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Le 29 juillet 2014

Fichier électronique

Madame Sheri Young
Secrétaire de l'Office
Office national de l'énergie
517, 10e Avenue S.-O.
Calgary (Alberta) T2R 0A8

Objet : Enbridge Pipelines Inc. (« Enbridge »)
Projet d'inversion de la canalisation 9B et d'accroissement de la capacité de la canalisation 9
Ordonnance XO-E101-003-2014 de l'ONÉ (l'« Ordonnance »)
Dossier no OF-Fac-Oil-E101-2012-10 02
Demande d'autorisation de mise en service no 2

Madame,

Enbridge soumet respectueusement par la présente une demande d'autorisation de mise en service partielle pour le projet d'inversion de la canalisation 9B et d'accroissement de la capacité de la canalisation 9 à l'Office national de l'énergie (ONÉ) dans le cadre de la portée de Sarnia « B » au terminal de Sarnia (« Demande »). La canalisation 9A est une canalisation en exploitation desservant actuellement des clients et, il est impératif qu'Enbridge termine l'installation de l'équipement et les activités de démarrage durant les arrêts planifiés. Dans le cadre de la demande, l'arrêt est prévu le 12 août 2014.

Enbridge présentera une série de demandes d'autorisation de mise en service pour l'équipement aux installations du Projet; la demande finale mettra le projet en service. Toutes les demandes précédant la demande d'autorisation de mise en service finale ne concernent que des connexions électriques critiques et des travaux minimes de raccordement de la canalisation devant être finalisés avant la demande finale, afin d'assurer la coordination des arrêts planifiés et de réduire au minimum l'interruption de service. Enbridge s'engage pleinement à respecter toutes les conditions de l'Ordonnance et n'inversera pas le sens de l'écoulement de la canalisation 9 avant d'avoir reçu toutes les approbations relatives aux autorisations de mise en service.

Si l'Office souhaite discuter davantage de cette question, n'hésitez pas à communiquer avec moi au 587-233-6356 ou par courriel à l'adresse prabhat.chaturvedi@enbridge.com ou avec Margery Fowke au 403-266-7907 ou par courriel à l'adresse margery.fowke@enbridge.com.

Veuillez recevoir, Madame, mes salutations distinguées.

Prabhat Chaturvedi, ing.
Spécialiste en réglementation
CLP, Affaires juridiques et réglementaires

p. j. Demande d'autorisation de mise en service partielle no 2

Pipelines Enbridge Inc.

Demande d'ordonnance en vertu de l'article 47 de la *Loi sur l'Office national de l'énergie* pour une ordonnance de mise en service des installations approuvées En vertu de l'ordonnance XO-E101-003-2014 de l'ONÉ

Projet : Inversion de la canalisation 9B et accroissement de la capacité de la canalisation 9

Demande d'autorisation de mise en service partielle n^{o} 2 (Sarnia « B »)

Le 29 juillet 2014

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1.0. APERÇU DU PROJET

Le 29 novembre 2012, Pipelines Enbridge Inc. (« Enbridge ») a présenté à l'Office national de l'énergie (« ONÉ » ou « Office ») une demande d'autorisation de construction et d'exploitation pour le projet d'inversion de la canalisation 9B et d'accroissement de la capacité de la canalisation 9 (le « Projet ») entre Sarnia, en Ontario et Montréal, au Québec.

Le Projet comprend les ajouts et les modifications nécessaires à l'infrastructure pour accroître la capacité annuelle de la canalisation 9 de 240 000 barils par jour (« bpj ») à 300 000 bpj et inverser le flux du tronçon de pipeline compris entre le poste de North Westover et le terminal de Montréal. Toutes les activités de construction auront lieu aux six installations d'Enbridge existantes : Terminal de Sarnia, poste de North Westover, poste de Hilton, poste de Cardinal, poste de Terrebonne et terminal de Montréal

Conformément à l'approbation reçue de l'Office, l'ordonnance XO-E101-003-2014 de l'ONÉ exigeait une demande d'autorisation de mise en service pour les installations dans le cadre du projet. Cette demande d'autorisation de mise en service partielle comprend une trousse d'autorisation de mise en service, selon la définition à la section 1 Sarnia « B ».

