1 PURPOSE

1 1 To provide instructions on proper equipment to be utilized and procedures and precautions to be followed to insure safety during a hydrostatic test

2 GENERAL

2 1 The Supervisor in charge of the installation shall be responsible for the hydrostatic testing All personnel involved with the hydrostatic test must be familiar with the test procedure and safety precautions to be followed during the hydrostatic test

3 SAFETY CONSIDERATIONS

3 1 Take precautions as necessary to protect employees and the general public during testing These shall include but are not limited to the following

3 1 1 Locate the test equipment and instrumentation a safe distance from the test section (See Gas Standard A-37 6)

3 1 2 Keep personnel not working on the test operation out of the test area

3 1 3 Place barriers along the test section where appropriate to prevent public access

3 1 4 Notify public agencies of the scheduled test when necessary, and notify parties located in the general vicinity of the test section to avoid the area during the test

3 1 5 Patrol and use flagmen to keep people away during testing

3 1 6 Schedule the test at a time that will minimize public exposure in highly populated areas

3 2 Visually inspect temporary piping closures and other equipment used in conjunction with the test to verify that they are in safe working order Maintain a periodic visual inspection of this equipment from a safe distance during the test

APPROVED BY	REV	DATE	DESCRIPTION	GM	DWN	CHKD	SUPV	APVD
	3	1 5 83	ADDED SECT 3 4 REVISED SECT 10 & 11 7			KAH		
	2	8-16 82	ADDED 3, 10, 34 7 & HEAD					
	1	1 7 80	Issue for use					

GM
UPV
DSGN
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CHKD
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DATE 4-24-79 SCALE

PIPING - DATA SHEET

HYDROSTATIC TESTING PROCEDURE

GAS STANDARD

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO CALIFORNIA

B/M
DWG LIST
SUPSDS
SUPSD BY
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3 3 Do not remove caps, plugs or valves from the test head, or any other test equipment until a positive determination is made from two independent taps that the test section is depressurized

3 4 During the preparation for a test or retest of a section of existing pipeline, consideration must be given to the potential for gas leakage into the test section from an adjacent section of pipeline that remains in service, or from the release of gas from residual liquid which may remain in the line Special precautions shall be made to verify that a combustible mixture is not present in the section which is to be tested, prior to performing cutting or welding operations on the section

4 TEST PROCEDURE

4 1 Establish a plan for the hydrostatic test As appropriate, this shall include detailed written instructions covering problem areas for the specific test involved These shall be developed by the engineer responsible for the test in conjunction with the supervisor on the test

4 1 1 Consider the potential for flooding or other damage should a failure occur

4 1 2 Consider the safety of Company personnel and the general public

4 1 3 Have a copy of the Strength Test Pressure Report and schematic sketch of the test section at the test location

4 2 Prepare a sketch of the test section showing stationing of the test section and points of maximum and minimum elevation (see Gas Standard A-37 2)

5 OBTAIN PROPER TEST EQUIPMENT

5 1 Test Heads

5 1 1 The General Construction-Gas Department is responsible for the construction and maintenance of all test heads Pages 7 thru 9 of this Standard lists all test heads authorized for use to date Test heads not on this list shall not be used until they have been inspected and issued serial numbers by the General Construction-Gas Department

5 1 2 Test heads are to be constructed in accordance with Gas Standard A-37 1, Drawing No 386527 All test heads must be visually inspected X-rayed, hydrostatically tested, properly tagged for maximum test pressure, and issued serial numbers before they are authorized for use The necessary paperwork to

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verify the inspection and testing, and to verify the wall thickness size and grade of pipe and fittings used to make each test head shall be on file with General Construction in Oakland

5 1 3 Test heads shall be requested from General Construction-Gas Department 4930 Colliseum Way Oakland 94601 (415) 535-0601 Company phone 443-324, as far in advance as possible In some instances, when a new test head must be fabricated the lead time may be as long as 6 to 8 months Expenses for newly fabricated test heads, and their shipment to and from the requesting location will be charged to the construction GM The proper job number and accounting will be required with the request

