

**Dobson Oilfield Services**

Revision 0

May 19, 2007

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SECTION A TITLE PAGE

**QUALITY MANAGEMENT SYSTEM MANUAL**  
**FOR THE**  
**CONSTRUCTION, REPAIR AND ALTERATION OF PRESSURE PIPING**  
**IN ACCORDANCE WITH**  
**ASME B31.3 PROCESS PIPING CODE**  
**AND**  
**THE ALBERTA SAFETY CODES ACT AND REGULATIONS**  
**BY**  
**Dobson Oilfield Services (1993) Inc.**  
**AT SHOP AND FIELD SITES**  
**IN ALBERTA CONTROLLED FROM**  
**11031 89 Avenue. Grande Prairie**

**4<sup>th</sup> Edition**

MANUAL NUMBER \_\_\_\_\_

REGISTRATION NO.: AQP-\_\_\_\_\_

ASSIGNED TO \_\_\_\_\_

# Certificate of Authorization Permit

## Quality Management System

Expiry Date: **May 19, 2010**

Reg. No.: **AQP-2268**

This is to certify that:

**DOBSON OILFIELD SERVICES (1993) INC.**  
11031 - 89 AVENUE  
GRANDE PRAIRIE, ALBERTA

having complied with the provisions of the SAFETY CODES ACT, is hereby authorized to:

**Construct, Repair/Alter ASME B31.3 Process Piping**

at the SHOP and FIELD sites controlled from the above address.



Form No. AB-121  
Rev. (2006/04)

Dated at Edmonton, this 17th day of May, 2007

A handwritten signature in black ink, appearing to read "L. Chan", is written over a horizontal line.

Chief Inspector and Administrator

**Certificate No.: 5504**

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## SECTION C QUALITY SYSTEM MANUAL REGISTER

### CONTROLLED COPIES (1 - 6)

1. ABSA
2. ABSA
3. Dobson Oilfield Services (1993) Inc.- Approved Copy - Master
4. President Dobson Oilfield Services (1993) Inc.
5. General Manager Dobson Oilfield Services (1993) Inc.
6. Quality Control Manager Dobson Oilfield Services (1993) Inc.

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## SECTION D SCOPE OF WORK

- D.1 This section defines the intended scope of work to be performed by Dobson Oilfield Services (1993) Inc. under this Quality System.
- D.2 New pressure piping constructed under this Quality System shall conform to the scope, and all requirements of ASME B31.3 Pressure Piping Code, as applicable, and the Alberta Safety Codes Act and Regulations, with the exception of Boiler External Piping which is not covered in this Quality System. Within these limitations pressure piping of all sizes, thicknesses and materials allowed by the Pressure Piping Codes shall be constructed, provided the requisite welding procedures are qualified and registered with the ABSA.
- D.3 Work under this program may also include repairs, alteration and replacement of ASME B31.3 pressure piping systems, with the exception of Boiler External Piping, that are subject to the Alberta Safety Codes Act and Regulations.
- D.4 Construction, repair and alteration of Boilers, Pressure Vessels, and Fittings are not within the scope of this manual. Therefore, Dobson Oilfield Services (1993) Inc. shall not engage in these activities.
- D.5 **Exemptions**
- (i) Pressure piping
- (a) that does not exceed DN 50, (NPS 2),
  - (b) that has a maximum allowable working pressure not exceeding 1035 kilopascals (150 psi),
  - (c) that has a design temperature between minus 29 degrees Celsius (-20°F) and 186 degrees Celsius, (366°F),
  - (d) that contains air, nitrogen, argon, carbon dioxide, steam
  - (e) that contains steam or hot water that is not in boiler external piping and,
  - (f) that is constructed to applicable ASME Code,
- is exempt from all the other requirements of the Pressure Equipment Safety Regulation except Section 35 and therefore, this Quality Management System manual is not a requirement for construction, repair, or alteration of the pressure piping.
- (ii) The Pressure Equipment Safety Regulation does not apply to the following:
- (a) a pressure piping system that is fully vented or operating with one or more pressure relief devices with set pressure not exceeding 103 kilopascals, (15psi) and sized so that the operating pressure cannot exceed 103 kilopascals, (15psi),
  - (b) does not have a differential pressure on the pressure boundary exceeding 103 kilopascals;

and therefore this Quality Management System manual is not a requirement for construction, repair, or alteration of the pressure piping.



**DOBSON OILFIELD SERVICES (1993) INC.**  
PIPELINE CONST. • WELDING & FABRICATING

11031 - 89 AVENUE  
GRANDE PRAIRIE, AB T8V 5B9  
OFFICE (780) 539-0990  
FAX (780) 532-7310

**STATEMENT OF AUTHORITY**

This Quality Management System Manual accurately describes the organization and systems to be used by Dobson Oilfield Services (1993) Inc. when constructing, repairing or altering power and process piping systems; to ensure compliance with ASME Pressure Piping Codes B31.3, as applicable, Customer Specifications, and the Alberta Safety Codes Act and Regulations.

The Quality Control Manager is hereby appointed to administer the system described in this manual. The Quality Control Manager has sufficient and well defined responsibility along with the authority and organizational freedom to initiate, recommend, and provide solutions to any quality control problems.

This Quality Management System has the full support of senior management who will ensure that adequate resources, including trained personnel, are provided in order to effectively implement the Quality System.

Any Quality Management System problem which cannot be resolved through designated channels, as described in this manual, shall be brought to my attention for resolution without compromising the Code or this Quality Management System.

  
\_\_\_\_\_  
Executive Management Signature

*W.R. DOBSON*  
\_\_\_\_\_  
Name

*OWNER*  
\_\_\_\_\_  
Title

*MAR 21/07*  
\_\_\_\_\_  
Date

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## SECTION 2 REVISION SUMMARY

REV. NO.	DATE	SECTION	PAGE	CHANGE	QUALITY CONTROL MGR.	ABSA SAFETY CODES OFFICER
0	2007/02/01	All	All	New 4th Edition Issued	RS	AKW

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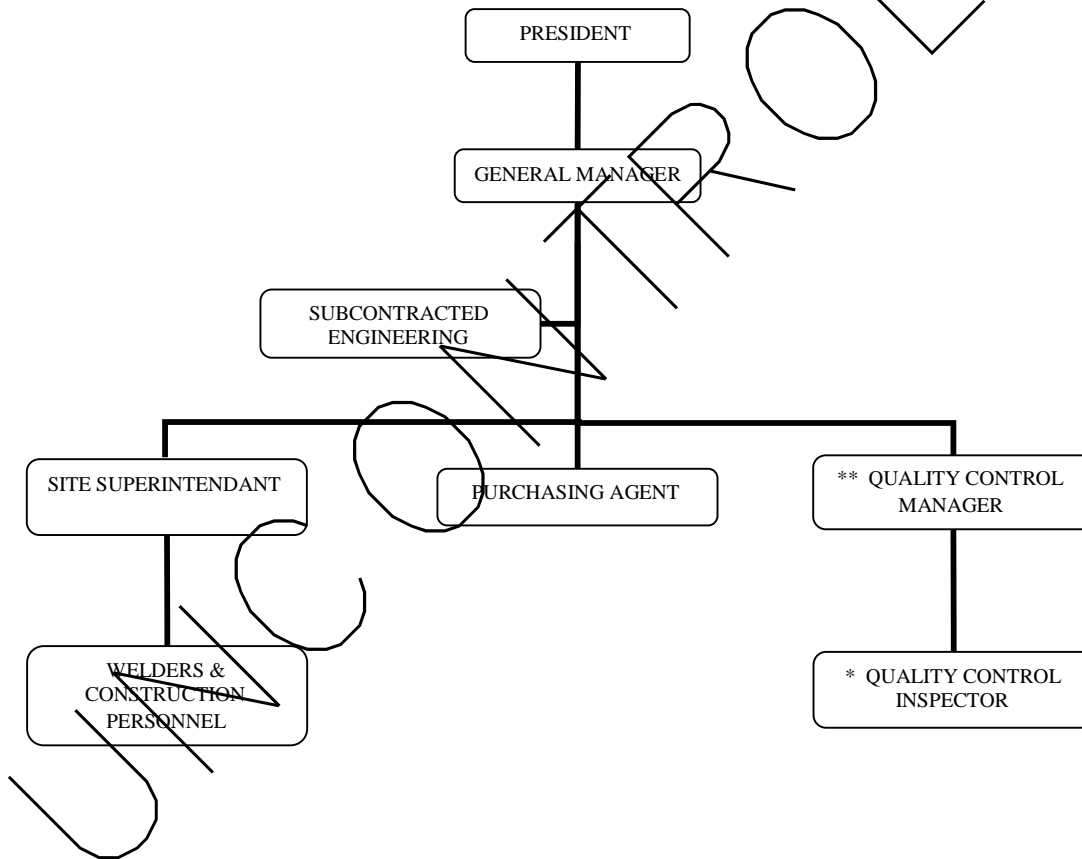
## SECTION 3 ORGANIZATION CHART

**NOTE:** More than one position may be held by one person.

\* This position is assigned to the Site Superintendent unless otherwise specified by the General Manager.

