failed sections and inform response team. Fill out the STPR as specified, with required signatures.
Contractor: RCP Primary Contact: _____ Cell Phone No. _____	Be a third party witness to the test results and certify the success of the test.
Contractor: Guida Survey Survey Lead _____ Cell Phone No. _____	Document constructed pipeline on profile and detail sheets. Fill in the "Verify in Field" dimensions section of the STPR(s).
Public Outreach, PG&E Primary Contact: _____ Cell Phone No. _____	Customer notifications per the Outreach plan.
On-Site Water Quality Technician: Name:_____ Cell Phone:_____	Water sampling and analysis coordination, complying with the Chain of Custody Procedure. Provide QC oversight to filtration and discharges.
Water Specialist: Name: _____ Cell Phone No. _____	Communicate PG&E discharge concurrence to the Test Supervisor.
Pipeline Cleaning / Pigging Specialist: Name: _____ Cell Phone No. _____ Office No. _____	Suggest pigging options. Provide determination of necessity for additional clearing pig runs during the pre-fill sequence, based on the removed liquid and/or examination of the pig. Collect a sample of the pre-fill removed liquid and provide to Quality Engineer following the Chain of Custody Procedure.
Environmental Field Specialist: Name: _____ Cell Phone No. _____	Ensure the flush water is disposed of and test water is handled in accordance with all environmental regulations. Agency notification of unplanned discharge (Water OR Gas).
PG&E Gas Quality Engineer Project Lead: Redacted Cell Phone No. Redacted	Analyze pipeline contaminants. (if required)

PRE-FILL SEQUENCE OF OPERATIONS

OPRN NO.	REMARKS	VERIFIED BY	TIME/ DATE
1.	Conduct a tailboard review of the procedure with all personnel involved prior to the test.		
2.	Physically secure all air & water supply manifold piping.		
3.	If temporary test caps are used, review the history of test caps to determine how many times they have been subjected to pressures in excess of 72% of yield strength. Caps that have been exposed to pressures in excess of 72% of yield strength on 3 occasions must be discarded or approved for use by the responsible (PG&E) engineer.		
	WATER TESTING/SAMPLING		
4.	The On-Site Water Quality Technician will collect a sample of source water and analyze for residual chlorine content. The On-Site Water Quality Technician will also preserve a sample of source water for metals analysis.		

HOLD POINT

TEST DOES NOT PROCEED UNTIL SUPERVISOR APPROVAL

SUPERVISOR HAS VERIFIED TEST WATER SAMPLING.

TEST SUPERVISOR SIGNS NAME HERE FOR APPROVAL: _____

OPRN NO.	REMARKS	COMPLETED BY	TIME/ DATE
5.	Fill ## Baker tanks located at Location __ with hydrostatic test water from *source*.		
6.	For all pipeline valves (other than mainline valves) that will be submitted to test pressure, place valves in 25% closed position for the duration of the Pre-Fill Sequence. *Reference each drawing detail for each valve.*		
7.	Install pig traps at Location __, and at Location __.		
8.	Insert clearing pig with a tracking device at Location __.		
9.	Connect a chemically cleaned; 5000 gallon certified waste hauling truck, with open domes to act as a noise suppressor and dust/liquids collector, to the pig trap at Location __. This truck will remain connected to the pig trap until full.		

PRE-FILL SEQUENCE OF OPERATIONS

OPRN NO.	OPRN NO.	OPRN NO.	OPRN NO.
10.	Connect a compressor to the pig trap at Location __.		
11.	Propel the pig to Location __. Maintain back pressure at 7-15psi by throttling the valve on the pig trap at Location __. This pigging operation is to ensure that the pipeline is clear of any obstructions and to remove any free liquids from the pipeline prior to being filled with water.		
12.	If more than a few gallons of liquid are removed by this dry pigging operation, the Pipeline Cleaning Specialist shall record the approximate volume and provide a minimum 8 ounce sample of liquid to the Gas Quality Engineer.		
13.	Remove the pig from Location _. At Location _, insert one fill pig past the 6-inch fill valve and a second fill pig upstream (on the pig trap door side) of the 6-inch valve.		
14.	Connect the Baker tanks at Location __ to a high volume fill pump. Install a meter and check valve downstream of the pump. Connect the fill line to the 6-inch valve on the pig trap at Location __.		
15.	Fill a 10,000 gallon slug of water between the two pigs. Monitor the fill volume from the in-line meter. Then, close the valve and disconnect the fill line.		
16.	Propel the pigs, with air, to Location __. Maintain back pressure at 7-15psi by throttling the valve on the pig trap at Location __. Monitor the pig locations by use of the tracking device.		
17.	The initial blow-by will be collected into the 5000 gallon certified waste hauling truck connected at Location __. Discharge the slug of water through the pig trap valve into 5000 gallon certified waste hauler trucks until the second pig reaches the pig trap. Alternatively, if sufficient trucks are unavailable, shuttle the water to an isolated Baker Tank to temporarily store the blow-by and slug water for trucking disposal. Do not use this Baker Tank for another purpose until properly cleaned. The On-Site Water Quality Technician will collect a water sample from each Truck and send it to the laboratory for analysis.		
18.	The Environmental Field Specialist is responsible to ensure that the blow-by and slug water is disposed of in accordance with all environmental regulations.		
19.	The Test Supervisor shall consult with the Pipeline Cleaning Specialist to determine if additional rinsing runs are required prior to line fill.		

PRE-FILL SEQUENCE OF OPERATIONS

OPRN NO.	OPRN NO.	OPRN NO.	OPRN NO.

