Scanning
OCS G 28282
SN 16066
New

August 11, 2008

In Reply To: MS 5232

REVISED APPROVAL

Mr. J. Keith R. Couvillion
Chevron U.S.A. Inc.
1500 Louisiana
Houston, Texas 77002

Dear Mr. Couvillion:

Reference is made to the following application that has been reviewed by the Minerals Management Service:

Application Type: New Right-of-Way Pipeline
Application Date: February 15, 2007
Supplemental Data Date(s): February 15, 2007, August 1, 2007, July 25, 2008, July 30, 2008

Work Description: Assignment of the maximum allowable operating pressure (MAOP) of the pipeline based on supplemental data submitted on July 25, and July 30, 2008 for the following:

One 7 5/8-inch bi-directional pipeline (A2 West) 3.89 miles in length with associated umbilical to transport bulk oil originating at the production manifold located in Block 696, through the associated PLET/pile and its associated jumper, continuing through Blocks 695 and 651, and terminating at Platform A (Blind Faith Floating Production Facility) located in Block 650, all in the Mississippi Canyon Area.

Assigned Right-of-Way Number: OCS-G28282
Assigned Segment Number: 16066
Umbilical Segment Number: 16067

Segment No.	MAOP (psig)	MAOP Determination
16066	10000	Valves, Hydrostatic Test Pressure

The right-of-way and approval to install, operate, and maintain the pipeline were granted originally on August 16, 2007, with conditions. All conditions of the original approval remain in effect. The maximum allowable operating pressure (MAOP) of the pipeline was not assigned in the August 16, 2007 approval. The MAOP of the pipeline is hereby approved as follows:

Assigned MAOP (psi): 10000
MAOP Determination : Valves, Hydrostatic Test Pressure

Approval is subject to the following:

The MAOP is assigned at the top of riser and is based on the pressure gradient of gas having a minimum specific gravity of 0.65 within the riser. The MAOP is based on a maximum shut-in tubing pressure of 11,399 psi at the wellheads. The pressure at the top of riser shall not exceed the assigned MAOP except for that time granted by an approved alternate procedure or departure request.

Alternate Procedures or Equipment and Departure Requests:

You request to use alternate procedures from the requirements of 30 CFR 250.1002(a) to use the "thick wall" pipe formula in ASME B31.8 Section A842.221 to determine the internal design pressure of the line pipe and riser pipe. Pursuant to 30 CFR 250.141, your alternate procedures are hereby approved.

You request a departure from the requirements of 30 CFR 250.1002(c)(1) to establish the MAOP above 10,000 psi. The pipeline system must be fully rated to shut-in tubing pressure. An MAOP greater than the rating of the pipeline system will not be approved, therefore your departure request is hereby denied.

You request a departure from the requirements of 30 CFR 250.1002(b)(1), (2) and (3), and (c)(1) to allow the pipeline to be temporarily operated at a pressure greater than the MAOP but no greater than 10,453 psi for a period of six months from the initial in-service date of the pipeline and riser. Pursuant to 30 CFR 250.142, your departure request is hereby approved.

You request to use alternate procedures from the requirements of 30 CFR 250.1002(c)(1) to allow a pressure credit to reduce the effective shut-in tubing pressure at the top of the riser. The basis of your request is to assume the riser is filled with dry gas having a specific gravity (S.G.) of 0.65 (S.G. of Air = 1.0). The MAOP is calculated at the top of the riser based on this assumption to ensure that the pipeline system is fully rated to the shut-in tubing pressure. Pursuant to 30 CFR 250.141, your alternate procedures are hereby approved.

You request to hydrostatically test the riser, line pipe, manifold, and jumpers to a minimum pressure of 12,500 psi. This is neither a departure request nor a request for alternate procedures or equipment, therefore no consideration is given to this request as such.

You request to hydrostatically test the riser, line pipe, manifold, and jumpers to a minimum pressure of 13,079 psi for 8 hours. This is neither a departure request nor a request for alternate procedures or equipment, therefore no consideration is given to this request as such.

Please be reminded that, in accordance with 30 CFR 250.1008(a), you must notify the Regional Supervisor at least 48 hours prior to commencing the installation or relocation of a pipeline or conducting a pressure test on the pipeline. Commencement notification(s) should be faxed to (504) 736-2408.In accordance with 30 CFR 250.1008 (b), you are reminded to submit a report to the Regional Supervisor within 90 days after completion of any pipeline construction. Also in accordance with a Letter to Lessees dated April 18, 1991, a copy of the as-

built plat(s) must be submitted to the National Ocean Service, N/CS26 Room 7317, 1315 E-W Highway, Silver Spring, MD 20910-3282.

Sincerely,

(org. sgd.) M. Gagliano
Michael J. Saucier
Regional Supervisor
Field Operations

bcc: 1502-01 Segment No. 16066, 16067 ROW OCS-G28282 (MS 5232)
1502-01 ROW OCS-G28282 (Scanning) (MS 5033)
MS 5250 New Orleans District

MGagliano:ttg:8/11/2008:Chevron-16066

Scanning 16066 (G28282)

Chevron Lease Term Well Jumpers S 15942, 16066
Response to MMS Comments

At the time the original pipeline applications were filed, the wells had not been drilled and a maximum design SITP of 12,114 psi was utilized. Now that the wells have been drilled, we propose to use the actual maximum SITP of 11,399 psi as the maximum source pressure.

In accordance with 30 CFR 250.242 Chevron respectfully requests to utilize the "thick wall" formula in ASME B31.8, A. A842.221 for determining the internal design pressure for the line pipe and riser pipe in lieu of the internal design pressure requirements in 30 CFR 250.1002(a). Utilizing the "thick walled" formula demonstrates that we satisfy the hoop stress requirements; therefore, the line pipe and riser pipe is fit for purpose.

In accordance with 30 CFR 250.242, Chevron respectfully requests that the MAOP for the subject pipelines be at the top of the riser at the +150 level and that the MAOP considers the effects of a 0.65 specific gravity fluid column from the well tree to the +150 level. As shown below, the pressure at the top of the riser at +150 ft is 10,463 psi. We propose to hydrotest the riser, line pipe, manifold jumpers, manifold and well jumpers (SN 16068, 16069, 16070, 17576) to a minimum pressure of 1.25 * 10,463 psi = 13,079 psi for 8 hours.

As shown on the safety schematic (attached) for the subject pipeline applications, the topsides SDV and piping is rated for 10,000 psi. Therefore, in accordance with 30 CFR 250.242, Chevron respectfully requests that we be allowed to operate with a pressure greater than 10,000 psi for a limited amount of time. As shown on the attached graph, the SITP for the wells is anticipated to drop immediately following first production. The wells producing from the "Peach" reservoir are the highest pressure wells. As shown in the calculations below, a 10,000 psi pressure at the +150 ft level is equivalent to a SITP of 10,936 psi. As shown on the graph, the SITP for the Peach wells is anticipated to have a SITP below 11,000 psi after six months. Therefore, Chevron requests to operate above 10,000 for this length of time.