\*\* These duties may be carried out by the Site Superintendent.

### DOBSON OILFIELD SERVICES (1993) INC. ORGANIZATIONAL CHART



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## SECTION 4 DEFINITIONS

### 4.1 **ABSA**

ABSA, the pressure equipment safety authority is the regulatory organization delegated by the Province of Alberta to provide pressure equipment safety services under the Alberta Safety Codes Act, and acts as the sole Jurisdiction/Regulatory Authority as defined in CSA B51 Code and the ASME Code.

### 4.2 **ABSA SAFETY CODES OFFICER**

A person appointed as a Safety Codes Officer by the Administrator of the ABSA, to administer the Alberta Safety Codes Act and Regulations (Pressure Equipment).

### 4.3 **ALBERTA SAFETY CODES ACT** (latest issues)

The Alberta Safety Codes Act as it applies for pressure equipment and the following regulations under the Safety Codes Act:

- Pressure Equipment Safety Regulation
- Pressure Equipment Exemption Order
- Pressure Welders Regulation
- Administrative Items Regulation

### 4.4 **ASTM**

American Society for Testing and Materials

### 4.5 **BOILER EXTERNAL PIPING**

Piping as defined in ASME B31.1 paragraph 100.1.2, which is subject to mandatory inspection by the Authorized Inspector (ABSA Safety Codes Officer) as defined in PG 90 of ASME Section 1.

### 4.6 **C.G.S.B.**

Canadian General Standards Board

### 4.7 **CODE**

Latest edition and addenda of the following American Society of Mechanical Engineers codes:

- a) ASME B31.1 Power Piping
- b) ASME B31.3 Process Piping
- c) ASME Section V Non-Destructive Examination
- d) ASME Section IX Welding and Brazing Qualifications

Latest edition and supplement of Canadian Standards Association CSA B51 – Boiler, Pressure Vessel and Pressure Piping Code

### 4.8 **CSA**

Canadian Standards Association

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## 4.9 JOB FILE

A file which contains all records and documents which are essential to ensure the quality of the product. This file shall be assigned the number of each job. This number shall be a means of identifying each job file.

## 4.10 NONCONFORMITY

Any condition which renders an item unacceptable or indeterminate for use because it does not comply with the Code, the Alberta Safety Codes Act, the Owner's specifications, design specifications or this Quality Management System Manual. Examples of nonconformities include physical defects, test failures; improper documentation, loss of material identification, and deviations from drawings, specifications or procedures.

## 4.11 OWNER'S INSPECTOR

Inspector designated by the Owner to verify that all required examinations and testing have been completed. This Inspector cannot be an Employee of Dobson Oilfield Services (1993) Inc.. For the inspections of pressure piping systems, he/she shall satisfy himself/herself that the pressure piping system conforms to all applicable Code rules and engineering design requirements (e.g. refer to ASME B31.3 Chapter 1, paragraph 300 and Chapter VI, paragraph 340 for requirements).

## 4.12 P. & I.D.

Process and instrumentation diagrams.

## 4.13 PRESSURE PIPING SYSTEMS UNDER SAFETY CODES ACT JURISDICTION

Pipe, tubes, conduits, fittings, gaskets, bolting and other components that make up a system for the conveyance of an expansible fluid under pressure and may also control the flow of that fluid. Transmission pipelines as defined in the Pipeline Act are not subject to the Safety Codes Act.

## 4.14 QUALITY CONTROL INSPECTOR (QCI)

An Employee of Dobson Oilfield Services (1993) Inc. designated by the Quality Control Manager to perform the Quality System duties as defined in this manual. The Quality Control Inspector reports through the Quality Control Manager to the General Manager on any Quality Management System related issue.

## 4.15 QUALITY CONTROL MANAGER (QCM)

An Employee of Dobson Oilfield Services (1993) Inc. designated by the General Manager to have the responsibility and authority to maintain a Quality Management System and the organizational freedom to recognize Quality Management System problems and to provide solutions to those problems.

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### 4.16 REGISTERED DESIGN

Drawings, specifications and information required by Sections 14 and 16 of the Pressure Equipment Safety Regulation, which have been reviewed and accepted for registration by ABSA.

### 4.17 SNT-TC-1A (latest Code adopted edition)

"Recommended Practice for Nondestructive Testing Personnel Qualification and Certification" published by the American Society of Nondestructive Testing.

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### SECTION 5 MANUAL CONTROL

- 5.1 This section describes the system for preparing, revising and controlling the distribution of this Quality Management System Manual.
- 5.2 The QCM is responsible for implementing this system. His/her duties include the following:
- to approve all proposed changes to the Quality Management System manual, by signature and date on the Revision Summary page.
  - to ensure that all revisions have been accepted in writing by ABSA prior to implementation. This acceptance will be indicated by a signature and date on the Revision Summary page.
  - to ensure that the Revision No., date and page number are shown on each page of the manual. Revised paragraphs will be indicated by a vertical line in each margin alongside the changed paragraph(s)
  - to issue revisions using Document Transmittal (Exhibit 5.1), to all persons who are assigned controlled manuals with instructions that superseded pages are to be destroyed.
- 5.3 If additional controlled manuals are issued, the QCM will keep a list indicating manual numbers and who they are assigned to. Uncontrolled manuals may be issued for information but shall not be used for construction. "Uncontrolled" shall be indicated on the front page of these manuals.
- 5.4 A controlled copy of this manual shall be available at all times, on sites where work under this Quality Management System is performed. This copy shall be made available to the ABSA Safety Codes Officer and/or the Owner's Inspector upon request.

### APPLICABLE DOCUMENTS/FORMS

- Document Transmittal, Exhibit 5.1

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**EXHIBIT 5.1 DOCUMENT TRANSMITTAL**

**Dobson Oilfield Services (1993) Inc.**

**DOCUMENT TRANSMITTAL**

TO:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**THE FOLLOWING DOCUMENTS ARE ENCLOSED:**

Drawing/Document Title	Revision No.

**INSTRUCTIONS:**

\_\_\_\_\_

**PLEASE DESTROY ALL PREVIOUS ISSUES/REVISIONS AND RETURN SIGNED CONFIRMATION OF RECEIPT BY FAX TO:**

I confirm the receipt of listed documents: \_\_\_\_\_  
**Signature** **Date**

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### SECTION 6 CONTRACT REVIEW

- 6.1 This section describes the system to ensure that contract requirements are defined and agreed upon prior to the start of work.
- 6.2 The QCM shall review the contract/order prior to acceptance, to ensure that requirements are adequately defined. Exhibit 6.1, Contract Review Form, shall be used to document the contract review. When requirements are inadequately defined or there is no written contract/order the QCM shall contact the Client to ensure requirements are stated and agreed upon, and shall record the information in the job file.
- He/she will ensure that:
- (a) the scope of work is defined, including the applicable ASME Code and service (e.g. ASME B31.3 service category).
  - (b) the Owner has approved the drawings for construction, repair or alteration.
  - (c) the material list including ASTM/ASME material specification numbers, grades, schedules, classes and sizes (as applicable), is provided.
  - (d) the welding procedures (Owner's or Contractor's) are specified and qualified for the job. If Owner's welding procedures are to be used it shall be on a per job basis and requires the written permission of the Owner.
  - (e) the degree and type of nondestructive examination (NDE) and type of pressure test is defined, and responsibility for these requirements is assigned.
  - (f) the responsibility for Quality Management System functions is defined.
  - (g) the responsibility for material procurement is defined.
  - (h) the responsibility for registering the drawings of pressure piping systems exceeding a total capacity of 0.5 cubic metres (18 cubic feet) with ABSA has been assigned.
  - (i) Dobson Oilfield Services (1993) Inc. has the capability to meet all contract/order requirements.
- 6.3 The QCM shall obtain written verification defining responsibility for the above activities from the owner.