HOLD POINT

TEST DOES NOT PROCEED UNTIL SUPERVISOR APPROVAL

TEST SUPERVISOR AND PIPELINE CLEANING SPECIALIST CONCUR THAT THE PIPELINE IS ADEQUATELY CLEARED OF CONTAMINANTS TO PROCEED.

TEST SUPERVISOR SIGNS NAME HERE FOR APPROVAL: _____

20.	Remove the pig traps at Locations __ and __.		
21.	Insert a fill pig, with tracking device, in the pipeline at Location __.		
22.	Install test heads at Location __ and Location __ as shown on the design drawings.		

FILL SEQUENCE OF OPERATIONS

OPRN NO.	REMARKS	VERIFIED BY	TIME/ DATE
1.	Install the primary temperature probe near the pipeline a minimum of one hundred (100) feet from the test location exposed pipe as shown on the design drawing details.		
2.	Install a secondary temperature probe on the bottom of the pipe, a minimum of two (2) feet into the soil at Location __. Pack the hole with soil after installing probe.		
3.	Install a third temperature probe on the pipe at Location __. The probe shall be shaded to limit ambient effect on the measurement. Insulation shall be provided as appropriate.		
4.	Install a pressure gauge on the test head at the Verification Station, Location __.		
5.	Connect the test head at Location __ to a 5000 gallon certified waste hauling truck with open domes. Bypass water will be collected during the filling operation.		
6.	Connect the Baker tanks at Location __ to a high volume fill pump. Install a meter and check valve downstream of the pump. Connect the fill line to the 6-inch valve on the test head at Location __.		
7.	Begin the line fill. This operation will be continuous and is estimated to take ____ hours to complete with a fill rate of approximately ____ gallons per minute (pipe volume of ____ gallons per foot).		
8.	Propel the pig to Location __. Maintain back pressure at 7-15psi by throttling the valve on the test head at Location __. Monitor the pig location by use of the tracking device.		
9.	The initial blow-by will be collected into the 5000 gallon certified waste hauling truck connected at Location __. Once the pig reaches the test head, reconnect the line to the 6-inch valve on the test head upstream of the pig. Fill the waste hauling truck with flush water. The On-Site Water Quality Technician will collect a water sample from the truck and send it to the laboratory for analysis.		
10.	The Environmental Field Specialist is responsible to ensure that the flush water is disposed of in accordance with all environmental regulations.		
11.	After the flush water truck has been filled, the On-Site Water Quality Technician shall collect "leak characterization" samples of water from the Location _ test head and has them sent for laboratory analysis.		
12.	Bleed off air from the test heads.		
13.	Bleed off air from all taps and valves that will be submitted to test pressure. Place valves in 25% closed position for the test. *Reference each drawing detail for each valve.*		

FILL SEQUENCE OF OPERATIONS

OPRN NO.	REMARKS	VERIFIED BY	TIME/ DATE
14.	Pressurize the pipe with the fill pump to between 100-150psig and record the pressure. Record the pressure reading here: _____psig		
	TEMPERATURE EQUILIBRIUM		
15.	Monitor all pipeline components for a minimum of 12 hours after filling to allow temperature equilibrium to be reached. Check for leaks.		
16.	At least eight (8) hours into the equilibrium duration, record the pressure at the same location as above. Record the pressure reading here: _____ psig If this recorded pressure is significantly different from the step above (more than 10psig) contact engineering.		

HOLD POINT

TEST DOES NOT PROCEED UNTIL SUPERVISOR APPROVAL

SUPERVISOR HAS CHECKED THE HEAD PRESSURE BEFORE AND AFTER EQUILIBRIUM AND CONFIRMED THERE IS NO INDICATION OF A LEAK.

TEST SUPERVISOR SIGNS NAME HERE FOR APPROVAL: _____

TEST SEQUENCE OF OPERATIONS

OPRN NO.	REMARKS	COMPLETED BY	TIME/ DATE
1.	The official test site is at Location __. Actual pipeline test dimensions and specifications "verified in field" are updated on STPR Part I. Confirm dimensions on STPR match RCP inputs.		
2.	Confirm barriers and related signage are placed along the test section to prevent public access within 50 feet of the test heads and all exposed pipe during line pressurization, to protect the public. In locations where space is limited, install K-rail (concrete or water filled plastic) around the exposed pipe to protect the public, in lieu of 50ft perimeter.		
3.	Assign patrolmen to patrol area to keep people away from exposed pipe during the test.		
4.	Deadweight tester and pressure recorder, with 24-hour recording charts shall be connected to the test section at Location __. The manifold must be capable of isolating all the instruments from the pipeline and each other. The pressure recorder shall be verified against the deadweight tester, prior to the start of the test, at three (3) points over the full range of the recorder/chart. Adjust stylus to match dead weight.		
5.	Visually inspect pressurizing equipment, hoses, and other associated equipment before pressurization. Make sure the equipment is properly sized and rated for the maximum test pressure and document as required.		
6.	After safety zones are established, typically 50ft perimeter from any exposed portion of the pipeline under test, including the test head locations. Set up the test equipment outside of the safety zone and use caution ribbon to restrict access to within 10ft of the test equipment. Limit the test equipment station access to the test conductor, third party witness, and Company inspector.		
7.	Establish radio communication between patrolmen and test supervisor prior to beginning pipeline pressurization.		
8.	Determine the volume associated with each stroke of the test pump. Count strokes to validate the amount of water added or subtracted to the pipeline while under test. A graduated cylinder may be used as an alternate to counting pumps strokes. Confirm the method and system is in place prior to starting the test.		