La liste de vérification T du Guide de dépôt de l'ONÉ figure à l'annexe 1 de cette demande.

1.1 PORTÉE DES TRAVAUX

La portée des travaux dans le cadre de cette demande d'autorisation de mise en service partielle comprend les travaux suivants au **terminal de Sarnia** :

1. installation de quatre (4) robinets à papillon à triple excentration de 20 pouces sur le collecteur de conduite existant dans la zone du collecteur 204;

2. installation de deux nouvelles têtes de collecteur de 30 pouces et de colonnes connexes de 20 pouces, une dans la zone du collecteur 202 et une dans la zone du collecteur 203, ainsi que d'un en-tête de gamme de 30 pouces reliant les deux s;

3. installation de quatre (4) robinets à papillon à triple excentration de 20 pouces sur la nouvelle tête de collecteur dans la zone du collecteur 203.

La portée des travaux énoncés ci-dessus figure dans le plan des conduites du projet à l'annexe 2. Tous les travaux de conduites et d'électricité seront effectués et mis à l'essai avant la date de raccordement prévue. L'arrêt de ces travaux est pré-

vu le 12 août 2014 et les conduites de la station seront isolées avant l'arrêt et vidangées avant la date de raccordement.

Les 8 nouvelles vannes ont été testées avec succès dans l'atelier du fournisseur, comme indiqué au tableau 3.3-1. Des essais ultrasoniques (« EU ») et des essais hydrostatiques ont été effectués sur les vannes. La conduite des têtes de collecteur et l'en-tête de gamme ont été testés avec succès sur deux tronçons, Comme indiqué dans les tableaux 3.4-1 à 3.4-3.

Un examen des particules magnétiques, un examen radiographique et des tests hydrostatiques ont été effectués sur les tronçons de canalisations. Des EU et des essais hydrostatiques seront effectués sur les vannes conformément aux exigences d'Enbridge, supérieures aux codes applicables de l'industrie. De plus, les soudures ont été inspectées visuellement et de manière non destructive conformément à la norme CSA Z662-11. Enbridge confirme que la circonférence totale de chaque joint de soudure a fait l'objet d'une inspection radiographique conformément à l'article 17 du *Règlement sur les pipelines terrestres de l'Office national de l'énergie*.

2.0 NORMES ET CARACTÉRISTIQUES TECHNIQUES

La partie suivante est un résumé général des règlements, des normes, des codes, des caractéristiques techniques et des procédures référencés dans la conception et la sélection des matériaux. Ils seront également suivis durant la construction, l'inspection, les essais et la mise en service du Projet.

1) *Règlement sur les pipelines terrestres de l'Office national de l'énergie*
2) Association canadienne de normalisation, Réseaux de canalisations de pétrole et de gaz (« norme CSA Z662 -11 »)
3) Normes techniques d'Enbridge
4) Spécification d'Enbridge relative au manuel de construction des installations
5) American Society of Mechanical Engineers (« ASME ») Section IX – Qualification de soudage
6) ASME section VIII – Construction des composants sous pression
7) ASME Section V – Examen non destructif
8) ASME B31.3 – matériaux et composants, conception, fabrication, assemblage, érection, examen, inspection et mise à l'essai des conduites
9) API 598 – Inspection et mise à l'essai des vannes
10) API 609 – Conception de vanne papillon

Un inspecteur d'Enbridge sera sur place durant l'installation de l'assemblage afin d'assurer le respect des règlements, des normes, des codes, des caractéristiques techniques et des procédures. L'inspecteur mènera une vérification de la qualité détaillée et signera sur les lieux de l'installation avant la mise en service.

3.0 DESCRIPTION DES INSTALLATIONS SOUMISES À DES ESSAIS PAR PRESSION

3.1 Pression de service maximale

La pression de service maximale (« PSM ») approuvée pour les vannes et les conduites à installer au terminal de Sarnia est de 1 896 kPa (275 psi).

3.2 Emplacement

La portée des travaux liés aux essais hydrostatiques correspond au terminal de Sarnia d'Enbridge. Reportez-vous à l'annexe 3 pour voir une carte aérienne du site.