**Note:** The QCM shall make the Owner aware that under the Alberta Pressure Equipment Safety Regulation, Section 13, the Owner must have a ABSA authorized Quality Management System for scope of work if the Owner assumes responsibility for Quality Management System functions such as material receiving inspection, material traceability, welder supervision and welders' records, control of NDE on site, witnessing pressure tests, and preparing Quality Management System records. If the Owner does not have an ABSA authorized Quality Management System for any of these functions, the QCM shall make the Owner aware that all requirements of this Quality Management System must be met. The Owner should also be made aware that he is responsible for registering the design with ABSA when the volume of any new piping system to be installed exceeds 0.5 cubic metres (18 cubic feet).

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### APPLICABLE DOCUMENTS/FORMS

- Contract Review Form, Exhibit 6.1

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**EXHIBIT 6.1 CONTRACT REVIEW FORM**

Job Number: \_\_\_\_\_ Date: \_\_\_\_\_

Owner Company: \_\_\_\_\_

Description of Job: \_\_\_\_\_

RESPONSIBLE FOR	OWNER	CONTRACTOR
Drawings and Specifications		
Design Registration		
Document Control		
Material Procurement		
Material Identification and Traceability		
Welding		
Nondestructive Examination		
Heat Treatment		
Measuring and Test Equipment		
Pressure Tests		
Record Retention		

The Alberta Pressure Equipment Safety Regulation, Section 13, requires the Owner to have an ABSA authorized Quality Management System if they assume any of the Quality Management System functions listed above from document control to record retention. A pressure piping system exceeding 0.5 cubic metres in capacity must be registered with ABSA.

Owners Representative: \_\_\_\_\_

Date Contracted: \_\_\_\_\_

\_\_\_\_\_  
Q.C. Manager

\_\_\_\_\_  
Date

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## SECTION 7 DOCUMENT CONTROL

- 7.1 This section describes the system for the preparation, review, approval, distribution and retrieval of all essential documents including design drawings and specifications, P and ID's, mechanical flow sheets, line equipment lists, material lists, spool sheets, isometrics, bill of materials, welding procedures and work instructions.
- 7.2 Design drawings, calculations and specifications shall be prepared in accordance with the applicable ASME pressure piping Code and the Alberta Safety Codes Act by the Client/Owner or by a subcontracted engineering firm experienced in ASME pressure piping design. Spool drawings may be prepared by Dobson Oilfield Services (1993) Inc. when these are not supplied by the Owner.
- 7.2.1 The QCM shall review the design specifications and drawings to ensure the piping system can be constructed, repaired/alterd in compliance with the Code. The design specifications and drawings shall include the following information.
- (a) Code of construction (e.g. ASME B31.3-2004 normal service)
  - (b) Material description including material specification, grade, dimensions, schedule, type, and rating.
  - (c) Design pressure and maximum and minimum design temperatures of system, and if applicable, ASME B31.3 service category.
  - (d) Nondestructive examination and extent (i.e. random, 100%).
  - (e) Test pressure and medium.
  - (f) Heat treatment temperature and holding time if applicable.
  - (g) Construction details, supports, etc.
  - (h) Welding procedure information (W.P.S. Numbers/electrode classification).
  - (i) Additional requirements.
- 7.2.2 The QCM shall be responsible for verifying that the design drawings and specifications have been submitted in duplicate to the ABSA Design Survey Section with form AB-96 for systems that exceed 0.5 cubic metres in aggregate capacity. If the design documents are to be submitted by the Owner, the QCM shall request written verification from the Owner (i.e. copy of AB-96 form). For pressure piping systems less than or equal to 0.5 cubic metres in capacity, the submission of drawings is not mandatory; however, all pressure piping systems must comply with the requirements of the Code. All design drawings for pressure piping systems exceeding 0.5 cubic metres in aggregate capacity shall be stamped by a Registered Professional Engineer.

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7.2.3 If the owner has not prepared design specifications, and the piping system meets the following criteria:

- (a) new piping systems having an aggregate volume equal to or less than 0.5 cubic metres.
- (b) repairs or alterations, with an aggregate volume equal to or less than 0.5 cubic metres, to existing piping systems.

The QCM shall prepare a Piping Construction, Repair or Alteration Specification Sheet (Exhibit 7.1) to fulfil the specification requirements of paragraph 7.2. The QCM shall obtain approval of these specifications from the Owner prior to construction, repair or alteration.

7.3 The QCM is responsible for the control of all documents and drawings. His/her duties include:

- (a) to release all drawings by stamping (or writing) "Issued For Construction" on the drawing, and initialling and dating each drawing.
- (b) to obtain written approval from the Owner prior to making any proposed changes.

#### Spool Drawings

- (c) to review, approve and issue for construction, repair or alteration any spool drawings prepared by Dobson Oilfield Services (1993) Inc. from Owner's design specifications and drawings.

#### Job File

- (d) to initiate a job file and ensure that all design specifications, Owner's material lists, P.O.'s etc. are kept in this file, each identified with the job number.

#### Drawing and Specification Distribution

- (e) to maintain a drawing list indicating the drawing title, number and revision, copies issued and the name of the person to whom they were issued.
- (f) to issue drawings, specifications, welding procedures, purchase orders, material lists and applicable quality control forms to each QCI.

- (g) to recall and destroy all superseded documents. Alternatively, these may be marked "Void" and kept in the job file.

#### As Built Drawings

- (h) to obtain the Owner's approval of any revisions and submit the final "as built" drawing to the Owner along with all pertinent records.

7.4 Handling of Drawings, Specifications and Documents at Site

The QCI shall:

- (a) maintain job file(s) at site containing drawings, specifications, welding procedures, purchase orders, material lists and applicable quality control forms and documents. Issue drawings and specifications to site personnel. Collect and mark "VOID" or destroy all superseded documents.
- (b) forward the job file to the QCM when the job is completed.

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### APPLICABLE DOCUMENTS/FORMS

- Piping Construction, Repair or Alteration Specification Sheet, Exhibit 7.1

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## EXHIBIT 7.1 PIPING CONSTRUCTION, REPAIR OR ALTERATION SPECIFICATION SHEET

(For Constr./Repair/Alteration Of Pressure Piping Systems Less Than Or Equal To 0.5 Cubic Meters, Aggregate Volume)

Owner: \_\_\_\_\_ Contractor \_\_\_\_\_ AQP: \_\_\_\_\_

Plant Location: \_\_\_\_\_ Job No. \_\_\_\_\_

Material List				Piping Sketch (Reference attached drawings if appropriate)			
Item No.	Description	Mat'l Spec. & Grade	Sch./ Rating	(use for recording RT Nos. & Welder/Machine Welding Operator Symbols)			
				PROLLEN			
Line No.	Design Pressure	Design Temperature Min. / Max.	Corr. All.	ASME Code B31.1/B31.3	Service (eg. Normal, Cat. D, M, High Press)	Test Pressure	Test Medium

**(Note: Pneumatic tests must have prior approval from ABSA)**

Welding Procedure Specification Numbers: \_\_\_\_\_

Line No.	MPI / LPI Extent %	Radiography Extent %	Hardness Testing	Ultrasonic - Other NDE Description / Extent %	Other Requirements

NDE Contractor: \_\_\_\_\_

Post Weld Heat Treatment Yes/N.A.: \_\_\_\_\_ Contractor \_\_\_\_\_

Approved by Owner: \_\_\_\_\_ Date: \_\_\_\_\_

Approved by Contractor: \_\_\_\_\_ Date: \_\_\_\_\_

Comments: \_\_\_\_\_

**WORK COMPLETED AND ACCEPTED (AB-83 completed)**

Contractor Signature: \_\_\_\_\_ Date: \_\_\_\_\_

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### SECTION 8 MATERIAL CONTROL

8.1 This section describes the system for ordering, receiving, identifying and maintaining traceability of all Code material.