TEST SEQUENCE OF OPERATIONS

OPRN NO.	REMARKS	COMPLETED BY	TIME/ DATE
9.	Raise the pressure in the pipeline slowly and smoothly to ___ psig; 75% of the minimum hydrostatic test pressure at the test site and hold for one (1) hour. Check all visible connections for leaks and allow the pressure to stabilize.		

HOLD POINT

TEST DOES NOT PROCEED UNTIL SUPERVISOR APPROVAL

SUPERVISOR HAS CHECKED ALL VISIBLE CONNECTIONS FOR LEAKS AND ALLOWED THE PRESSURE TO STABLILIZE.

TEST SUPERVISOR SIGNS NAME HERE FOR APPROVAL: _____

10.	Test Supervisor is to notify the Project Coordinator that Ramp Pressure is commencing.		
11.	Upon Test Supervisor approval, pressurizing shall continue at a uniform rate not to exceed 10 psi/minute to a pressure of ____ psig at the test site. The pipeline is now on test. Hold the pressure at this level for a 30 minute period. Record the pressure and temperature at every ten (10) minutes during this period.		
12.	Test Supervisor is to notify the Project Coordinator that Ramp Pressure duration is complete.		
13.	Reduce the pressure to below ____ psig at the test site. Isolate the test pump and plug/blind the valves on the test head. Hold this pressure for a minimum of seven and a half (7+1/2) hours. **The max and min pressure at the test site during this period is ____ Min and ____ Max**		
14.	Test readings of pressure, temperature, and added/subtracted volume must be documented at 15 minute intervals for the remainder of the test. Do not reduce pressure yet.		
HYDROSTATIC TEST CERTIFICATION			
15.	Provide pressure, temperature, and volume readings to the test certification company for test certification.		
16.	Obtain hydrostatic test certification and notify the Project Coordinator.		

TEST SEQUENCE OF OPERATIONS

OPRN NO.	REMARKS	COMPLETED BY	TIME/ DATE
	HOLD POINT **TEST DOES NOT PROCEED UNTIL SUPERVISOR APPROVAL**		
	PRIOR TO PRESSURE REDUCTION, SUPERVISOR HAS VERIFIED RCP HAS CERTIFIED THE TEST. TEST SUPERVISOR SIGNS NAME HERE FOR APPROVAL: _____		
17.	Confirm required STPR documentation and names / dates / signatures are completed properly, in ink. Confirm required data recorded on dead weight pressure log and on front and back of pressure and temperature charts. Provide STPR documentation and RCP report to the designated PG&E representative at the test completion.		
	HOLD POINT **TEST DOES NOT PROCEED UNTIL SUPERVISOR APPROVAL**		
	PRIOR TO COMPLETION OF DEPRESSURIZATION, SUPERVISOR HAS VERIFIED THE REQUIRED STPR DOCUMENTATION HAS BEEN RECORDED AND DELIVERED TO PG&E. TEST SUPERVISOR SIGNS NAME HERE FOR APPROVAL: _____		

This page is a separation point for submitting required documentation to PG&E for Stage One As-Built Documentation.

DE-WATERING SEQUENCE OF OPERATIONS

OPRN NO.	REMARKS	COMPLETED BY	TIME/ DATE
	SAFETY		
1.	**Use extreme caution when releasing water at the test pressure!** When opening any valves or appurtenances watch body position and stand clear of line of fire. The test pressure shall be relieved by partially opening a small tap valve before initiating the water removal process. Discharge the pressurized water into a vacuum truck.		
2.	Connect the test head to the Baker tanks at Location __. The first water storage tank shall be a closed-top and vented tank to prevent water blow over. Rigid piping shall be used for all discharge piping. Welded pipe shall be used from the test head to the first tank during discharge.		
3.	Connect a compressor to the test head at Location __.		
4.	Establish de-watering safety zones 50-feet from all discharge piping between the test head and first water storage tank. Access is limited to only personnel necessary to perform the work.		
	HOLD POINT **TEST DOES NOT PROCEED UNTIL SUPERVISOR APPROVAL**		
	SUPERVISOR HAS VERIFIED PIPING CONNECTIONS ARE SECURED WITH RIGID PIPING. TEST SUPERVISOR SIGNS NAME HERE FOR APPROVAL: _____		
5.	Begin dewatering the line, into the Baker Tanks, from Location __ to Location __, by propelling the filling pig (already in the line).		
6.	To collect a representative sample of discharge water, the Water Specialist reviews the "leak characterization" analytical lab results and then submits a recommendation ***to*** or ***not to*** process the test water to obtain representative discharge samples for laboratory analysis, to PG&E representative: Sr. Environmental Scientist (Redacted). PG&E representative provides written (e-mail) concurrence to the Water Specialist's recommendation ***to*** process the test water to obtain representative discharge samples. Once concurrence ***to*** process the test water and obtain discharge samples is given, the water specialist provides authorization by communicating verbally and in an email to the test supervisor.		