3.3 Sommaire des essais sur l'équipement

Tout l'équipement du terminal de Sarnia a été testé sous pression avec succès conformément aux exigences en matière d'essais internes, supérieures aux codes applicables de l'industrie.

Tableau 3.3-1 Sommaire des essais sur le nouvel équipement du terminal de Sarnia

N° de caractéristique technique	Équipement	Numéro de fiche	Dimensions	Conception pression (kPa)	Information sur les essais		Fabricant
					Type d'essai	Résultats de l'essai	
1	Robinet à papillon à triple excentration	203– V-087	508 mm (NPS 20)	450	Essai hydrostatique	Réussi	Zwick
2	Robinet à papillon à triple excentration	203– V-067	508 mm (NPS 20)	450	Essai hydrostatique	Réussi	Zwick
3	Robinet à papillon à triple excentration	203– V-047	508 mm (NPS 20)	450	Essai hydrostatique	Réussi	Zwick
4	Robinet à papillon à triple excentration	203– V-057	508 mm (NPS 20)	450	Essai hydrostatique	Réussi	Zwick
5	Robinet à papillon à triple excentration	508 mm (NPS 20)	508 mm (NPS 20)	450	Essai hydrostatique	Réussi	Zwick
6	Robinet à papillon à triple excentration	204– V-364	508 mm (NPS 20)	450	Essai hydrostatique	Réussi	Zwick

N° de caractéristique technique	Équipement	Numéro de fiche	Dimensions	Conception pression (kPa)	Information sur les essais		Fabricant
					Type d'essai	Résultats de l'essai	
7	Robinet à papillon à triple excentration	204– V-214	508 mm (NPS 20)	450	Essai hydrostatique	Réussi	Zwick
8	Robinet à papillon à triple excentration	204– V-204	508 mm (NPS 20)	450	Essai hydrostatique	Réussi	Zwick

Reportez-vous à l'annexe 4 pour les dessins isométriques montrant l'emplacement d'installation de ces vannes au terminal de Sarnia. La trousse de documents sur les essais figure à l'annexe 5.

3.4 Sommaire des essais sur les conduites du terminal de Sarnia

Touteles conduites du terminal de Sarnia ont été testées sous pression avec succès conformément aux exigences en matière d'essais internes, supérieures aux codes applicables de l'industrie.

Tableau 3.4-1 Sommaire des essais sur les conduites

Série d'essais	PSM (kPa)	Dimensions	Épaisseur des parois (mm)	Nuance	Longueur des conduites (mm)	Type	Fabricant	Information sur les essais	
								Type d'essai	Résultat de l'essai
1	1896	(NPS 20)	9,5	290	24369	SRÉ	SeAH Steel Corp.	Hydrostatique	Réussi
1	1896	(NPS 30)	12,7	448	147148	SAS	Sumitomo	Hydrostatique	Réussi
2	1896	(NPS 20)	9,5	290	4700	SRÉ	SeAH Steel Corp.	Hydrostatique	Réussi
2	1896	(NPS 30)	12,7	448	37900	SAS	Sumitomo	Hydrostatique	Réussi

Reportez-vous à l'annexe 4 pour les dessins isométriques. La légère variation d'élévation au terminal de Sarnia n'a pas d'incidence importante sur les pressions de fluide.

3.4.1 Série de tests 1

L'essai hydrostatique mené sur des tronçons de canalisation du terminal de Sarnia (figurant à l'annexe 4) (PSM de 1896 kPa ou 275 psi) compris dans la série d'essais 1 a été effectué avec succès avec de l'eau le 19 juillet 2014. L'essai a été supervisé par l'inspecteur d'Enbridge Andre Begin.

Les conduites testées dans cette série étaient exposées et accessibles au moment de l'essai.