**Note:** All the material receiving, identification, verification and coding requirements defined in this section also apply to Owner supplied material. When material is supplied by the Owner it shall be checked by the QCM/QCI upon receipt against the Owner's material list (see paragraph 8.3).

#### 8.2 Purchasing

8.2.1 The Purchasing Agent shall be responsible for ordering all material. The Purchasing Agent shall prepare a purchase order (Exhibit No. 8.1) from the material list on the drawing. It shall include:

- (a) Purchase order (P.O.) number and job number.
- (b) ASME/ASTM specification number and grade, schedule dimensions, fitting, type, rating, etc. as applicable.
- (c) Supplementary requirements such as heat treatment (normalizing), special chemistry, etc.
- (d) Requests for material test reports (MTRs) when required by the Owner's specifications (optionally require name of company's P.O. number be written on MTRs).
- (e) Statement that all fitting designs must be registered with the ABSA.
- (f) Welding consumables must be ordered by SFA specification and AWS classification, as required by the welding procedures to be used.

8.2.2 The purchase order shall be reviewed and approved by the QCM prior to issue. One copy of the purchase order shall be forwarded to the Vendor and one copy shall be retained by the QCM in the job file. A copy of the purchase order shall be forwarded to the QCI at field sites to enable receiving inspection against the purchase order.

8.2.3 Any proposed material substitutions must be approved in writing by the Owner and Designer. Revised drawings and specifications shall be prepared and issued in accordance with Section 7 of this manual.

#### 8.3 Material Receiving

The QCI is responsible for receiving and storage of material at site. His/her duties include:

- (a) Checking all incoming material against the purchase order/Owner's material list, and packing slip for:
  - (i) visible damage
  - (ii) correct dimensions
  - (iii) correct material markings, specification and grade, size, schedule, rating, name of manufacturer or trademark, etc. as applicable.

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- (b) Checking MTRs against material markings and verifying that all material markings match those described on the MTRs and confirming that the MTRs are identified with the purchase order number; acceptance shall be indicated by initial and date on the MTR.
- (c) Segregating and identifying acceptable material.

### 8.4 Boilers, Pressure Vessels and Skid Package Units

The QCI shall visually examine each boiler, pressure vessel and skid package upon arrival and will notify the Owner's Inspector if damage is suspected.

The ABSA Safety Codes Officer shall be notified when system has been completed to enable him/her to verify the boiler or pressure vessel installation. He/she shall also be informed immediately if any boiler or pressure vessel is damaged. (Refer to paragraph 9.4)

### 8.5 Nonconforming Items/Material

Any material or item that does not meet above requirements shall be considered a nonconformity and shall be processed in accordance with Section 11 of this Manual.

### 8.6 Material Identification and Traceability

The QCI is responsible for identification and traceability of all material at the job site. He/she shall:

- (a) ensure that either the colour code or heat number traceability system is used.
- (b) ensure the colour code system involves application of a paint stripe on the full length of each acceptable pipe **prior to any cutting**. The colour represents the pipe material specification and grade, however, traceability also involves verifying that the correct pipe schedule is used per the design specifications. See Exhibit 8.2. Heat number traceability involves the marking (with a permanent marker) of the material specification, grade and/or the heat number on each section of pipe **prior to making the cut**.
- (c) verify that the above identification is maintained on each piece of pipe throughout construction, repair or alteration until all testing has been completed and the Owner has released it for final painting.
- (d) ensure that piping spools, received at the site, are identified with the line number, spool number and job number, and that spool lists are supplied with each shipment. (Piping Data Reports (AB-83) are required if spooling is subcontracted).
- (e) verify that all material left at end of the project is fully identified and itemized on a material list.

#### Material Transfers

- (f) ensure that material shipped from another site is accompanied by a material list.
- (g) ensure that spooling to be installed at another site is identified with the spool number, job number and line number and that the spool list is sent with each shipment.

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### **APPLICABLE DOCUMENTS/FORMS**

- Purchase Order, Exhibit 8.1
- Colour Code for Pipe and Fittings, Exhibit 8.2

### ABSA/Alberta Municipal Affairs Forms

- Construction Data Report for Piping Systems, AB-83

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### EXHIBIT 8.1 PURCHASE ORDER

<b>THIS NUMBER MUST APPEAR ON ALL INVOICES, PACKAGES, ETC. PURCHASE ORDER</b>	
<b>TO:</b>	<b>DATE:</b>
<b>ADDRESS:</b>	
<b>SHIP TO:</b> Dobson Oilfield Services (1993) Inc.	<b>REQ. NO. OR DEPT.:</b>
<b>ADDRESS:</b> 11031 89 Ave Grande Prairie, Alberta T8V 5B9	<b>FOR:</b>

PLEASE NOTIFY US IMMEDIATELY IF YOU ARE UNABLE TO SHIP COMPLETE ORDER BY  
DATE SPECIFIED

QUANTITY	PLEASE SUPPLY ITEMS LISTED BELOW	PRICE	AMOUNT
1			
2			
3			
4			
5			
6			
7			
8			
9			
<b>DATE REQUIRED:</b>		<b>PLEASE SEND COPIES OF YOUR INVOICE</b>	
<b>TERMS:</b>		<b>PURCHASING AGENT</b>	

**PLEASE NOTE:** All fitting designs must be registered with the Alberta Boilers Safety Association

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## EXHIBIT 8.2 COLOUR CODE FOR PIPE AND FITTINGS

To maintain traceability, a job specific colour code may be used. The colour must be specific to the pipe specification and grade. Each pipe shall have continuous full length paint stripe applied at receiving. The following is an example of a colour code system:

<u>PIPE MATERIAL</u>	<u>COLOUR</u>
SA/A106 Grade B	Light Blue
SA/A53 Grade B ERW	Green
SA/A333 Grade 6 (Low Temp)	Yellow
<u>FITTINGS MATERIAL</u>	

Colour coding is not required, the original manufacturer's stamping shall be used to maintain traceability to the specification.

The QCM shall assign a colour code for materials other than those listed above. He/she shall inform the QC Inspector if the Owner's colour code is to be used instead. Pipe materials in outdoor storage for extended periods may require re-coding in order for the materials to retain positive identification.

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## SECTION 9 EXAMINATION AND INSPECTION PROGRAM

9.1 This section describes the system to verify that all pressure piping construction, repair or alteration meets the Code, job specifications and drawings. Under the Code, inspection applies to functions performed by the Owner's Inspector; and examination to functions done by Dobson Oilfield Services (1993) Inc.. It is the Owner's responsibility to provide an Inspector who shall inspect the piping to verify that all examination requirements have been completed in accordance with the Code and the design specifications. Inspection by the Owner does not relieve Dobson Oilfield Services (1993) Inc. from the responsibility of performing all examinations required by the Code, Owner's specifications and this Quality Management System.

### 9.2 QCM's Duties

The QCM is responsible for the overall examination program. He/she shall:

- (a) issue Quality Management System manuals, Owner's specifications, drawings, Quality Management System forms, ABSA forms, material lists, purchase orders, calibration records, etc. to the QCI prior to start of work.
- (b) ensure that each individual assigned to perform Quality Management System functions is competent and fully understands all applicable requirements referred to in this Quality Management System Manual.
- (c) review all completed records for compliance with the Code, Owner's specifications and this Quality Management System.
- (d) Prepare and sign the Alberta Construction Data Report for Piping Systems (AB-83) for all spools and/or complete systems constructed, repaired or altered by Dobson Oilfield Services (1993) Inc. and present the form to the Owner's Inspector for his/her signature.
- (e) Prepare and sign the Completion of Construction Declaration Form (AB-81) for piping systems exceeding 0.5 cubic metres in capacity constructed, repaired or altered by Dobson Oilfield Services (1993) Inc. and forward to ABSA.
- (f) forward the Construction Data Report for Piping Systems (AB-83) to the Owner with any additional records required by the contract.