Please below see the internal design pressure calculations in accordance with 30 CFR 250.1002(a):

Line Pipe:

$$Pi = \frac{2 \times S \times t}{D} \times F \times E \times T$$

Pi = Internal design pressure, psi
S = SMYS; 65,000 psi
t = nominal wall thickness, inch; 0.812
D = nominal outside diameter, inch; 7.625
F = design utilization factor; 0.72 for flowlines during operations

E = longitudinal joint factor; 1 for seamless pipe per ASME B31.8 Table 841.1B
T = temperature derating factor; 0.967 for 300° F during operations per ASME B31.8 Table 841.1C;

$$Pi = \frac{2 \times (65000) \times (.812)}{7.625} \times 0.72 \times 1 \times .967$$

Pi = 9639 psi

Manifold Jumper Pipe:

$$Pi = \frac{2 \times S \times t}{D} \times F \times E \times T$$

Pi = Internal design pressure, psi
S = SMYS; 70,000 psi
t = nominal wall thickness, inch; 1.181
D = nominal outside diameter, inch; 7.99
F = design utilization factor; 0.72 for flowlines during operations
E = longitudinal joint factor; 1 for seamless pipe per ASME B31.8 Table 841.1B
T = temperature derating factor; 0.967 for 300° F during operations per ASME B31.8 Table 841.1C;

$$Pi = \frac{2 \times (70000) \times (1.181)}{7.99} \times 0.72 \times 1 \times .967$$

Pi = 14408 psi

Pressure at the top of the riser at +150 ft

Using the Actual Maximum SITP = 11399 psi

Weight of 0.65 gravity fluid = 18.85 lb/ft^3

7150 ft * 18.85 lb/ft^3 * ft/144 in^2 = 936 psi

Pressure at the top of the riser at the +150 ft = 11399-936 = 10463 psi

Therefore, the pressure at the top of riser is greater than the internal design pressure of the line pipe. Design does not meet the requirement of 30 CFR 250.1002(a). The pressure at the top of the riser is less than the internal design pressure of the manifold pipe. Design is acceptable.

Alternatives:

1. Use actual fluid density based on reservoir fluid samples and PVT analysis:

Actual fluid density is 48.26 lb/ft^3 (peach reservoir)

Weight of fluid = 7150 * 48.26 lb/ft^3 * ft/144 in^2 = 2396 psi

Pressure at the top of the riser at the +150 ft = 11399-2396 = 9003 psi

Therefore, the pressure at the top of riser is less than the internal design pressure of the line pipe, manifold jumper and riser pipe. Design is acceptable.

2. Using mixed Peach and Pink reservoir fluid density based on reservoir fluid samples and PVT analysis = 47.9 lb/ft^3 as stated in the original application

Weight of fluid = 7150 * 47.9 lb/ft^3 * ft/144 in^2 = 2378 psi

Pressure at the top of the riser at the +150 ft = 11399-2378 = 9021 psi

Therefore, the pressure at the top of the riser is less than the internal design pressure of the line pipe, manifold jumper and riser pipe. Design is acceptable.

3. Use "thick wall" pipe formula in ASME B31.8 A842.221

For line pipe:

$$S_H \le F_1 \cdot S \cdot T$$

F_1 = hoop stress design factor from Table A842.22 , 0.72
S = specified minimum yield strength, 65,000 psi
T=temperature derating factor, 0.967

$$S_H \le 0.72 \times 65{,}000 \times 0.967 \Rightarrow \quad S_H \le 45{,}255$$

$$S_H = (P_i - P_e) \cdot \frac{(D^2 + D_i^2)}{(D^2 - D_i^2)} - P_e$$

Pi = maximum actual SITP = 11399 psi
*Pe = external pressure at 7000 ft = 7000 ft * 64 lb/ft3 * ft/144in2 = 3111 psi*
D = Outside Diameter of Pipe, 7.625 inch
Di = D-2t, in = 7.625 -2.812 = 6.001*

$$S_H = (11399 - 3111) \cdot \frac{(7.625^2 + 6.001^2)}{(7.625^2 - 6.001^2)} - 3111$$

$S_H = 32,153 \leq 45,255$

If Pe =0, and S_H *=45,255*

$$45,255 = (Pi - 0) \cdot \frac{(7.625^2 + 6.001^2)}{(7.625^2 - 6.001^2)} - 0$$

Pi = 10,636 psi > 10,463 psi

Calculations show that regardless of whether external hydrostatic pressure is considered, the line meets the requirements of ASME B31.8 A842.221 and is therefore fit for purpose.

For riser pipe (at top of riser):

$S_H \leq F_1 \cdot S \cdot T$

F_1 = hoop stress design factor from 30 CFR 250.1002, 0.60
S = specified minimum yield strength, 65,000 psi
T=temperature derating factor, 0.967

$S_H \leq 0.6 \times 65,000 \times 0.967 \Rightarrow \quad S_H \leq 37,713$

$$S_H = (P_i - P_e) \cdot \frac{(D^2 + D_i^2)}{(D^2 - D_i^2)} - P_e$$

Pi = internal pressure at the top of the riser using a 0.65 gravity fluid = 10463 psi
Pe = external pressure at top of riser =0
D = Outside Diameter of Pipe, 7.625 inch
*Di = D-2t, in = 7.625 -2*1.000 = 5.625*

$$S_H = (10463 - 0) \cdot \frac{(7.625^2 + 5.625^2)}{(7.625^2 - 5.625^2)} - 0$$

$S_H = 35448 \leq 37,713$

Calculations show that the riser pipe meets the requirements of ASME B31.8 A842.221 and is therefore fit for purpose.