DE-WATERING SEQUENCE OF OPERATIONS

OPRN NO.	REMARKS	COMPLETED BY	TIME/ DATE
	HOLD POINT **TEST DOES NOT PROCEED UNTIL SUPERVISOR APPROVAL**		
	SUPERVISOR HAS WRITTEN (E-MAIL) VERIFICATION FROM THE WATER SPECIALIST THAT PG&E CONCURRENCE TO PROCESS THE TEST WATER AND OBTAIN DISCHARGE SAMPLES FOR LABORATORY ANALYSIS HAS BEEN PROVIDED. TEST SUPERVISOR SIGNS NAME HERE FOR APPROVAL: _____		
7.	To process the test water and obtain representative discharge samples, pass 3 volumes of water equal to the capacity of the filtration equipment (3 carbon filter units = 1500 gallon capacity * 3 = 4500 gallons total) through the 5 micron filter and granulated activated carbon filter unit equipment. Discharge this water into a Baker Tank isolated from the test water being passed through the filtration equipment. After three volumes of water have been filtered, the On-Site Water Quality Technician shall collect the necessary water samples in accordance with the Quality Assurance Work Plan and submit the samples to the laboratory.		
8.	The Water Specialist reviews the analytical results of the representative discharge sampling against permit conditions and then submits a recommendation ***to*** or ***not to*** discharge water, to PG&E representative: Sr. Environmental Scientist Redacted Redacted PG&E representative provides written (e-mail) concurrence to the Water Specialist's recommendation ***to*** discharge. Once concurrence ***to*** discharge water is given, the water specialist provides authorization by communicating verbally and in an email to the test supervisor.		
	HOLD POINT **TEST DOES NOT PROCEED UNTIL SUPERVISOR APPROVAL**		
	SUPERVISOR HAS WRITTEN (E-MAIL) VERIFICATION FROM THE WATER SPECIALIST THAT PG&E CONCURRENCE TO DISCHARGE HAS BEEN PROVIDED. TEST SUPERVISOR SIGNS NAME HERE FOR APPROVAL: _____		
9.	Upon approval, discharge (in compliance with the permit requirements) the Baker Tanks through the 5 micron filter and granulated activated carbon unit. DO NOT exceed discharge rate of _____ gpm.		

DRYING SEQUENCE OF OPERATIONS

OPRN NO.	REMARKS	COMPLETED BY	TIME/ DATE
1.	Once the de-watering is complete remove the test heads. Install pig traps at Location __ and Location __.		
2.	Connect the compressor to the pig trap at location __ .		
3.	Connect the pig trap at Location __ to the Baker tanks. The first water storage tank shall be a closed-top and vented tank to prevent water blow over.		
4.	Send two (2) poly pigs from Location __ to Location __ to remove residual water from the pipeline. Multiple pig runs may be required. The company CM will determine when pigging is no longer required.		
5.	Purge water from the lines for all the taps and valves that were submitted to test pressure.		
6.	Set up dryers at Location __. Connect the dryers to the pig trap. Propel drying pigs from Location __ to Location __, with dry air until a -20ºF dew point is achieved. Use the Dew Point Test Form provided. Utilize an electronic dew point meter to measure dew point. Once dew point has reached -20ºF, read again 5-10 minutes later to confirm dew point reading is at or under -20ºF.		

HOLD POINT

TEST DOES NOT PROCEED UNTIL SUPERVISOR APPROVAL

SUPERVISOR HAS VERIFIED THAT THE DRYING PROCEDURE HAS BEEN COMPLETED.

TEST SUPERVISOR SIGNS NAME HERE FOR APPROVAL: _____

7.	At the conclusion of the drying operation, remove the pig traps and seal the ends of the pipeline to keep the pipeline free of water, dirt, or other contaminants.		
8.	Note final dew point temperature on the Dew Point Test Form.		

PRESSURE TEST FAILURE PROTOCOL

In the event of a pressure test failure, the California Public Utilities Commission (CPUC) should be notified immediately using the attached form. Instructions for notifying the CPUC and reporting a failure incident are as follows:

NO	ROLE	INSTRUCTIONS
1.	Test Supervisor	• Immediately notify HTEC (Hydro Test Emergency Center) **925.270.2517** • Provide the information needed on the CPUC Pressure Test Failure Report form (attached at the end of this document) **NOTE**: If the Test Supervisor is unable to connect with the HTEC Commander within 15 minutes, the Test Supervisor can directly contact Gas Control.
2.	HTEC Commander	Notify Gas Control at 800.811.4111 within 1 hour of the failure if media is present on site (2 hours if no media is present).
3.	Gas Control	Notify the CPUC On-Call person
4.	CPUC On-Call	• Work directly with the HTEC to complete the CPUC Pressure Test Failure Report form and submit to the CPUC • Inform Gas Control and the HTEC that the form has been submitted.

The next (final) page of this document is the CPUC Test Failure Report Form.

California Public Utilities Commission

Pressure Test Failure Report

Section 1: General Information	
Name of Operator:	**PG&E**
Address:	**375 N. Wiget Lane, Walnut Creek, CA 94598**
Date of Report (mm-dd-yyyy)**:**	

Section 2: Contact Information	
Report Contact	**Failure Contact**
Name:	**Name:**
Job Title:	**Job Title:**
Telephone Number:	**Telephone Number:**

Section 3: Failure Information	
Test Number or other designator:	
Date of Failure (mm-dd-yyyy)**:**	**Failure Location:**
Date Test Started (mm-dd-yyyy)**:**	**Mile Point #:**
Time Test Started (tttt hours)**:**	**Test Medium:**
Time of Failure (tttt hours)**:**	
MAOP (psig) being established or verified:	
Test Pressure (psig) at lowest elevation: at highest elevation:	
Pressure at time of failure (psig):	
% SMYS at time of failure	
Failure Description (e.g. during hydrostatic testing):	
Reason for Pressure Test	**New Pipe** ☐ **MAOP Validation** ☐ **Other (describe)** ☑

Section 4: Pipe Description	
Pipeline Number:	**Grade of Pipe:**
MAOP (psig):	**%SMYS @ MAOP:**
Diameter (in):	**Wall Thickness (in):**
Longitudinal Seam Type:	

Section 5: Additional Information
Current Action Taken:

Pacific Gas and Electric Company	Leak Repair, Inspection, and Gas Quarterly Incident Report (A-Form)	62-4060 (Rev 03/11) TD-4110P-11-F01