### 9.3 QCI's Duties

The QCI is responsible for the site examination program. He/she shall:

- (a) Initiate a Job File, and maintain all records detailed in Section 16 of this manual in this file.
- (b) Prior to starting fabrication, notify the Owner's Inspector of the job and obtain inspection hold points.

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- (c) Perform all the examinations required under the Code. These are detailed on the Pressure Piping Examination and Inspection Sheet (Exhibit 9.1). Additional functions shall be detailed on back of the checklist, when applicable.
- (d) Sign and date each function on the Pressure Piping Examination and Inspection Sheet when satisfactorily completed.
- (e) Communicate with the Owner's Inspector to arrange for inspection and sign off, when inspection hold points are reached.
- (f) Examine each system after completion and prior to pressure testing against design specifications and drawings using the Pressure Test Examination Guide (Exhibit 15.2).
- (g) Verify that the "as built" drawings have been revised to incorporate all changes and that the changes have been approved by the Owner.
- (h) Forward the Job File, drawings and radiographs to the QCM.

### 9.4 Boilers and/or Pressure Vessels Installed at Site

The QCI shall ensure that:

- (a) Each boiler and/or pressure vessel is installed in accordance with job specifications and the Alberta Safety Codes Act and Regulations.
- (b) The ABSA Safety Codes Officer is notified at start of construction, repair or alteration to enable him/her to inspect the installation of each boiler and pressure vessel prior to start up.

### **APPLICABLE DOCUMENTS/FORMS**

- Pressure Piping Examination Checklist, Exhibit 9.1

### ABSA/Alberta Municipal Affairs Forms

- Completion of Construction Declaration, AB-81
- Construction Data Report for Piping Systems, AB-83

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### EXHIBIT 9.1 PRESSURE PIPING EXAMINATION AND INSPECTION SHEET

<b>PRESSURE PIPING EXAMINATION AND INSPECTION SHEET</b>				
<b>JOB NUMBER:</b>		<b>SPOOL NUMBER:</b>		
NO.	FUNCTION	MANUAL REFERENCE	SIGNATURE OR INITIAL AND DATE	
			Q.C. INSPECTOR	OWNER'S INSPECTOR
1	DRAWINGS: ABSA registration over 0.5m <sup>3</sup> . Approved by Owner. Approved for Construction (signed & dated).	7.2, 7.3		
2	ABSA Safety Codes Officer (when required) and Owner's Inspector notified.	8.4, 9.3		
3	Registered Welding Procedures, Q.C. Manual and forms available at site, Job File started.	9.2(a) 9.3(a)		
4	Welders qualified for Weld Procedures and have valid Performance Qualification cards. Welders Log completed. WPS reviewed with welders.	10.3		
5	Material checked against P.O., drawings, and specifications. Identification confirmed. Color coding applied.	8.3 8.6		
6	Sample of each Welder's work examined, including root spacing, alignment, cleaning, joint preparation, preheat and electrode control.	10.3(f)		
7	Nondestructive Examination completed. Reports and radiographs reviewed, signed by Level II or III, Radiograph I.D. detailed on drawings.	12.2		
8	Visual Examination of all completed welds. Welders I.D. stamped and/or recorded on drawings.	10.3(g)		
9	Heat Treatment verified and recorded on drawings.	13.3		
10	Each system checked against specifications and drawings before pressure test.	9.3(d) 9.3(f)		
11	All deficiencies recorded and signed off by Q.C.I. and Owner's Inspector before pressure test.			
12	Pressure Test checked. Gauge calibration verified, gauge # recorded.	15.4 / 14.3		
13	System checked after test. Deficiencies recorded and corrected. (Exhibit 15.2)	15.4		
14	Construction data reports (AB-83) prepared and signed by QCM and Owner's Inspector.	9.2(d)		
15	Declaration form (AB-81) submitted to ABSA.	9.2(d)		
16	As built drawings accepted by Owner.	9.3(h)		

Hold points indicated by an asterisk \*.

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### SECTION 10 WELDING

10.1 This section describes the system for controlling all welding, welding procedures and Welders/Machine Welding Operators performance qualification tests.

#### 10.2 Welding Procedures

The QCM is responsible for the control of Welding Procedures. His/her duties include:

- (a) verifying that welding procedures have been registered with ABSA for the scope of work indicated in the design specifications, before the start of work.
- (b) engaging a Welding Consultant to assist in the preparation of Welding Procedure Specifications (WPS), and Procedure Qualification Records (PQR) and to conduct physical tests; if Dobson Oilfield Services (1993) Inc. is required to develop new procedures. The QCM shall witness the welding of the test coupons for the procedure qualification.
- (c) certifying the WPS and PQR for any new Dobson Oilfield Services (1993) Inc. procedures and submitting them to the ABSA for registration.
- (d) ensuring copies of the registered welding procedures are available at each work site.
- (e) ensuring welding procedures to be used are detailed on the construction, repair or alteration drawings.
- (f) obtaining written permission from the Owner on a per job basis, if the Owner's welding procedures are to be used.

#### 10.3 Welder Supervision and Record

The Site Superintendent is responsible for supervision of all Welders. His/her duties include:

- (a) verifying, prior to start of work, that Welders have:
  - (i) an Alberta Pressure Welders/Machine Welding Operators Certificate of Competency.
  - (ii) a valid performance qualification card, issued by an accredited organization authorized by the ABSA, for the scope of work to be performed.
- (b) keeping a copy of each Welder's/Machine Welding Operators performance qualification card on file.
- (c) recording the details from each Welder's/Machine Welding Operators performance qualification card(s) on the Welders/Machine Welding Operators Log (Exhibit No. 10.1).
- (d) issuing symbol stamps to each Welder/Machine Welding Operators and recording the symbol assignment on the Welders/Machine Welding Operators Log.

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- (e) instructing each Welder prior to start of work to ensure that he/she understands the welding procedure requirements, the job specifications, the system for controlling electrodes and the application of Welders/Machine Welding Operators symbols.
- (f) ensuring that all welding procedure requirements are followed and visually examining each completed weld.
- (g) verifying that all welds are identified with the Welder's/Machine Welding Operators symbol by stamping or recording on construction, repair or alteration drawings.

### 10.4 Welding Consumable Control

The Site Superintendent is responsible for control of welding consumables at site, including those supplied by the Welder/Machine Welding Operators. He/she shall:

- (a) examine welding consumables (including those in each portable rig) prior to start of work to verify that they are identified with the correct SFA specifications and AWS classifications (i.e. SFA 5.1 E7018) as indicated on welding procedures/job specifications.
- (b) verify prior to the start of work that all low hydrogen electrodes are packaged in air-tight containers and that there are no open boxes or incorrect electrodes in portable rigs.
- (c) ensure that low hydrogen electrodes are placed in heated storage at temperatures according to the electrode manufacturer's specifications, upon removal from hermetically sealed containers.
- (d) instruct Welders to remove only enough electrodes from the heated storage for 2 hours welding.
- (e) inform Welders that low hydrogen electrodes which have been out of sealed or heated storage more than 4 hours shall not be used and shall be discarded or segregated to an oven marked for non-code work only.

### APPLICABLE DOCUMENTS/FORMS

- Welders/Machine Welding Operators Log Sheet, Exhibit 10.1



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### SECTION 11 NONCONFORMITIES

- 11.1 This section describes the system for identifying, documenting, and resolving nonconformities found at receiving, during construction, repair or alteration, examination or testing.
- 11.2 The QCM shall be responsible for the disposition of all nonconformities
- 11.3 All nonconformities relating to completed pressure piping shall be corrected or eliminated before the completed component can be considered to comply with the Code.
- 11.4 Identification No./Documentation
- 11.4.1 All nonconformities shall be reported immediately to the QCI and shall be identified by tagging or marking the item with a red paint marker and removing the item from the work area. A detailed description of each nonconformity shall be provided on a Nonconformity Report (Exhibit 11.1). The QCI will be responsible for documenting the nonconformity.
- 11.5 Disposition
- 11.5.1 If the resolution of a nonconformity alters the design specifications in any way, the Owner and Designer must also approve the disposition. Examples of this are material substitutions or incorrect size and/or thickness.
- 11.5.2 The QCM will contact Owner to verify that the drawings and specifications are prepared and issued in accordance with Section 7 of this Manual if the design is to be revised.
- 11.5.3 If it is decided that the item can be repaired, the QCM will prepare a repair procedure which must have the approval of the Owner's Inspector.
- 11.5.4 The affected item will be released for fabrication only when the QCM and the Owner's Inspector have accepted the completion of the nonconformity by signing and dating the Nonconformity Report.
- 11.5.5 All documentation pertaining to nonconformities will be filed in the job file.