5 1 4 If the proper size test heads are not available for a test, substitute test heads may be used with the approval of Gas System Design Department Due to the unequal O D and W T of the pipe to be tested and the substitute test heads Gas System Design Department will determine the proper installation procedures for these test heads

5 1 5 For the safety of personnel the protection of the test head, and ease of shipment, special steel skids have been made for each test head Care must be taken in placing the test head on the skid For most test heads there is only one mounting position which will allow for the proper placement of the chains Improper mounting could result in an injury or damage to the test head

5 1 6 Modifications, welding, or cutting shall not be made in the field (except welding the test head to the pipe being tested) If modifications are required, the test head must be returned to General Construction-Gas Department in Oakland for the modifications

5 1 7 All test heads shall be returned to General Construction-Gas Department in Oakland immediately after completion of the test All test heads must be returned with the same valves plugs, caps and nipples intact

5 1 8 A pup of tested pipe may be left on the test head only if it is (a) relatively close to the same grade and wall thickness of the test head and (b) clearly marked with the grade wall thickness and pressure to which it was tested This information must also be on the shipping notice when returning the test head

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5 1 9 A shipping notice must accompany each test head that is being returned or relocated to another job site

5 2 Pigs spheres scrapers etc for use on a job must be properly sized for the largest internal diameter of the test section or test head When necessary use scraper cups discs or polyurethane pigs for post test pipeline cleaning Gas Standard A-37 3 illustrates typical manufacturer s instructions for filling and sizing a sphere

5 3 Test Instruments

5 3 1 Pressure recorders are required on all hydrostatic tests The recorders must be calibrated every six months If both a dead weight tester and a pressure recorder are used on a hydrotest adjust the pressure recorder to read the same as the dead weight tester before beginning the test A chart with the proper pressure scale and time interval must be used

5 3 2 Dead weight testers must be calibrated within the last 12 months by the General Construction Gas Measurement and Control Section located at 25051 O'Neil Avenue Hayward California 94544 phone (415)537-1223 Company phone 481-337 A dead weight tester is required when testing over 90% SMYS of any segment of the test section

5 3 3 Indicating pressure gauges should be available for possible installation at the remote end of the test section or at maximum or minimum elevations of the test section These gauges are for information purposes only

5 4 Pressurizing equipment, hoses and other associated equipment must be checked out and be in good working condition before the test Make sure the equipment is properly sized and rated for the maximum test pressure

6 VERIFY THE STRENGTH TEST PRESSURE REPORT

6 1 If Part I of the Strength Test Pressure Report does not show the latest design changes on the design drawings or the actual pipe to be tested, return the Strength Test Pressure Report to the Project Engineer or Gas System Design for necessary corrections (the Gas Estimators' Manual and the Gas Foremans' Manual give complete instructions on the Strength Test Pressure Report)

7 NOTIFICATION OF HYDROTEST

7 1 For work assigned to General Construction notify the General Office - Gas Construction Department seven days prior to the date the hydrotest is scheduled

7 2 If work is performed by the Division, notify the Gas System Design Department seven days prior to the date of hydrotest

7 3 If the job was reported to the CPUC it is likely that the hydrotest will be witnessed by a member of the CPUC Staff and Gas System Design Department

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8 WATER SUPPLY

8 1 The water used for testing shall be reasonable clean Contaminated water or salt water shall not be used Water shall be obtained from the most readily available source, subject to authorizations by the appropriate local county, state or federal regulating agency or agencies

8 2 If wells must be used as the water source and the quantity of water needed for the test is substantial a draw-down test shall be performed If the wells prove to be inadequate an alternate source should be found Transporting water by truck shall be used only as a last resort when the quantity of water needed is substantial

9 WATER FILLING (See Gas Standard A-37 4 for Typical Set-up)

9 1 Make sure the following points are considered in the water filling operation

9 1 1 The test section must be completely filled with water A pig must be run ahead of the water to force as much air as possible out of the test section For test sections where a pig cannot be used the air must be vented at the high points