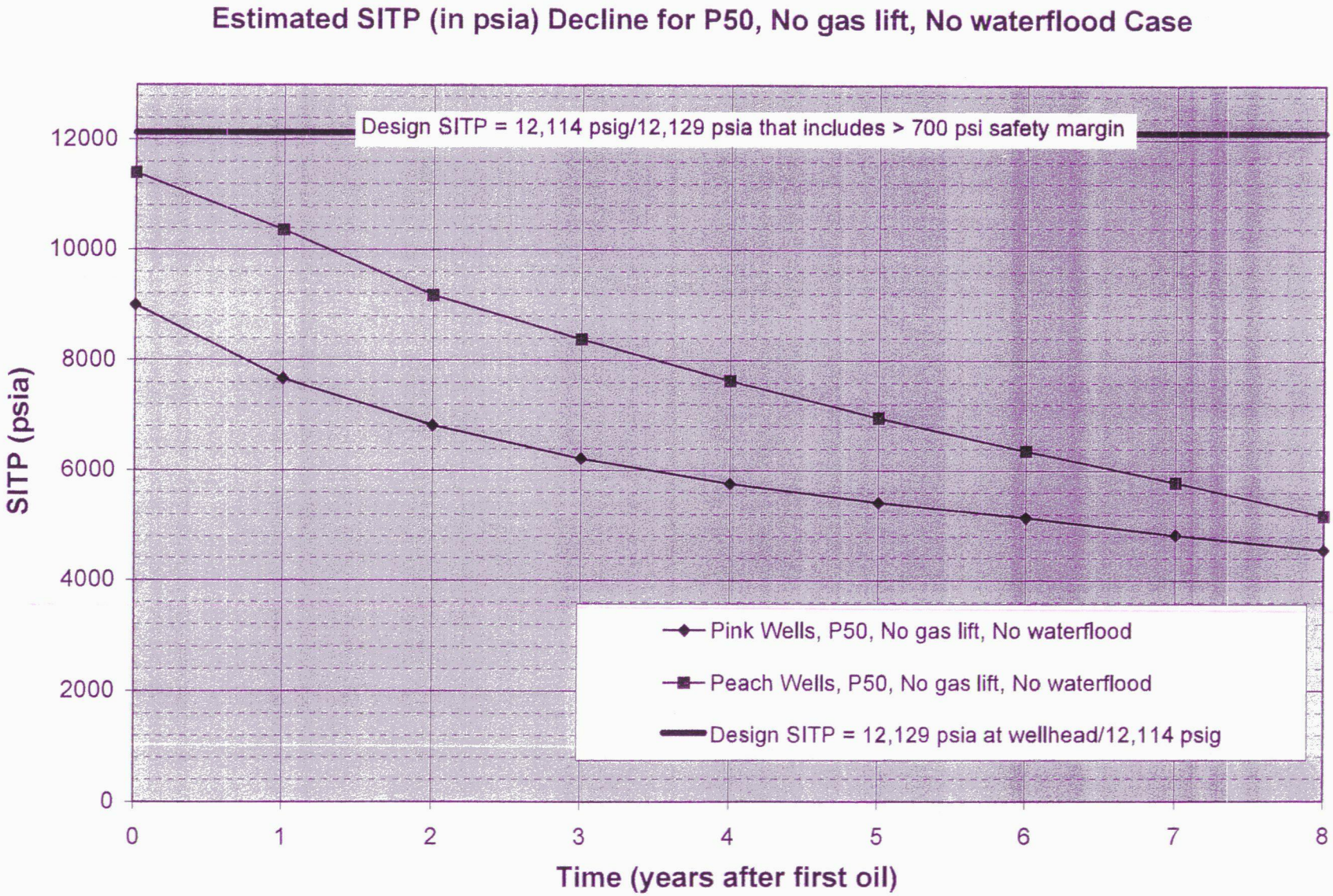
Calculation of SITP Equivalent to 10,000 psi pressure at the riser top at +150 ft

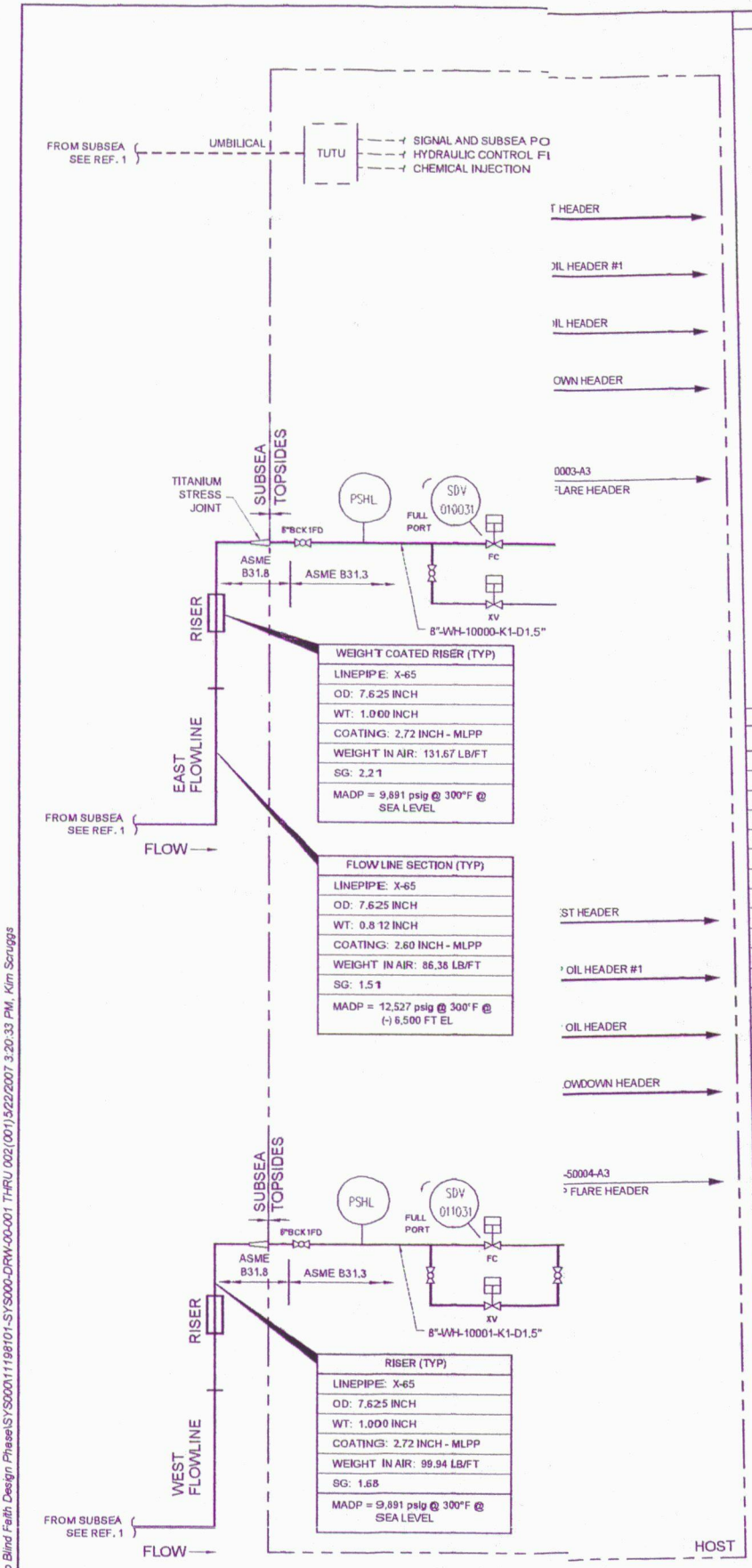
Using a gas gravity of 0.65 and density of 18.85 lb/ft^3

7150 ft * 18.85 lb/ft^3 * $ft/144\ in^2$ = 936 psi

SITP = Surface pressure + Weight of fluid

SITP =10,000 + 936 =10,936 psi





SUBSEA SYMBOLOGY LEGEND

- VALVE WITH ROV OPERATOR
- HYDRAULIC OPERATED CONTROL VALVE WITH ROV OVERRIDE
- CHOKE VALVE
- CHECK VALVE
- ROV OPERATOR
- FLOWLINE HUB
- BALL VALVE WITH ROV OPERATOR
- SCSSV
- PISTON SPRING RETURN VALVE
- PNEUMATIC ACTUATED CHOKE VALVE
- REDUCER
- TITANIUM STRESS JOINT
- WEIGHT COATED RISER
- BARRED TREE
- PRESSURE CONTROLLLER WITH ALARMS
- PRESSURE DIFFERENTAL INDICATOR WITH ALARMS
- PRESSURE SAFETY HIGH LOW
- FAIL SAFE VALVE
- SANDFIELD MOUNTED PRESSURE INDICATOR
- FIELD MOUNTED UNCLASSIFIED
- FIELD MOUNTED SHUT DOWN VALVE, DAMPER, LAUVER
- FIELD MOUNTED UNCLASSIFIED