### APPLICABLE DOCUMENTS/FORMS

- Nonconformity Report, Exhibit 11.1

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**EXHIBIT 11.1 NONCONFORMITY REPORT**

<b>NONCONFORMITY REPORT</b>	
<b>JOB NUMBER:</b>	<b>NONCONFORMITY REPORT NO.:</b>
<b>SERIAL NUMBER / DWG. – LINE NUMBER:</b>	
<b>IDENTIFICATION DETAILS:</b>	
<b>DESCRIPTION OF NONCONFORMITY:</b>	
<b>QCI/QCM SIGNATURE:</b>	<b>DATE:</b>
<b>PROPOSED DISPOSITION OR REPAIRS:</b>	
<b>Q. C. MANAGER APPROVAL:</b>	<b>DATE:</b>
<b>CLIENT/OWNER'S DESIGN APPROVAL:</b>	<b>DATE:</b>
<b>NONCONFORMITY RECTIFIED:</b>	
<b>Q. C. MANAGER APPROVAL:</b>	<b>DATE:</b>
<b>OWNER'S INSPECTOR APPROVAL:</b>	<b>DATE:</b>

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### SECTION 12 NONDESTRUCTIVE EXAMINATION

- 12.1 This section describes the system to ensure that all nondestructive examinations (NDE) are completed in accordance with ASME Section V, the referencing Code section (including ASME B31.3 service category requirements when applicable), and job specifications. This applies to radiographic, ultrasonic, magnetic particle, and dye penetrant examination.
- 12.2 The QCM shall be responsible for appointing, in writing, all NDE subcontractors, and shall ensure the following:
- (a) Nondestructive Examination shall be performed by a subcontracted service. The required NDE shall be specified on all drawings approved for construction, repair or alteration.
  - (b) All NDE Subcontractors to Dobson Oilfield Services (1993) Inc. shall specify that:
    - (i) All personnel performing NDE shall be qualified and certified in accordance with SNT-TC-1A or CGSB.
    - (ii) There shall be a level III Examiner on staff to be responsible for NDE procedures and supervise Examiner certification and training.
    - (iii) That all examination be done under the supervision of a level II or level III Examiner.
    - (iv) That all interpretation be done by a level II or level III Examiner.
- 12.3 The QCI is responsible for control of NDE at the job site. His/her duties include:
- (a) to verify that NDE Subcontractor has applicable written procedures, available at site, for each method to be used.
  - (b) to verify that NDE Examiners have valid ASNT or CGSB Certification for the applicable test methods, and to maintain certificate details of each Examiner in the job file. Interpretation of radiography and ultrasonic code examinations must be done by a level II or level III Examiner.
  - (c) to ensure that Examiners are aware of extent and type of NDE required by the job specifications and the acceptance standards.
  - (d) to initiate a suitable flagging system to identify the welds to be examined.
  - (e) to provide written instructions to the NDE Subcontractor of welds requiring examination and applicable Code to be followed.
  - (f) to maintain records indicating welds examined.
  - (g) to maintain records indicating the welds placed by each Welder/Machine Welding Operator by recording symbols on construction, repair or alteration drawings or keeping a list. (This is needed for full and random radiography; 5% by random radiography means 5% of fabrication with the work product of each Welder or Machine Welding Operator doing the production welding included).

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- (h) to indicate acceptance of each weld examined by recording the radiograph and/or ultrasonic test identification number on construction, repair or alteration drawing.
- (i) to verify that all NDE has been completed in accordance with this section, by reviewing the radiographic film, interpretation sheets and NDE reports.
- (j) to forward all NDE reports and radiographic film to QCM upon completion of work.

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### SECTION 13 HEAT TREATMENT

- 13.1 This section describes the system to ensure that all heat treatment is performed in accordance with the Code and job specifications.
- 13.2 The QCM will issue written instructions to the heat treatment Subcontractor (Exhibit 13.1) specifying holding time, holding temperature, heating and cooling rates and any special instructions, when Dobson Oilfield Services (1993) Inc. is responsible for assigning the heat treatment Subcontractor.
- 13.3 The QCI's duties include:
- notify heat treatment Subcontractor which welds are to be heat treated.
  - verify that heat treatment procedures are adequate; including location of thermocouples, and calibration records for measuring instruments.
  - verify that the calibration records are available at the site for measuring instruments and recorders.
  - check the time-temperature chart against the job specifications and the thermocouple diagram; and verify that all time-temperature charts are identified with thermocouple location numbers, weld identification, job number and the signature of the heat treatment Subcontractor's representative.
  - indicate the completion of each weld heat treated on construction, repair or alteration drawings.
  - file the charts, thermocouple diagrams, calibration records, etc. in the job file.

### APPLICABLE DOCUMENTS/FORMS

- Heat Treatment Form, Exhibit 13.1

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### EXHIBIT 13.1 HEAT TREATMENT FORM

<b>HEAT TREATMENT FORM</b>					
JOB NO.		CUSTOMER:			
DESCRIPTION:					
DATE:					
COMPONENT DESCRIPTION					
DWG. NO. AND LINE NO.	DIAMETER	THICKNESS	MATERIAL	LENGTH	WEIGHT
TYPE OF HEAT TREATMENT:					
<b>INSTRUCTIONS: STRESS RELIEVE</b>					
1. Temperature to be raised from 800°F (426°C) to 1150°F (621°C) at a maximum rate of _____°F (_____°C) per hour. NOTE: MUST NOT EXCEED 400°F (222°C) PER HOUR. (Calculated rate = 400°F/h. Divided by governing metal thickness)					
2. Temperature to be held at 1150°F (621°C) plus or minus 25°F (14°C) for _____ minutes.					
3. Temperature to be lowered from 1150°F (621°C) to 800°F (426°C) at a rate of _____°F (_____°C) per hour. NOTE: MUST NOT EXCEED 500°F (278°C) PER HOUR. (Calculated rate = 500°F/h. Divided by governing metal thickness)					
4. <b>Additional requirements: Job number and description required on heat treatment chart.</b>					
5. Furnace Heat Number:					
6. Furnace Operator's Signature:					
Q. C. Inspectors Signature:					

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### SECTION 14 MEASURING AND TEST EQUIPMENT

- 14.1 This section describes the system to control the calibration of pressure gauges and recorders.
- 14.2 The QCM is responsible for the control of test equipment. He/she shall ensure that:
- (a) all gauges and recorders are identified with a serial number and date of required re-calibration (Calibration Expiry Date).
  - (b) all gauges/recorders are calibrated by a qualified testing laboratory against a dead weight tester traceable to a national standard.
  - (c) all gauges used for pressure testing shall have a range suitable for the test pressure (1.2 to 4 times the test pressure) and pressure gauges/recorders accompanied by a copy of the latest calibration record.
  - (d) pressure gauges/recorders shall be calibrated at intervals not exceeding 12 months.
  - (e) records of pressure gauge/recorder calibrations are maintained.
- 14.3 The QCI shall:
- (a) examine the equipment, prior to the test, for visible damage and calibration status, and verify that the gauge is of suitable range for the test.
  - (b) return all test equipment to the QCM upon completion of testing and identify any equipment that requires recalibration or repair.

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### SECTION 15 PRESSURE TESTS

15.1 This section describes the system for ensuring that all pressure testing, including hydrostatic, pneumatic, service and sensitive leak tests are completed in accordance with the design specifications and Code service category requirements.

#### 15.2 Written Procedures

All pressure tests shall be performed in accordance with a written test procedure which meets with Code and job specifications. Pressure tests must be performed before the pipe is buried or insulated.