9 1 2 Fill the test section from only one direction

9 1 3 If necessary, anchor or support the pipe to prevent excessive stress levels caused by the weight of the water Special consideration should be given to bridge crossings and spans

9 1 4 Open and close fill and drain valves slowly to prevent pressure surges resulting from rapid changes in water velocity

9 2 Water Filling Equipment

9 2 1 Size the fill pumps considering static head due to elevation difference in the test section and the fill time desired

9 2 2 Install filters on the suction line to prevent fish and other foreign matter from entering the test section

9 2 3 The exhaust of the pump engine must have spark arrestors

9 2 4 Water may be transferred from the one test section to another by use of a hairpin (See Gas Standard A-37 5) The hairpin shall not be left in place during the test

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10 WATER REMOVAL (See Gas Standard A-37 7 for Typical Set-up)

10 1 Use extreme caution when releasing water at the test pressure The pressure should be relieved by partially opening a small tap valve before opening the main dewatering valve

10 2 Remove the water from long test sections by pigging The most effective speed of a pig for dewatering is considered to be 1 to 5 miles per hour

10 3 Where removal of moisture is critical, use two pigs with a slug of methanol between them

10 4 Short sections may be inclined to drain, and swabbed dry by hand

10 5 Dispose of the water in a manner that will prevent damage to the environment and comply with any water disposal regulations

11 REPORTS

11 1 The Gas Estimators' Manual and the Gas Foremans' Manual contain sections that provide complete instruction on the completion of the Strength Test Pressure Report Completed reports must be signed and all copies for distribution must be clear and show all pertinent data

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TEST HEADS AUTHORIZED FOR USE

DIAMETER	SERIAL No	GRADE	W T	MAXIMUM TEST PRESSURE
3	3761	B	216'	2160
3	3761-A			
3	3801-A	'		
3"	3801-B	'	'	"
4 Comb	4761-A	B	237	2160
4 Comb	4761-B			
4	4791-A			
4	4791-B			
4	4792-A			
4	4792-B			
6'	6761-A	X-52	500	2160
6	6761-B			
6"	6762-A	"B	432	2738
6"	6762-B			
* 6	6791-A			
6	6791-B			
8 Comb	8761-A	B	500	2160 W/4 Heads
8 Comb	8761-B			
8	8791-A			2160
8	8791-B			
8	8792-A			
8	8792-B			
10"	10761	X-52	500	2160
10"	10761-A	"		
10	10762-A	B		1627
10	10762-B		"	1953
10	10763-A	X-52	365	1765
10	10763-B			"
10"	10811-A	"	500"	2418
10'	10811-B	"	"	'

*Correction was made in this revision

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DIAMETER	SERIAL No	GRADE	W T	MAXIMUM TEST PRESSURE
12	12751-A	X-52	500	2039
12	12751-B			
12	12752-A			
12	12752-B			
12	12763-A			
12	12763-B			
16	16751	X-52	500	1625
16	16752			
16	16753			
16	16753-A			
16	16753-B			
16	16753-C			
16	16764-A			
16	16764-B			
16	16765-A			
16	16765-B			
16	16766-A		680	2160
16	16766-B			
18	18761-A	X-52	500	1733
18	18761-B			
20	20761-A	X-42	750	1440
20	20761-B			
20	20762-A	X-52	500	1560
20	20762-B			
22	22761-A	Y-60	1 000	3853
22	22761-B			3853

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DIAMETER	SERIAL NO	GRADE	W T	MAXIMUM TEST PRESSURE
24	24761-A	X-52	625	1440
24	24761-B			
24	24762-A		750	1950
24	24762-B		"	
26	26761-A	Y-52	750	1772
26	26761-B			
26	26762-A			
26	26762-B			
30"	3081-1A	X-52	1 000 '	1500
30"	3081-1B	"	"	"
34	34761-A	X-52	1 000	1835
34	34761-B			
34"	34801-A	Y-65	1 375	2553
34'	34801-B	"	"	"
36	36761-A	X-60	750	1440
36	36761-B			
36	36762-A		730	
36	36762-B			

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