COMMON ABBREVIATIONS

ABBR.	DESCRIPTION
AAV	2-1/16" ANNULUS ACCESS VALVE
AMV	2-1/16" ANNULUS MASTER VALVE
AP	ANNULUS PLUG
AWV	2-1/16" & 3/4" ANNULUS WING VALVE
FC	FAIL CLOSED
FIV	5-1/8" FLOWLINE ISOLATION VALVE
F1C7	3/4" FLOWLINE 1 CHEMICAL 7
F1C9	3/4" FLOWLINE 1 CHEMICAL 9
F2C8	3/4" FLOWLINE 2 CHEMICAL 8
F2C10	3/4" FLOWLINE 2 CHEMICAL 10
GLIV	2-1/16" GAS LIFT ISOLATION VALVE
HFL	HYDRAULIC FLYIGN LEAD
IAS	INSTRUMENT AIR SUPPLY
LCP	LOWER CROWN PLUG
LC	LOCKED CLOSED
LO	LOCKED OPEN
MADP	MAXIMUM ALLOWABLE DESIGN PRESSURE
MLPP	MULTI-LAYER POLYPROPILENE
N.C.	NORMALLY CLOSED
N.O.	NORMALLY OPEN
PCV	5-1/8" PRODUCTION CHOKE VALVE (O=OPEN, C=CLOSED)
PMV	5-1/8" PRODUCTION MASTER VALVE
PWV	5-1/8" PRODUCTION WING VALVE
SCSSV	1/4" SURFACE CONTROLLED SUBSURFACE SAFETY VALVE
SDU	SUBSEA DISTRIBUTION UNIT
SG	SPECIFIC GRAVITY
TUTU	TOPSIDES UMBILICAL TERMINATION UNIT
UCP	UPPER CROWN PLUG
UTA	UMBILICAL TERMINATION ASSEMBLY
XOV	2-1/16" CROSSOVER VALVE
XT	SUBSEA TREE

ORIGINAL DRAWING WITH SIGNATURES ON FILE

REF No	DRAWING No	REFERENCE D
1	11198101-SYS000-DRW-00-002	SAFETY SCHEMATIC SHEET 2 OF 2

FAITH SUBSEA DEVELOPMENT

G	ENGINEERING CHECK	PROJECT MANAGER	CLIENT
	MJQ	WRL	EJH
	5-15-07	5-15-07	5-21-07

HEI-SBS-SC-SZZ-074-CVX-00001

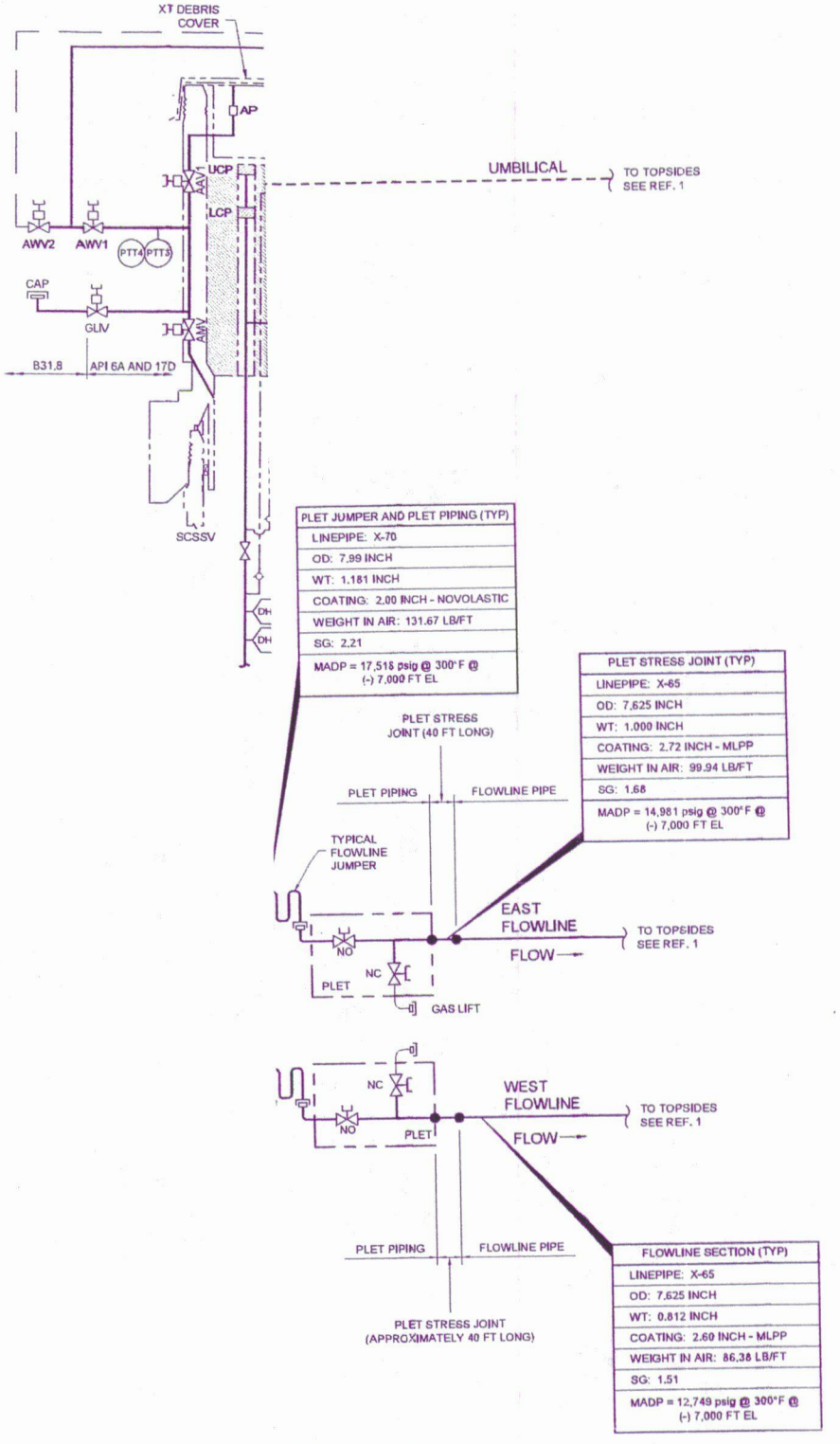
INTEC ENGINEERING

SAFETY SCHEMATIC
SHEET 1 OF 2

11198101 - SYS000 - DRW - 00 - 001 - 0

PROJECT NUMBER | CTR | TYPE | GROUP | NUMBER | REV

Q:\Current\11\11198101 Chevron\Texaco Blind Faith Design Phase\SYS000\11198101-SYS000-DRW-00-001 THRU 002(001).5/22/2007 3:20:33 PM, Kim Scruggs