**Note:** In view of the hazard involved, pneumatic testing is permitted only when a hydrostatic test is not practical. Pneumatic test proposals must be accepted by the Owner and ABSA Safety Codes Officer prior to the test. Pneumatic test procedures must contain information specified in Exhibit No. 15.1. Sensitive leak tests must meet requirements of ASME Section V, Article 10.

#### 15.3 QCM's Duties

The QCM is responsible for the implementation and control of this section. His duties include the following:

- (a) preparing the written test procedure for all pressure tests.
- (b) ensuring that the test procedure is accepted by the Owner's representative prior to the test.
- (c) for pressure piping systems exceeding 0.5 m<sup>3</sup> in aggregate volume or 2172 kPa design pressure, submitting all proposed pneumatic test procedures to the ABSA Design Survey Section for acceptance prior to the test.
- (d) for pressure piping systems equal to or less than 0.5 m<sup>3</sup> in aggregate volume and 2172 kPa design pressure, submitting a standard pneumatic test procedure (see Appendix A) detailing the scope of the test to the ABSA Safety Codes Officer for acceptance prior to the initial test. After acceptance by the ABSA Safety Codes Officer, when hydrostatic testing is not practical, all pneumatic tests within the scope of the standard procedure may be conducted providing concurrence is obtained from the Owner prior to the test.
- (e) distribute the test procedure to site personnel.
- (f) ensuring two calibrated gauges are used for each test. **Note:** A chart recorder may be used in place of one gauge.

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### 15.4 The QCI's Duties Include:

- (a) notifying the Owner's Inspector, reasonably in advance of any pressure test.
- (b) witnessing all pressure tests and verifying that the tests were performed in accordance with the approved procedures and job specifications.
- (c) examining the system prior to the test and after completion using the Pressure Test Examination Guide, (Exhibit 15.2).
- (d) highlighting on the construction, repair or alteration drawings, each section tested.

### APPLICABLE DOCUMENTS/FORMS

- Guidelines for the Preparation of Pneumatic Testing Procedure, Exhibit 15.1
- Pressure Test Examination Guide, Exhibit 15.2

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### EXHIBIT 15.1 GUIDELINES FOR THE PREPARATION OF PNEUMATIC TESTING PROCEDURE

Due to the large energy storage in compressed gas and hence the potential hazard of a sudden release of this energy, pneumatic testing should be avoided if at all possible.

The testing procedure must be submitted to the ABSA Safety Codes Officer for acceptance before any testing can be carried out. For piping systems less than or equal to 0.5 m<sup>3</sup> and 2172 kPa design pressure further tests may be conducted utilizing an accepted standard procedure providing the test is within the same scope as the standard procedure and concurrence of the Owner is obtained prior to the test.

The testing procedure must be accompanied by detailed justifications why a standard hydrostatic test is not feasible.

In addition to strict adherence to the respective Code sections (e.g. ASME Section VIII, Div. I, paragraph UG100, ASME B31.3, paragraph 345.5 or ASME B31.1 paragraph 137.5), the testing procedure should contain, as a minimum, the following information:

- (1) Lists of all personnel within the testing area and designated personnel in charge of testing
- (2) Test boundaries of the pressure system with specified maximum pressure x volume (PV) limits, including listings of piping and/or equipment to be included in the test.
- (3) Test site preparations and related precautions undertaken including removal of unauthorized personnel, isolation of test site, etc.
- (4) Test media, pressure source and pressure and temperature ranges of testing.
- (5) Provision of Pressure Relief Valves which must be sized to handle the maximum output of the pressure source to avoid excessive testing pressure.
- (6) Material specification involved in the test. For materials whose resistance to brittle fracture at low temperature has not been enhanced, test temperature above 60°F (16°C) may be considered in reducing the risk of brittle fracture during pneumatic testing.
- (7) Exposure of all joints including weld joints, threaded/flanged connections, etc. All post-weld heat treatment shall be completed.

Should a piping system be tested, all equipment and pressure vessels shall be disconnected from the piping or isolated by blinds or other means.

- (8) Method of testing with details of pressure steps, holding time inspection methods, etc.
- (9) Precautions taken to prevent gas expansion temperature drop and thermal stresses due to temperature gradients.
- (10) Reference should be made to the Canadian Registration Numbers (CRN) of the system/vessels to be tested.

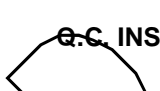
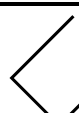




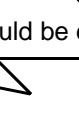
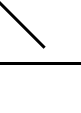
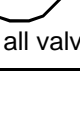
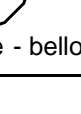
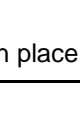


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## EXHIBIT 15.2 PRESSURE TEST EXAMINATION GUIDE

PRESSURE TEST EXAMINATION GUIDE	Q.C. INSP.
JOB NO.:	
<b>PRESSURE TEST PREPARATION</b>	
1. All punch list items corrected.	
2. Test blinds correct thickness.	
3. All items which could be damaged by test isolated or removed (control valves, safety valves, instruments, expansion joints, etc.)	
4. Equipment with internals (ie. filters) that could be damaged, isolated as required.	
5. Vents and drains correctly installed.	
6. Open and Closed position of all valves verified.	
7. Shipping bars in place - bellows.	
8. Hanger stops in place.	
	
	
	
	
<b>PRESSURE TEST COMPLETION</b>	

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<b>PRESSURE TEST EXAMINATION GUIDE</b>	<b>Q.C. INSP.</b>
<b>JOB NO.:</b>	
<b>PRESSURE TEST PREPARATION</b>	
1. All temporary blinds (blanks) removed.	✓
2. Temporary gaskets changed for correct gaskets.	✓
3. Temporary supports removed.	✓
4. Shipping bars removed from bellows.	✓
5. Spring hanger stops removed - cold setting checked.	✓
6. Pressure relief valves - "UV" or "V" symbol and correct set pressure and capacity installed.	✓
7. Pressure relief valve vents are correct size - adequately supported - drain holes and or weather hoods installed.	✓
8. Screens for pumps and compressors installed (initial start-up and permanent screens).	✓

<b>Q. C. Inspector Signature:</b>	<b>Date:</b>
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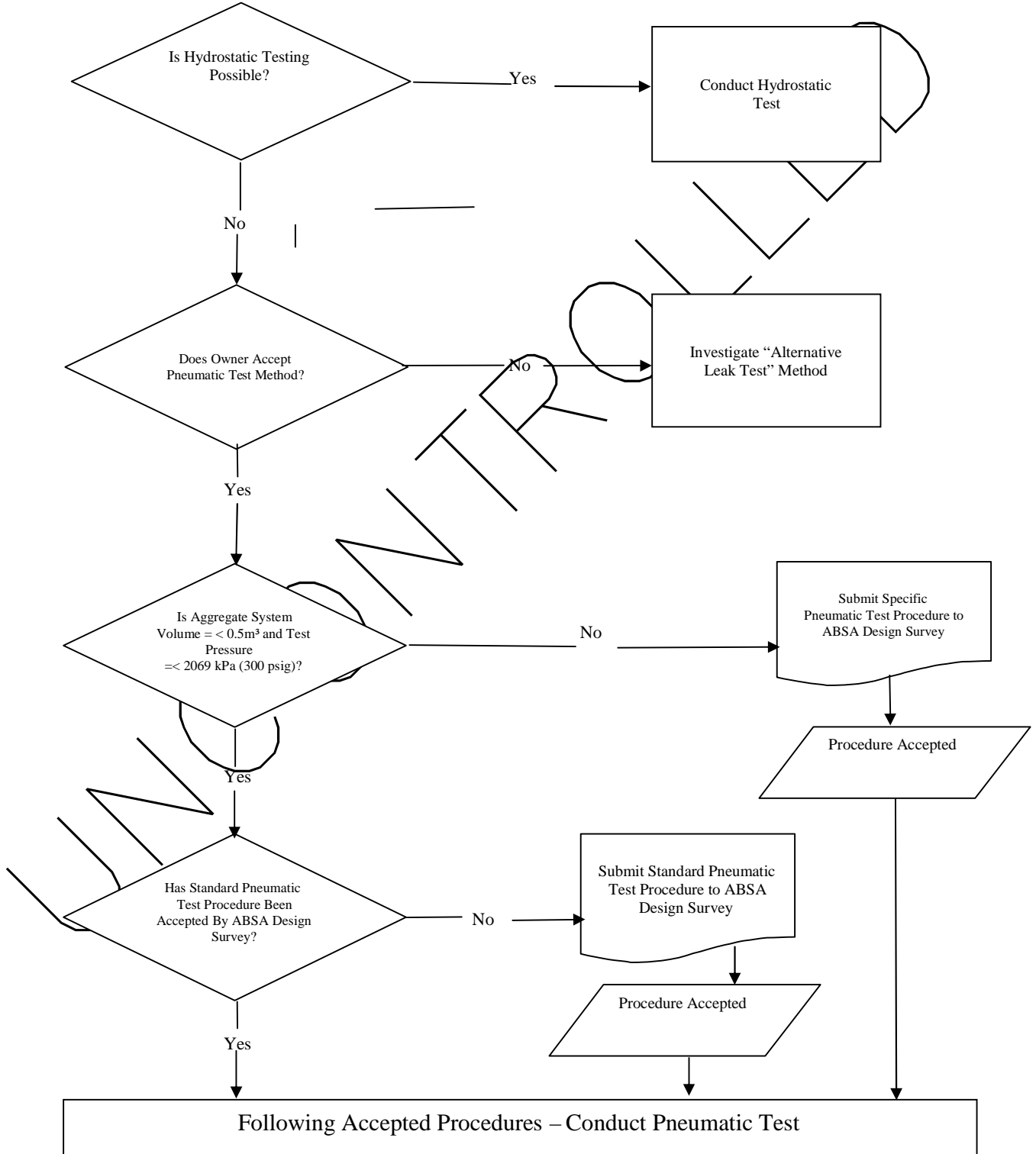
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### SECTION 16 RECORD RETENTION