Tableau 3.4-2 Série d'essais 1 – Sommaire des essais hydrostatiques

Date de l'essai	Le 19 juillet 2014
Milieu d'essai	Eau traitée
Lieu de l'essai	Installation du terminal de Sarnia d'Enbridge
Pression d'essai cible	425 psi
Essai de pression réelle au début	421 psi
Essai de pression réelle à la fin	420 psi
Durée de l'essai	4,25 heures
Température réelle au début et à la fin de l'essai	67,9 F (début), 65,0 F (arrêt)
Résultat	Réussi

Une fois l'essai de résistance effectué, les conduites ont été inspectées visuellement pour détecter toute fuite durant l'essai d'étanchéité pendant que la pression se situait entre 420 psi et 418 psi.

Le rapport de l'essai de pression, le graphique de l'essai et les certificats d'étalonnage signés se trouvent à l'annexe 6.

3.4.2 Série de tests 2

L'essai hydrostatique mené sur des tronçons de canalisation du terminal de Sarnia (figurant à l'annexe 4) (PSM de 1896 kPa ou 275 psi) compris dans la série d'essais 2 a été effectué avec succès avec de l'eau le 18 juillet 2014. L'essai a été supervisé par l'inspecteur d'Enbridge, Andre Begin.

Les conduites testées dans cette série étaient exposées et accessibles au moment de l'essai.

Tableau 3.4-3 Série d'essais 2 – Sommaire des essais hydrostatiques

Date de l'essai	Le 18 juillet 2014
Milieu d'essai	Eau potable de l'atelier
Lieu de l'essai	Installation de fabrication Lamsar (Sarnia, Ontario)
Pression d'essai cible	425 psi
Essai de pression réelle au début	421,7 psi
Essai de pression réelle à la fin	424,0 psi
Durée de l'essai	4,25 heures
Température réelle au début et à la fin de l'essai	72,1 F (début), 74,9 F (arrêt)
Résultat	Réussi

Une fois l'essai de résistance effectué, les conduites ont été inspectées visuellement pour détecter toute fuite durant l'essai d'étanchéité pendant que la pression se situait entre 322,5 psi et 331,0 psi.

Le rapport de l'essai de pression, le graphique de l'essai et les certificats d'étalonnage signés se trouvent à l'annexe 7.

4.0 Permis d’eau aux fins des essais de pression

Aucun permis d’eau n’était requis pour les essais hydrostatiques.

5.0 DÉCLARATION DU GESTIONNAIRE DU PROJET

Je, Larry Smerechinski, déclare ce qui suit.

Je suis le gestionnaire principal, Conception des installations, employé par Enbridge Pipelines Inc. et je suis responsable des questions concernant la conception du projet d'inversion de la canalisation 9B et d'accroissement de la capacité de la canalisation 9 qui a été approuvé conformément à l'ordonnance XO-E101-003-2014 de l'ONÉ. J'ai évalué et examiné la demande du point de vue des aspects techniques. Ainsi, j'ai une connaissance directe des faits et des questions abordés aux présentes et je confirme l'exactitude des énoncés suivants.

a) L'examen ultrasonique et l'essai hydrostatique les vannes des collecteurs 203 et 204, le collecteur des conduites du collecteur 202 et celui du collecteur 203 ainsi que l'en-tête de gamme de la canalisation 9B, au terminal de Sarnia ont été réalisés avec succès sous la supervision directe d'un représentant de la société.
b) Tous les registres, les diagrammes de l'essai, etc. sont signés et datés par un représentant de la société.
c) Aucun permis d'eau n'était requis pour l'essai.
d) Tous les dispositifs de contrôle et de sécurité liés à la vanne seront inspectés et testés au plan de la fonctionnalité avant la mise en service.
e) La pression d'essai n'a été inférieure à 97,5 % de la pression d'essai de résistance minimale pour aucun des essais de pression.
f) Les versions les plus récentes de tous les normes et les codes de l'industrie ont été appliquées, y compris, sans toutefois s'y limiter, les dernières versions de la norme CSA Z662-11 et du *Règlement sur les pipelines terrestres de l'Office national de l'énergie*.