SIGNATURES ON FILE

REF No	DRAWING No	REFERENCE
1	11198101-SYS000-DRW-00-001	SAFETY SCHEMATIC SHEET 1 OF 2

FAITH SUBSEA DEVELOPMENT

G	ENGINEERING CHECK	PROJECT MANAGER	CLIENT
	MJQ	WRL	SM
	6-27-08	6-30-08	6-30-08

IEI-SBS-SC-SZZ-074-CVX-00002

INTEC ENGINEERING

SAFETY SCHEMATIC SHEET 2 OF 2

11198101 - SYS000 - DRW - 00 - 002 - 2

PROJECT NUMBER | CTR | TYPE | GROUP | NUMBER | REV

Q:\Current\11\11198101 Chevron Texaco Blind Faith Design Phase\SYS000\11198101-SYS000-DRW-00-001 THRU 002 (002)6/30/2008 4:15:30 PM, Kim Scruggs

Chevron Blind Faith Pipeline Segments
S 15942, 16066, 16066, 16068, 16069, 16070, 17576
Response to MMS Comments
July 25, 2008

At the time the original pipeline applications were filed, the wells had not been drilled and a maximum design SITP of 12,114 psi was utilized. Now that the wells have been drilled, we propose to use the actual maximum SITP of 11,399 psi as the maximum source pressure.

Departures Requested:

1. In accordance with 30 CFR 250.242 Chevron respectfully requests to utilize the "thick wall" formula in ASME B31.8, A. A842.221 for determining the internal design pressure for the line pipe and riser pipe in lieu of the internal design pressure requirements in 30 CFR 250.1002(a). Utilizing the "thick walled" formula demonstrates that we satisfy the hoop stress requirements; therefore, the line pipe and riser pipe is fit for purpose.

2. In accordance with 30 CFR 250.242, Chevron respectfully requests the following departures relating to the MAOP of the pipeline:

- The MAOP for the subject pipelines be established at the top of the riser at the +150 level and that the MAOP considers the effects of a 0.65 specific gravity gas column from the well tree to the +150 level and be based on 30 CFR 250.1002(c)(2). As shown below, the pressure at the top of the riser at +150 ft is 10,463 psi. We propose to hydrotest the riser, line pipe, manifold jumpers, manifold and well jumpers (SN 16068, 16069, 16070, 17576) to a minimum pressure of 1.25 * 10,463 psi = 13,079 psi for 8 hours.
- Departure from the requirements in 30 CFR 150.1002(c)(1) and establish the MAOP above the maximum working of 10,000 psi at a design temperature of 250° F for the valves and flanges for the TSJ assembly, SCR tie-in spool, and SCR hull piping, including the boarding shut down

Chevron currently estimates that the pressure at the top of the riser at the +150 ft level using a 0.65 specific gravity gas will have declined to 10,000 psi (equivalent to a SITP 10,936 psi) in approximately 6 months.

3. Alternatively to the departures in Number 2 above, in accordance with 30 CFR 250.242, Chevron respectfully requests the following departures relating to the MAOP of the pipeline:

- The MAOP of the subject pipelines be established at the top of the riser at the +150 level and the MAOP considers the effects of a 0.65 specific gravity gas column from the well tree to the +150 level and be based on 30 CFR 1002(c)(1). As shown below, 10,000 psi at the top of the riser at the +150 ft is equivalent to a SITP of 10,936 psi. We propose to hydrotest the riser, line pipe, manifold jumpers, and manifold to a minimum pressure of 1.25 *10,000 psi = 12,500 psi.

- Departure from the requirements in 30 CFR 250.1002(d) to install and maintain redundant safety devices meeting the requirements of section A9 of API RP 14C due to the maximum source pressure of 11,399 psi (maximum SITP) exceeding the proposed MAOP.

Chevron currently estimates that the pressure at the top of the riser at the +150 ft level using a 0.65 specific gravity gas will have declined to 10,000 psi (equivalent to a SITP 10,936 psi) in approximately 6 months.

Support for Departures:

Internal Design Pressure for Line Pipe and Riser Pipe

Please below see the internal design pressure calculations in accordance with 30 CFR 250.1002(a):

Line Pipe:

$$Pi = \frac{2 \times S \times t}{D} \times F \times E \times T$$

Pi = Internal design pressure, psi
S = SMYS; 65,000 psi
t = nominal wall thickness, inch; 0.812
D = nominal outside diameter, inch; 7.625
F = design utilization factor; 0.72 for flowlines during operations
E = longitudinal joint factor; 1 for seamless pipe per ASME B31.8 Table 841.1B
T = temperature derating factor; 0.967 for 300° F during operations per ASME B31.8 Table 841.1C;

$$Pi = \frac{2 \times (65000) \times (.812)}{7.625} \times 0.72 \times 1 \times .967$$

Pi = 9639 psi

Pressure at the top of the riser at +150 ft

Using the Actual Maximum SITP = 11399 psi

Weight of 0.65 specific gravity gas = 18.85 lb/ft^3

7150 ft * 18.85 lb/ft^3 * ft/144 in^2 = 936 psi

Pressure at the top of the riser at the +150 ft = 11399-936 = 10463 psi

Therefore, the pressure at the top of riser is greater than the internal design pressure of the line pipe. Design does not meet the requirement of 30 CFR 250.1002(a).

Please below see the internal design pressure calculations in accordance with "thick wall" pipe formula in ASME B31.8 A842.221

For line pipe:

$$S_H \le F_1 \cdot S \cdot T$$

F_1 = hoop stress design factor from Table A842.22 , 0.72
S = specified minimum yield strength, 65,000 psi
T=temperature derating factor, 0.967

$$S_H \le 0.72 \times 65{,}000 \times 0.967 \Rightarrow \quad S_H \le 45{,}255$$

$$S_H = (P_i - P_e) \cdot \frac{(D^2 + D_i^2)}{(D^2 - D_i^2)} - P_e$$

Pi = maximum actual SITP = 11399 psi
*Pe = external pressure at 7000 ft = 7000 ft * 64 lb/ft3 * ft/144in2 = 3111 psi*
D = Outside Diameter of Pipe, 7.625 inch
Di = D-2t, in = 7.625 -2.812 = 6.001*

$$S_H = (11399 - 3111) \cdot \frac{(7.625^2 + 6.001^2)}{(7.625^2 - 6.001^2)} - 3111$$

$S_H = 32{,}153 \le 45{,}255$

If Pe =0, and $S_H = 45{,}255$

$$45{,}255 = (Pi - 0) \cdot \frac{(7.625^2 + 6.001^2)}{(7.625^2 - 6.001^2)} - 0$$

Pi = 10,636 psi > 10,463 psi

Calculations show that regardless of whether external hydrostatic pressure is considered, the line meets the requirements of ASME B31.8 A842.221 and is therefore fit for purpose.