Form Type ☐ Leak ☐ Inspection Only or Non-Leak Damage

Dates

Compliance Due Date

Assigned to M&C Coordinator

Assigned to Construction

INITIAL DATA

Leak Number (District - Year - Series - Location)

Location: A = Above Ground, B = Below Ground

USA Ticket #

Valid Date (Month - Day - Year)

Date Reported

Time Reported (24 hr Time)

PCC Number

Response Date

Response Time (24 hr Time)

Paved Wall-To-Wall ☐ Yes ☐ No

Gas Flow Stopped Date

Gas Flow Stopped Time (24 hr Time)

SAP Repair Order #

Address:

City:

Description of Reading Location:

Reported By: ☐ Call-In ☐ Mobile Survey ☐ Foot Survey ☐ Other Employee

Surface At Read Location: ☐ Concrete ☐ Unsurfaced ☐ Above ground ☐ Asphalt ☐ Water/Marsh/Tidal ☐ In Substructure ☐ Other

Readings % Gas	Instr (a)	Grade (b)	Info Code (c)	Date	Time (24 hr Time)	Operator LAN ID	Unit Serial Number (Last 4 Digits)	Location Remarks (Not needed, if same as previous)
				- -				
				- -				
				- -				
				- -				
				- -				
				- -				

GRADE 2+ REQUESTED REPAIR DATE (Only needed if less than 90 days) - - (Repair required within 90 calendar days)

(a) **Instrument Type Used to Grade:** Enter, C for Combustible Gas Indicator, V for Visual. H for Hydrogen Flame Ionization (use for waterways or marsh only)

(b) **Enter Grade:** (1, 2+, 2, or 3). Enter 0 (zero) if no leak is found.

(c) **Info code is required if leak is graded as 1, 2+, or 2 and is less than 2% gas:**
A-Wall to wall and/or Continuously Paved, B-Near to, at, inside or under building, C-Odor and next to public gathering location, D-In foreign structure, E-Audible and/or visible, F-On facility in extremely poor condition, G-At least second customer call out, H-Leak is reported as 0% Gas Visual, J-Leak within the scope of work by others, M – Migration, N – Downgrade to Grade 3 is not allowed, S–Leak is suspected to be on a copper service, T – T&R Facility

MAPPING DATA

Location Map Wall Map: Plat:

Recorded Location Map Wall Map: Plat:

Normally Cathodically Protected ☐ Yes ☐ No CPA

Operating Map/Diagram

Federal Land ☐ Yes ☐ No

Block

MAOP (All)

NOP (All) .

SYSTEM PRESSURE

☐ LP(≤10.5" WC) ☐ SHP(≤ 25psig) ☐ HP(≤ 60 psig) ☐ TP(>60 psig)

Year Inst. TP Line # Mile Point: . Original Job # (TP Only)

For Leaks On Services: Main Connected to Service ☐ Cast Iron ☐ Plastic ☐ Steel Main Installation Year

HIGH CONSEQUENCE AREA

High Consequence Area ☐ Yes ☐ No (>= 20% SMYS Only) Date source of leak was determined -

Is leak source responsible for HCA? ☐ Yes ☐ No (CHOOSE "Yes" if the diameter & pressure of the effected pipe produce the impact circle creating HCA)

PIPE DATA

SOURCE : Choose One

- ☐ Bell Joint (1)
- ☐ Body of Pipe (1)
- ☐ Drip (1)
- ☐ Encapsulation (1)
- ☐ Fusion Joint (1)
- ☐ Other Mechanical Joint (1)
- ☐ Curb Valve (2)
- ☐ Line Valve (2)
- ☐ Clamp (3)
- ☐ Compress Coupling/Fitting Plastic(3)
- ☐ Compress. Coupling Steel (3)
- ☐ Compression Coupling Stainless Steel (3)
- ☐ Fitting (3)
- ☐ Plastic Tee Cap (3)
- ☐ Pressure Control Fittings(3)
- ☐ Stab Type Fittings (3)
- ☐ Tap Connection (3)
- ☐ Non-corrodible prefab riser (4)
- ☐ Riser (4)
- ☐ Riser Insert Kit (4)
- ☐ Girth Weld (5)
- ☐ Longitudinal Weld (5)
- ☐ Other Welds (5)
- ☐ Regulator/Pilot (6)
- ☐ Riser Valve Threads (7)
- ☐ Threads (7)
- ☐ Unknown(Replaced Facility)(7)
- ☐ *Other (7)

*Other requires explanation. Describe reason for other.

Categories for Source:
(1)Body of Pipe, (2) Valves, (3) Fittings, (4) Riser, (5) Welds, (6) Regulation (7) Other

CAUSE: Choose One

- ☐ Atmospheric Corrosion (1)
- ☐ External Corrosion (1)
- ☐ Internal Corrosion (1)
- ☐ Stress Corrosion Cracking (1)
- ☐ Damage by Earth Movement (2)
- ☐ Damage by Heavy Rains/Flood (2)
- ☐ Earthquake (2)
- ☐ Lightning (2)
- ☐ Other Natural Forces (2)
- ☐ Damage by Third Party (3)
- ☐ Digin/Excavation (3)
- ☐ Previously Damaged (3)
- ☐ Vehicle (3)
- ☐ Damage by Electrical Facility (4)
- ☐ Deliberate Acts/Vandalism (4)
- ☐ Fire or Explosion on Company Facility (4)
- ☐ Fire or Explosion on Customer Facility (4)
- ☐ Cast Iron Fracture (5)
- ☐ Compression Coupling (5)
- ☐ Construction Defect (5)
- ☐ No/Deteriorated Pipe Dope (5)
- ☐ Plastic Crack Failure (5)
- ☐ Plastic Embrittlement (5)
- ☐ Material Failure (5)
- ☐ Weld Failure (5)
- ☐ Equipment Malfunction (6)
- ☐ Incorrect Operation (6)
- ☐ Rodent (7)
- ☐ Root Damage (7)
- ☐ Unknown (Replaced facility) (7)
- ☐ Other (7)_____
- ☐ Inspection Only (7)