Le 29 juillet 2014

_____ _____

Larry Smerechinski — Date

Gestionnaire principal, Conception des installations

Liste de vérification T du guide de l'Office national de l'énergie – Demande d'autorisation de mise en service

Dépôt n° 2 **Exigence en matière de dépôt**	**Dans la demande? Références**	**Pas dans la demande? Références**
Tronçon de canalisation :		
• Certificat ou ordonnance en vertu duquel les travaux sont exécutés	• 1.0	
• Liste des normes, des caractéristiques techniques et des procédures	• 2.0	
• Description des installations soumises à des essais de pression	• 3.0	
• Sommaire des relevés de pression et de température continus	• 3.0	
• Énoncé selon lequel tous les dispositifs de contrôle et de sécurité ont été ou seront testés du point de vue de la fonctionnalité	• 5.0	
• Confirmation des points suivants – les essais requis ont été effectués et ont satisfait aux exigences – tous les permis ont été obtenus le cas échéant	• 5.0	
• Tous les registres, les diagrammes de l'essai, etc. sont signés et datés par un représentant de la société.	• Annexes 7, 8 et 9	
• Détails concernant les essais de pression non réussis, y compris la cause de l'échec	S.O.	Les essais de pression ont été réussis.

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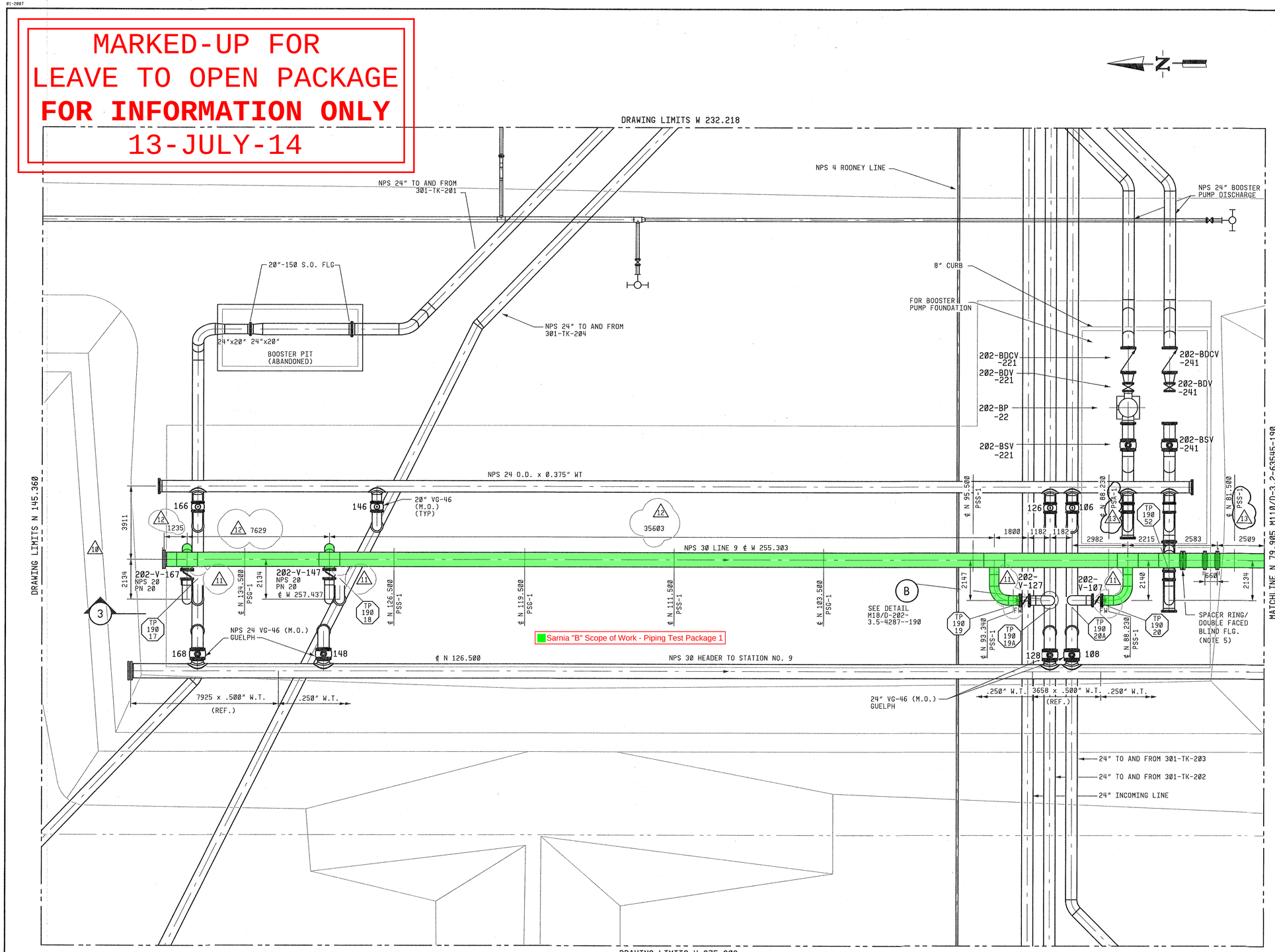