For riser pipe (at top of riser):

$$S_H \le F_1 \cdot S \cdot T$$

F_1 = hoop stress design factor from 30 CFR 250.1002, 0.60
S = specified minimum yield strength, 65,000 psi
T=temperature derating factor, 0.967

$$S_H \le 0.6 \times 65{,}000 \times 0.967 \Rightarrow \quad S_H \le 37{,}713$$

$$S_H = (P_i - P_e) \cdot \frac{(D^2 + D_i^2)}{(D^2 - D_i^2)} - P_e$$

Pi = internal pressure at the top of the riser using a 0.65 gravity fluid = 10463 psi
Pe = external pressure at top of riser =0
D = Outside Diameter of Pipe, 7.625 inch
*Di = D-2t, in = 7.625 -2*1.000 = 5.625*

$$S_H = (10463 - 0) \cdot \frac{(7.625^2 + 5.625^2)}{(7.625^2 - 5.625^2)} - 0$$

$S_H = 35{,}448 \le 37{,}713$

Calculations show that the riser pipe meets the requirements of ASME B31.8 A842.221 and is therefore fit for purpose.

MAOP and Hydrotest Pressure:

As per 30 CFR 250.1002(c) The maximum allowable operating pressure (MAOP) shall not exceed the least of the following:
(i) Internal design pressure of the pipeline, valves, flanges, and fittings:
(ii) Eighty percent of the hydrostatic pressure test (HPT) of the pipeline; or
(iii) if applicable, the MAOP of the receiving pipeline when the proposed pipeline and the receiving pipeline are connected at a subsea tie-in.

The design working pressure rating and design temperature for the valves, flanges and fittings are shown in the attached drawing (11198101-060). As shown, the valves and flanges for the TSJ assembly, SCR tie-in spool, and SCR hull piping, including the boarding shut down valve are rated for 10,000 psi at 250° F since the temperature at the base of the riser is anticipated to be 253° F and 223° F at the top of the riser.

Using a 0.65 specific gravity gas, the maximum SITP at the top of the riser at 150 ft is as follows:

Using the Actual Maximum SITP = 11399 psi

Weight of 0.65 specific gravity gas = 18.85 lb/ft^3

7150 ft * 18.85 lb/ft^3 * ft/144 in^2 = 936 psi

Pressure at the top of the riser at the +150 ft = 11399-936 = 10463 psi

However, the SITP of the wells is expected to drop immediately following first production as shown on the enclosed graphs. The wells producing from the "Peach" reservoir are the highest pressure wells. As shown in the calculations below, a 10,000 psi pressure at the +150 ft level is equivalent to a SITP of 10,936 psi. As shown on the graph, the SITP for the Peach wells is anticipated to have a SITP below 11,000 psi after six months.

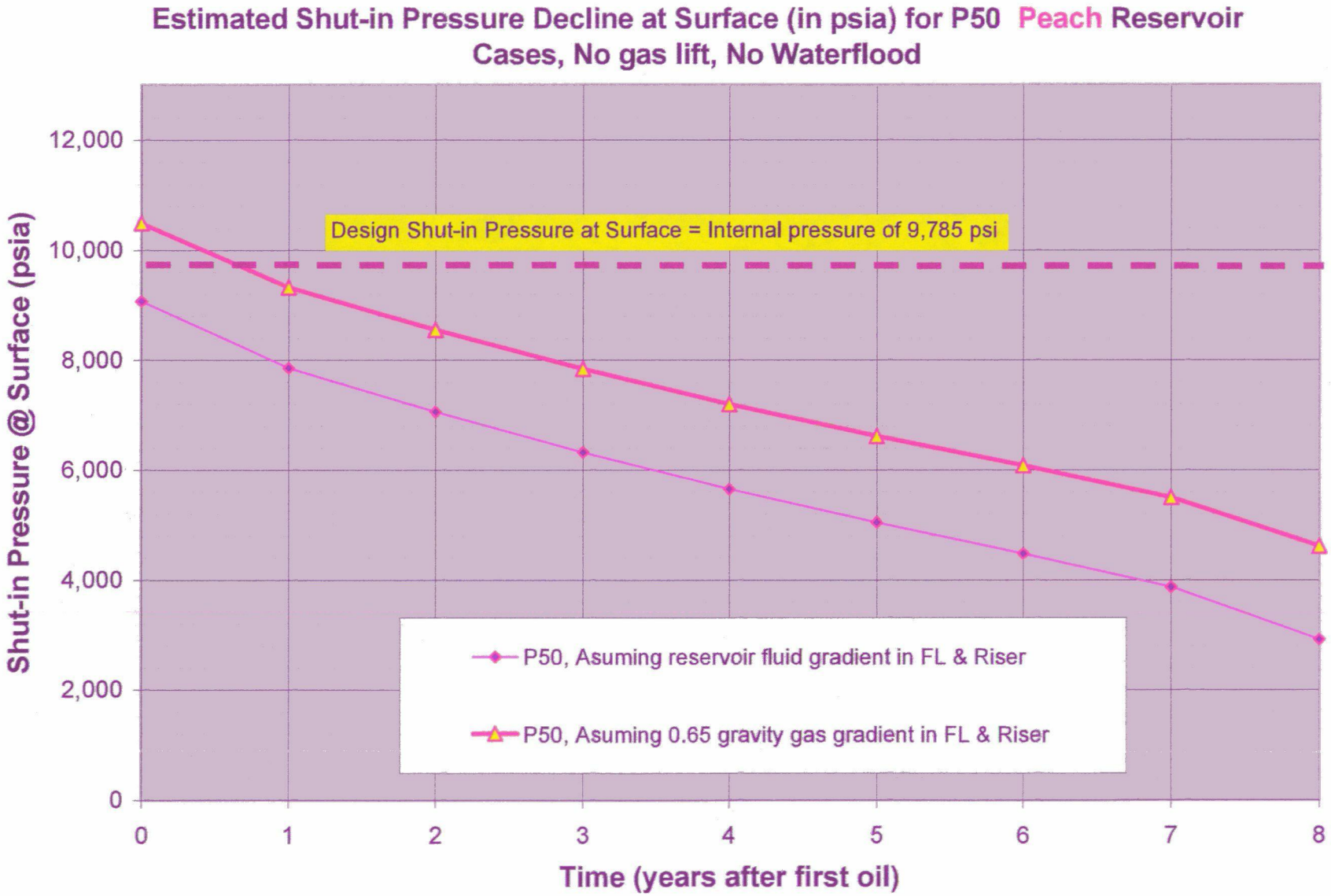
Equivalent to 10,000 psi pressure at the riser top at +150 ft