Categories for Cause:
(1) Corrosion, (2) Outside Forces (3,4) Damage by others (5) Failures (6) Malfunctions (7) other causes

LINE MATERIAL:

- ☐ Cast Iron
- ☐ Ductile Iron
- ☐ Steel
- ☐ Wrought Iron
- ☐ Copper
- ☐ Aldyl A
- ☐ PE2406 (Orange)
- ☐ PE2406/2708 (Yellow)
- ☐ PE 3408 (Black)
- ☐ PE 4710 (Black)
- ☐ Other Plastic _____
- ☐ *Other _____

LINE USE:

- ☐ Distribution Main <= 60 PSIG
- ☐ Distribution Main > 60 PSIG, not classified as Transmission
- ☐ Gathering
- ☐ Single Service
- ☐ Branch Service
- ☐ Transmission (>=20% SMYS)

Line Size [ ][ ].[ ][ ] Line Above Ground ☐ Yes ☐ No Internal Liner ☐ Yes ☐ No Line Inserted ☐ Yes ☐ No

Existing EFV ☐ Yes ☐ No EFV Operated ☐ Yes ☐ No (Required for Distribution Services only)

Incident Report # _____ Material Problem Report # _____

Was the damage/leak discovered as the result of current construction activity occurring this calendar year? ☐ Yes ☐ No

REPAIR DATA

Repair Location _____

Repair Remarks _____

Repaired By LAN ID: [ ][ ][ ][ ] Repair Date [ ][ ]-[ ][ ]-[ ][ ] Repair Time (24 Hour Time) [ ][ ][ ][ ]

Pipeline Engineer Consulted ☐ Yes ☐ No New EFV Installed ☐ Yes ☐ No Paving Needed? ☐ Yes ☐ No

Is leak source a mechanical joint which can be repaired by tightening? ☐ Yes ☐ No (If no, normal leak grading and response applies)

REPAIR CODE: Choose One – either Capital or Maintenance (Expense)

CAPITAL

- ☐ Deactivate #TP Main
- ☐ Deactivate Dist Main =>1 foot
- ☐ Deactivated Entire Service
- ☐ Replace Entire Service
- ☐ Replace #TP Main >= 50 ft
- ☐ Replace Dist Main > = 100 ft
- ☐ Replace Main Valve > = 2-inch
- ☐ Replace Service Valve > = 2-inch

MAINTENANCE (Expense)

- ☐ Bell Joint Clamp – Cast Iron
- ☐ Bell Joint Permabond – Cast Iron
- ☐ Bell Joint Seal – Cast Iron
- ☐ Cast Iron Repair Sleeve –Cast Iron
- ☐ Full Circle Clamp – Clamp
- ☐ Skinner Clamp – Clamp
- ☐ Skinner Pipe Joint Clamp – Clamp
- ☐ SS Clamp w/Anode – Clamp
- ☐ Deactivated Partial Service
- ☐ Mechanical Repair Fitting – Fitting
- ☐ Remove/Replace Completion Plug – Fitting
- ☐ Tighten Cap/Bolt – Fitting
- ☐ Aldyl A Overcap –Plastic
- ☐ Replace Plastic Tee Cap – Plastic
- ☐ Tee Fused Over Defect - Plastic
- ☐ Replace Dist Main < 100 ft
- ☐ Replace Main Valve < 2-inch
- ☐ Replace Partial Service
- ☐ Replace Riser
- ☐ Replace Service Valve <2-inch
- ☐ Replace #TP Main < 50 ft
- ☐ Direct Deposition Weld – Weld
- ☐ Fill Weld – Weld
- ☐ Patch Weld – Weld
- ☐ Type A Sleeve – Weld
- ☐ Type B Sleeve – Weld
- ☐ Welded Sav-A-Valve – Weld
- ☐ Welded Sleeve/Can – Weld
- ☐ Aquawrap – Other
- ☐ Clockspring – Other
- ☐ Greased - Other
- ☐ Grinding – Other
- ☐ Reattached Anode - Other
- ☐ Rewrapped Pipe - Other
- ☐ Soap and/or Tape - Other
- ☐ Trident Seal – Other
- ☐ Other

*Other requires explanation. Describe reason.

Size Installed: [ ][ ].[ ][ ] Replaced With: ☐ STEEL ☐ PE 4710 (Black) ☐ PE2406/2708 (Yellow)

Copper Entirely Replaced ☐ Yes ☐ No

GENERAL INSPECTION DATA

Reason for Inspection: ☐ Leak Repair ☐ WRO ☐ New Business ☐ Landslide ☐ Reconstruction ☐ Plugged Copper ☐ Capacity
☐ Facilities Exposed by Third Party ☐ Exposed Facility/Pipe Span ☐ Other_____(explain)

Date: ____-____-____ Inspected by LAN ID: ____

LINE MATERIAL	SOIL TYPE	SOIL RESIST(TP)	SURFACE OVER
☐ Steel	☐ Clay	☐ 0 – 1,000	☐ Asphalt
☐ Wrought Iron	☐ Rock	☐ 1,000 - 2,000	☐ Concrete
☐ Cast Iron	☐ Sand	☐ 2,000 - 5,000	☐ Above Ground
☐ Ductile Iron	☐ Loam	☐ 5,000 - 10,000	☐ In Substructure
☐ Copper	☐ Wet	☐ >10,000	☐ Unsurfaced
☐ Aldyl-A	☐ Exposed Facility	REQUIRED FOR T.P.	☐ Water/Marsh/Tidal
☐ PE 2406 (Orange)	☐ Gravel		☐ Other _____
☐ PE 2406/2708 (Yellow)	☐ Other_____		
☐ PE 3408 (Black)			
☐ PE 4710 (Black)			
☐ Other Plastic			
☐ Other_____			