- 16.1 This section describes the records that will be maintained in accordance with Code and contract requirements.
- 16.2 The QCM will ensure that the following records are maintained in the job file, identified by job number, for a minimum of five years.
- (a) Design specifications
  - (b) Drawings
  - (c) Pressure piping data reports and declaration forms
  - (d) Material test reports
  - (e) NDE reports
  - (f) Physical test reports
  - (g) Radiographic film and interpretation sheets
  - (h) Heat treatment records
  - (i) Nonconformity reports
  - (j) Weld identification drawings (when required) and Welders/Machine Welding Operator Log
  - (k) Welding procedures
  - (l) Pressure test procedures and reports and pressure gauge/recorder calibration records
  - (m) Material lists, spool lists, purchase orders generated by Dobson Oilfield Services (1993) Inc.
  - (n) Copies of NDE Examiners' certificates
  - (o) As built drawings
  - (p) Copies of Welders/Machine Welding Operators performance qualification cards
  - (q) Pressure Piping Examination and Inspection Sheet
  - (r) Pressure Test Examination Guide
  - (s) Contract Review Form
- 16.3 The QCI will maintain a file of all applicable documents at the site and forward them to the QCM upon completion of the job.

SECTION 17 APPENDIX A

17.1 PNEUMATIC TESTING FLOW CHART



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## 17.2 SAMPLE - STANDARD PNEUMATIC TEST PROCEDURE FOR ASME B31.3 PIPING SYSTEMS

**PLEASE NOTE THAT THIS SAMPLE PROCEDURE SHOULD ONLY BE USED FOR GUIDANCE IN PREPARING AN ACTUAL TEST PROCEDURE, WHICH MUST TAKE INTO CONSIDERATION ALL POTENTIAL HAZARDS RELATED TO THE SPECIFIC PNEUMATIC TEST.**

### 1.0 GENERAL

- 1.1 All Pneumatic testing of process piping shall be in accordance with ASME B31.3.
- 1.2 This standard procedure shall have been accepted by ABSA before pneumatic testing commences. If the volume of the piping system is greater than 0.5 cubic metres (18 cubic feet) or if the pneumatic test pressure exceeds 2172 kPa (315 psig), then a **job specific** pneumatic test procedure shall be submitted to ABSA and their acceptance obtained prior to the test.

### 2.0 LIMITATIONS OF STANDARD PROCEDURE

- 2.1 Under this standard procedure, pneumatic testing shall be limited to piping systems constructed of P-1 or P-8 materials, with a flange class of 150 or greater. The maximum test pressure shall not exceed 2172 kPa (315 psig).
- 2.2 The stored energy in the piping systems under test shall be limited to that contained in the volume of 0.5 cubic metres (18 cubic feet).

For example, it is necessary to test an 8 NPS schedule 80 pipe system with a design pressure of 250 psig.

- a) Test pressure is  $250 \times 1.10 = 275$  psig.
- b) From calculations of the volume of 8 NPS schedule 80 pipe, the maximum length of piping that may be tested under this standard procedure is 56.76 feet.

### 3.0 TESTING DESIGN BASIS

- 3.1 The test pressure shall be 110 percent of design pressure.
- 3.2 **A pressure relief device shall be provided**, having a set pressure not higher than 110% of the test pressure. The pressure relief device shall be sized to relieve the maximum output of the pressure source to prevent excessive testing pressure.
- 3.3 Test manifold(s) and temporary test piping shall have been designed for a pressure not less than the pressure relief device set pressure and shall have been hydrostatically tested in accordance with ASME B31.3.
- 3.4 **Particular care must be taken to minimize the chance of brittle failure during a pneumatic leak test.** The metal temperature shall be maintained at a minimum of 17 degrees C (30 degrees F) above the minimum design metal temperature for the piping. (See ASME B31.3 paragraph 345.5.1 and figure 323.2.2A)

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### 4.0 TESTING PROCEDURE

- 4.1 **Prior to the test**, a pneumatic test procedure, and pressure test report will be prepared by the QCM.
- 4.2 **Testing** - The medium for all pneumatic testing will be air or nitrogen. When testing with nitrogen in an enclosed area, care should be taken that adequate ventilation is provided in the event there are leaks. Caution should also be exercised when leak testing nitrogen filled systems.
- a) All personnel not directly involved with the pneumatic test shall be evacuated from the area. No unauthorized personnel shall be allowed within 15 metres (50 feet) of the test area. Rope or ribbon barriers shall be used to keep personnel from entering the area. **No personnel shall be allowed within the barriers during pressurization.**
  - b) Wrap all flanged connections with masking tape. Make a small hole for leak testing.
  - c) Carefully pressurize the system to 172 kPa (25 psig) and hold for at least 10 minutes, so that the system can stabilize.
  - d) Soap test all welds, flanges, threads and other possible leak sources. Mark all leaks for repair.
  - e) Depressurize carefully and repair all leaks found. Repeat the leak test (steps c to e) until the system is gas tight at 172 kPa (25 psig).
  - f) Increase the pressure to 345 kPa (50 psig) and thereafter in increments of 345 kPa (50 psig) until the test pressure is reached. The pressure shall be increased gradually in steps, providing enough time for the pressurized piping system to equalize strains.
  - g) The minimum hold time at each increment shall be 10 minutes. During each hold period, check for leakage by monitoring the ability of the system pressure to remain constant during the hold time. The pneumatic test report shall be completed, denoting all hold pressures and the time shall be logged at each step.
  - h) A minimum of two calibrated pressure gauges shall be used to monitor the pressure. The pressure gauge ranges shall be not less than 1.5 times nor more than 4 times the final test pressure.
  - i) If a leak is detected at any time; the leak is to be marked, the system safely depressurized, the leak repaired and the test begun again (step c).
  - j) Once the required test pressure is reached, the pressure is to be held for a minimum of 10 minutes.
  - k) The pressure shall be slowly reduced to design pressure and the system tested for leaks (step e). If no leaks are detected the test is successfully completed.
- 4.3 **Depressurizing** - The system will be **slowly** and **safely** depressurized.
- 4.4 **After Testing** - The QCI and the Owner's Inspector will sign the test report stating that they have witnessed and accepted the test.