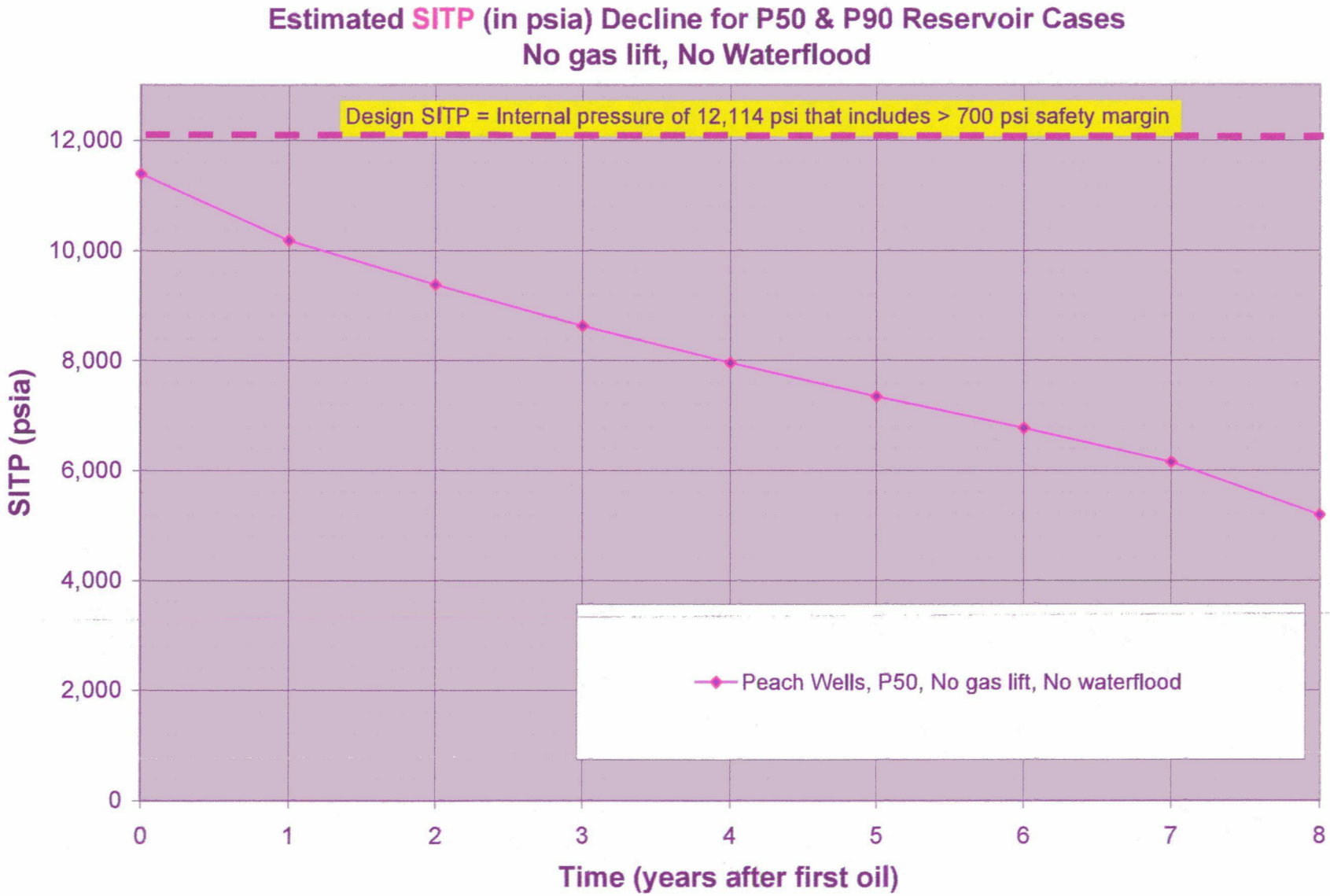
Using a gas gravity of 0.65 and density of 18.85 lb/ft^3

7150 ft * 18.85 lb/ft^3 * ft/144 in^2 = 936 psi

SITP = Surface pressure + Weight of fluid

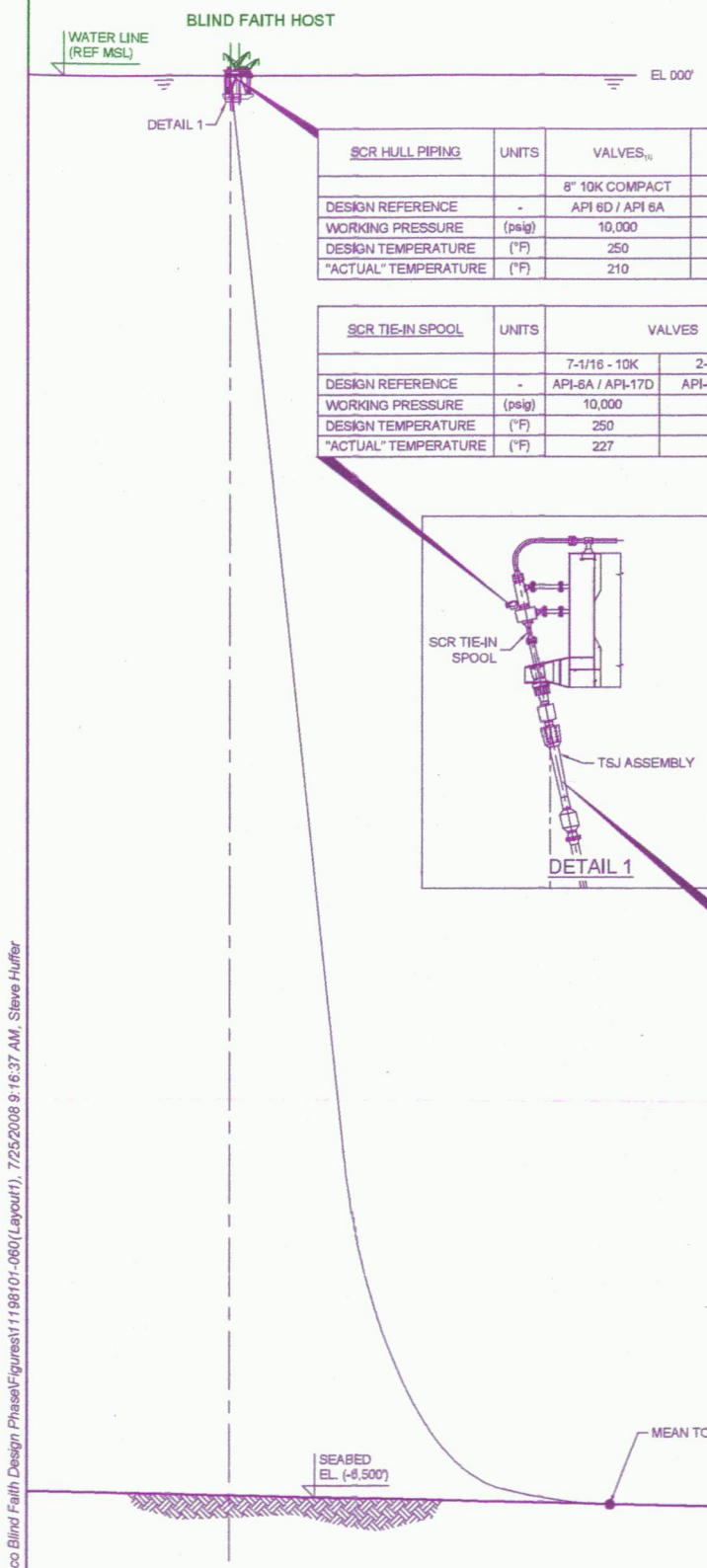
SITP =10,000 + 936 =10,936 psi





NOTES:

1. INCLUDES BOARDING VALVE TOPSIDES.
2. 15,000 PSI FLANGES WERE UTILIZED DUE TO HIGH LOADS DURING INSTALLATION. (NOT NEEDED FOR PRESSURE DESIGN)
3. ALL DIMENSIONS ARE IN FEET AND ALL ANGLES IN DEGREES UNLESS NOTED OTHERWISE.