FEET EXPOSED ____
COVER ON PIPE (Inches) ____
INTERNAL LINER ☐ Yes ☐ No
PAVED WALL TO WALL ☐ Yes ☐ No
NEAR PUBLIC ASSEMBLY ☐ Yes ☐ No

NLIS REFERENCE #: _____ LINE SIZE ____.____

CATHODIC PROTECTION SYSTEM CONDITION

Pipe to Soil (Mv)		LAN ID Taking Reading:		Cathodic Protection System Damaged ☐ Yes ☐ No	Corrective Form Issued ☐ Yes ☐ No

ONLY WHEN BARE METAL OBSERVED & ACCESSIBLE

METALLIC PIPE CONDITION

COATING TYPE	☐ Bare/None	☐ Paint	☐ Single Wrap	☐ Somastic	☐ Hot Applied Asphalt	COATING CONDITION	☐ Excellent ☐ Fair
	☐ Epoxy	☐ Tape	☐ Double Wrap	☐ Extru Coat	☐ Other		☐ Good ☐ Poor
COATING DAMAGED	☐ Yes ☐ No			COATING REPAIRED	☐ Yes ☐ No		
ASBESTOS	☐ Yes ☐ No ☐ Unknown			PIPE SUPPORT CONDITION	☐ Good ☐ Possible Lack of - Consult Engineer		
CIRCUMFERENTIAL WELD CONDITION (Visual)	☐ Acceptable ☐ Cracked ☐ High/Low Observed ☐ Dimensions not in tolerance (See D-20 or D-22)						
LONG SEAM (TP only) Pipe Grade/Spec (TP only)	☐ DSAW ☐ ERW ☐ AO Smith ☐ Spiral ☐ SSAW ☐ SMLS ☐ LAP ☐ Flash ☐ Grade B ☐ X42 ☐ X52 ☐ X60 ☐ X65 ☐ X70						

EXTERNAL INSPECTION

RUST	☐ None ☐ Light ☐ Heavy	WALL THICKNESS (Req. for TP) (inches)	____.____	WALL THICKNESS MEASURED	☐ Yes ☐ No
PITTING	☐ None ☐ Light ☐ Heavy	MAX. PIT DEPTH (Req. for TP) (inches)	____.____	GRAPHITIZED (Cast Iron)	☐ Yes ☐ No
GOUGING	☐ None ☐ Light ☐ Heavy	MAX. GOUGE DEPTH (Req. for TP) (inches)	____.____	MAX. GOUGE Length (Req. for TP) (inches)	
		MAX. EXTERNAL CORROSION Length (Req. for TP) (inches)	____.____	DEPTH OF DENTS (inches)	

INTERNAL INSPECTION

RUST	☐ None ☐ Light ☐ Heavy	PITTING	☐ None ☐ Light ☐ Heavy	MAX. PIT DEPTH (Req. for TP) (inches)	____.____

PLASTIC PIPE CONDITION

PRINTLINE LEGIBLE ☐ Yes ☐ No

PIPE MANUFACTURER (LOCATED ON PIPE)		MANUFACTURE DATE ____/____/____	LOCATING WIRE SIZE		LOCATING WIRE CONDITION ☐ Good ☐ Bad ☐ None
GOUGING ☐ Yes ☐ No	UNDER STRESS/ BENT ☐ Yes ☐ No	DISCOLORING TO GRAY ☐ Yes ☐ No	CRACKING ☐ Yes ☐ No	IN CONTACT WITH HARD OBJECTS ☐ Yes ☐ No	
ESTIMATE GOUGE DEPTH ☐ <10% ☐ 10-50% ☐ >50%		VISUAL APPEARANCE (SEE S4170) ☐ Acceptable ☐ Unacceptable		TEE CAP CRACKING ☐ Yes ☐ No	

GAS QUARTERLY INCIDENT DATA

Damaging Party Type ☐ First Party (PG&E) ☐ Second Party (Contractor working on PG&E job) ☐ Third Party (Everyone else)

Damaging Party Name: Damaging Party Operator:		Address:	
City:	Phone:		Zip Code:
Zero Customers Out ☐ Yes ☐ No	Est. Date and Time of Restoration (or CGI) ____-____-____		Time (24 Hour) ____
# INJURED: EMPLOYEES _____ OTHERS _____	DAMAGE $_____	# Cust. Interrupted _____	# Cust. Hours _____
# FATAL: EMPLOYEES _____ OTHERS _____	Media ☐ Yes ☐ No	Media Type ☐ TV ☐ Radio ☐ Newspaper Name/Channel: _____	
FIRE ☐ Yes ☐ No	EXPLOSION ☐ Yes ☐ No		
DOT REPORTABLE (Fatality, In-patient Hospitalization, ≥$50K Property Damage) ☐ Yes ☐ No	CPUC REPORTABLE (Major News Media) ☐ Yes ☐ No		

LOCATION SKETCH

REQUIRED for new or returned to service segments of ☐main or ☐service: ☐ On-Site Test ☐ Pre-Test ☐ Soap Test TESTED AT _____ PSIG FOR _____ Hour/Minutes TEST in accordance with A-34 BY: (LAN ID) _____ DATE _____	TYPE OF MATERIAL INSTALLED _____ Manufacturer Name _____ Size: _____ SDR: _____ WT: _____	MFG. DATE (MM/DD/YY) __/__/__ See A-93	WELDED BY: (LAN ID) _____ Date: _____ WELDING INSPECTED PER PG&E D-40 INSPECTED BY: (LAN ID) _____ Date: _____
REQUIRED for new or returned to service segments of ☐main or ☐service: ☐ On-Site Test ☐ Pre-Test ☐ Soap Test TESTED AT _____ PSIG FOR _____ Hour/Minutes TEST in accordance with A-34 BY: (LAN ID) _____ DATE _____	TYPE OF MATERIAL INSTALLED _____ Manufacturer Name _____ Size: _____ SDR: _____ WT: _____	MFG. DATE (MM/DD/YY) __/__/__ See A-93	D-34 Qualifications for joining plastic: Plastic Joined BY: (LAN ID) _____ Date: _____

TIE-IN DATA ☐ Socket Fusion ☐ Stab Coupling ☐ Electro-Fusion ☐ Compression Fitting ☐ Butt Fusion ☐ Transition Fitting

COMMENTS: GPS COORDINATES

Responsible Person LAN ID: _____

A sketch is required for all repairs (or directions as to where to find the sketch is required, if it is located on another record).
If any fittings are used, then text and/or sketch must show location.

N

Please Note: EMS Markers are to be installed for Unlocatable Facilities, Deactivated Facilities and where plastic is found without wire. All EMS markers shall be clearly dimensioned.

Field Supervisor Reviewed By LAN ID: _____ Date ___-___-___ Post Repair Check ☐ Yes ☐ No Date ___-___-___

Mapping Reviewed By LAN ID: _____ Date ___-___-___ Posting Required ☐ Yes ☐ No

Dist. List: Redacted, Joel Mannie, Chauna Morrissey, Redacted
Bill Gibson, Redacted

Hydrostatic Test Package QA Review

QA: PASS / HOLD

The following Hydrostatic Test package has been reviewed by QA and requires revision. The issue list below includes all notes generated from the review with items held for correction (prior to submittal) found above the red line.

Hydro Test # : XX
Review Date : XX/XX/XXXX
Review Stage : XXX
Construction Coordinator Supervisor : XXXXXXXX
Main Test Date : XX/XX/XXXX
Pipeline Engineer : XXXXXXXX

COMMENTS

		Fixed by	Date
Hold For Correction	1. Item #202 (Sheet 4of6, Det.B) shown @25.7' on weld map & B.O.M., only 14' on STPR		
	2. Detail 2, Sheet 5of6, Psta 1+51 not red lined to match profile station of 1+35		
	3. Detail Sheet shows tie-in station of "0+00.5," profile shows "-0+00.5"		
	4. Pressure chart for Seg. B-C: Item #153 shown "X-60" on chart, "Y60" on STPR		
	5. Item #3 on M.O.R. shown @6', shown @21' on STPR		
	6. Item #2, 3/4" 0.113"WT, GRB shown on M.O.R. but not in the STPR(s)		
	7. Test head config. drawings missing from test #4, (same head used? Need on STPR?)		
	8. Test #3&4 STPR Min/Max Press. do not match Min/Max Press on Pipe Specs (pg 5of6)		
	9. No 34" elbows (5 EA) on STPR, but shown on M.O.R.		
	10. Pipe lengths for Item #101 @120' on STPR's, 126' on isometric sketches		
FINDINGS FOR FUTURE IMPROVEMENT	11. Seg BC has no test head iso drawings, Item #'s missing from iso drawings		
	12. Test 2 - No iso for 14' of 1.05" .144 WT; Test 5 - No iso for 41' of 1.05 GRB SMLS		
	13. RCP report (Test 2): 34" pipe @58' red lined to 47.8 on pg 2of17, kept 58' elsewhere		
	14. Test 2 - 2 Hand written test logs incl. with slightly diff. values (min 1123 vs 1125)		
	15. RCP report has engineered pipe lengths instead of actual field verified lengths.		
	16. Multiple strength test stationing not clearly identified on the profile sheet		
	17. Unable to verify item #201 from plans, no red lined dimensions provided		
	18. 60.9' worth of removal on C.O.C forms (76B1,2,3,4), 78' of removal shown on details		
	19. Only one reading taken on Dew Point Test Forms		
	20. No coating inspection reports		
	21. Test procedure verification & hold point areas are missing signatures.		

PACKAGE ITEMS	INCLUDED?	DATE ADDED	NAME
REQUIRED DOCUMENTATION			
Site Specific Test Procedure	☐ Yes ☐ No		
Red-lined Drawings (incl. GPS coord.)	☐ Yes ☐ No		
Weld inspection Stamp (signed)	☐ Yes ☐ No		
Weld map (may be red lined)	☐ Yes ☐ No		
Dew point test form & Supporting data	☐ Yes ☐ No		
Main inspection report (form A)	☐ Yes ☐ No		
Chain of custody, abandonment, asset	☐ Yes ☐ No		
Bill of Material	☐ Yes ☐ No		
Pipeline Repair, Emergency Pipeline test	☐ Yes ☐ No		
Radiographer Daily Inspection Sheets	☐ Yes ☐ No		
Max test pressure approvals (Keifner)	☐ Yes ☐ No		
FOLLOW UP DOCUMENTATION			
Certification of Results (Bureau Veritas)	☐ Yes ☐ No		
Direct Examination (Form H)	☐ Yes ☐ No		
ABI Test Results (ATC)	☐ Yes ☐ No		
Destructive Test Results (ATS)	☐ Yes ☐ No		