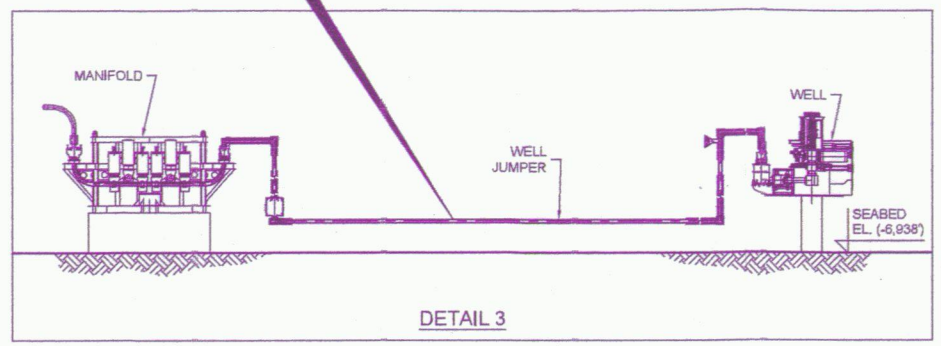
SCR HULL PIPING	UNITS	VALVES[1]	FITTINGS	FLANGES	CONNECTORS	HUBS
		8" 10K COMPACT	N/A	8" SPO - 10K	N/A	N/A
DESIGN REFERENCE	-	API 6D / API 6A	N/A	SPO 14463-YW	N/A	N/A
WORKING PRESSURE	(psig)	10,000	N/A	10,000	N/A	N/A
DESIGN TEMPERATURE	(°F)	250	N/A	250	N/A	N/A
"ACTUAL" TEMPERATURE	(°F)	210	N/A	223	N/A	N/A

SCR TIE-IN SPOOL	UNITS	VALVES		FLANGES			CONNECTORS	HUBS
		7-1/16 - 10K	2-1/16 - 10K	7-1/16 - 15K[3]	6" SPO - 15K[3]	8" SPO - 10K	N/A	N/A
DESIGN REFERENCE	-	API-6A / API-17D	API-6A / API-17D	API-6A	SPO 14396-YE (A707)	SPO 14463-YW	N/A	N/A
WORKING PRESSURE	(psig)	10,000	10,000	15,000	15,000	10,000	N/A	N/A
DESIGN TEMPERATURE	(°F)	250	250	250	250	250	N/A	N/A
"ACTUAL" TEMPERATURE	(°F)	227	227	227	227	227	N/A	N/A

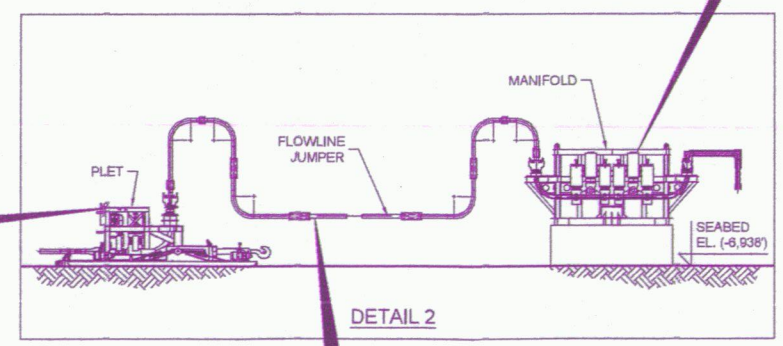
TSJ ASSEMBLY	UNITS	VALVES	FLANGES			CONNECTORS	HUBS
		N/A	7-5/8" SPO - 10K	6" SPO - 15K[3]	7-5/8" SPO - 10K	N/A	N/A
DESIGN REFERENCE	-	N/A	SPO 14318-YE (A707)	SPO 14396-YE (A707)	SPO 14319-YE (TI)	N/A	N/A
WORKING PRESSURE	(psig)	N/A	10,000	15,000	10,000	N/A	N/A
DESIGN TEMPERATURE	(°F)	N/A	250	250	250	N/A	N/A
"ACTUAL" TEMPERATURE	(°F)	N/A	227	227	227	N/A	N/A

PLET	UNITS	MANUAL MAINLINE VALVES	MANUAL GAS LIFT VALVES	FLANGES	CONNECTORS	FLOWLINE HUB ASSEMBLIES	GAS LIFT HUB ASSEMBLIES
		7-1/16 - 15K	2-1/16 - 15K	N/A	N/A	MAX-8	-
DESIGN REFERENCE	-	API-6A / API-17D	API-6A / API-17D	N/A	N/A	FMC DESIGN	FMC DESIGN
WORKING PRESSURE	(psig)	15,000	15,000	N/A	N/A	12,500	12,500
DESIGN TEMPERATURE	(°F)	300	300	N/A	N/A	300	300
"ACTUAL" TEMPERATURE	(°F)	287	287	N/A	N/A	287	287

WELL JUMPER	UNITS	VALVES	FLANGES	WELL JUMPER CONNECTOR ASSEMBLIES	HUBS
				MAX-8	
DESIGN REFERENCE	-	N/A	N/A	FMC DESIGN	N/A
WORKING PRESSURE	(psig)	N/A	N/A	12,500	N/A
DESIGN TEMPERATURE	(°F)	N/A	N/A	300	N/A
"ACTUAL" TEMPERATURE	(°F)	N/A	N/A	287	N/A



MANIFOLD	UNITS	PIGGING LOOP VALVE	MANUAL BRANCH VALVES	ACTUATED BRANCH VALVES	FLANGES	PIGGING LOOP CONNECTOR ASSEMBLIES	FLOWLINE / WELL HUB ASSEMBLIES
		7-1/16 - 15K	5-1/8 - 15K	5-1/8 - 15K	-	MAX-8	MAX-8
DESIGN REFERENCE	-	API-6A / API-17D	API-6A / API-17D	API-6A / API-17D	N/A	FMC DESIGN	FMC DESIGN
WORKING PRESSURE	(psig)	15,000	15,000	15,000	N/A	12,500	12,500
DESIGN TEMPERATURE	(°F)	300	300	300	N/A	300	300
"ACTUAL" TEMPERATURE	(°F)	287	287	287	N/A	287	287



FLOWLINE JUMPER	UNITS	VALVES	FLANGES	FLOWLINE JUMPER CONNECTOR ASSEMBLIES	HUBS
				MAX-8	
DESIGN REFERENCE	-	N/A	N/A	FMC DESIGN	N/A
WORKING PRESSURE	(psig)	N/A	N/A	12,500	N/A
DESIGN TEMPERATURE	(°F)	N/A	N/A	300	N/A
"ACTUAL" TEMPERATURE	(°F)	N/A	N/A	287	N/A

DETAIL 3
DETAIL 2

INTEC ENGINEERING

July 25, 2008
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