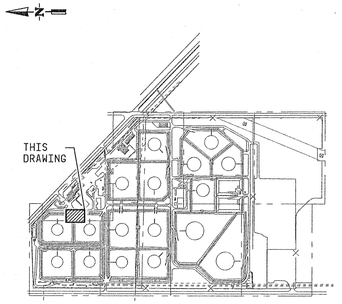

LOCATION PLAN

NOTES:

1. ALL DIMENSIONS IN MILLIMETERS, ALL CO-ORDINATES ARE IN METERS, UNLESS NOTED OTHERWISE.
2. VALVES ARE PREFIXED BY 202-V- UNLESS NOTED OTHERWISE.
3. FIELD VERIFY TIE-IN'S FOR ACTUAL LOCATION PRIOR TO FABRICATION.
4. FOR PIPE SUPPORT DETAILS, SEE DWG. M28C/D-3.2-63179--190LIS. M29B/D-3.2-63468--190LIS.
5. FOR SPACER RING AND DOUBLE FACED BLIND FLANGE, SEE TYP. DESIGN DETAIL, M29C/D-3.8-24831--190LIS.

LEGEND:

- SCOPE OF WORK (10)

DCN-L9B-M-028

3 July 2014 Rev. 13 DCN

LICENCED PROFESSIONAL ENGINEER J.W.D. SHELDON PROVINCE OF ONTARIO 4197001

Professional Engineers of Ontario
CERTIFICATE OF AUTHORIZATION
Jacobs Canada Inc.
Number 11252378

2014 CONSTRUCTION

REV:	LINE 9B REVERSAL PROJECT		
10	AFE: 1241237A80 (LIS)	DATE: 29 NOV 13	
	BY: RBC	APPR: BSHELDON	
	CHK: KWB	APPR: ETAMAYO	

NO	SUBSEQUENT REVISION	DATE/BY	APPR
10	ADDED SPACER RINGS, DOUBLE FACED BLINDS AND FIELD WELDS	11 APR 14 RBG	JWS
12	REVISED PIPING DIMENSIONS	09 MAY 14 KF	JWS
13	ISSUED FOR DCN-L9B-M-028	04 JUL 14 GC	JWS

M5/D-3.2-20326--190LIS PIPING PLAN AREA 1
M29/D-3.2-63466--190LIS SECTIONS 3 AND 4

REFERENCE DRAWINGS (10)

(11) THIS DRAWING TO BE READ IN CONJUNCTION WITH D-202-3.5-4286-9-190LIS TO BE AS-BUILT POST CONSTRUCTION.

NO	REVISION	DATE/BY	APPROVE
9	REVISED AS-BUILT AS PER FIELD VERIFICATION PROJECT	10 SEP 12 JACOBS	JPF
8	AS BUILT AS PER FIELD MARK-UP	15 DEC 11 STANTEC	JPF
7	SCANNED AND FTNS REVISIONS	10 SEP 12 STANTEC	KES

ENBRIDGE

ENBRIDGE PIPELINES INC.
10201 JASPER AVENUE
EDMONTON ALBERTA CANADA

SARNIA (ON) TERMINAL
WEST MANIFOLD 202
PIPING PLAN

DRAWN	NR	CHECK	RFP	APPROVE	HCFROST
DATE	02 JAN 74	SCALE	1:100	APPROVE	CHBUCKLEE

D-202-3.5-4286-13-190LIS | M11

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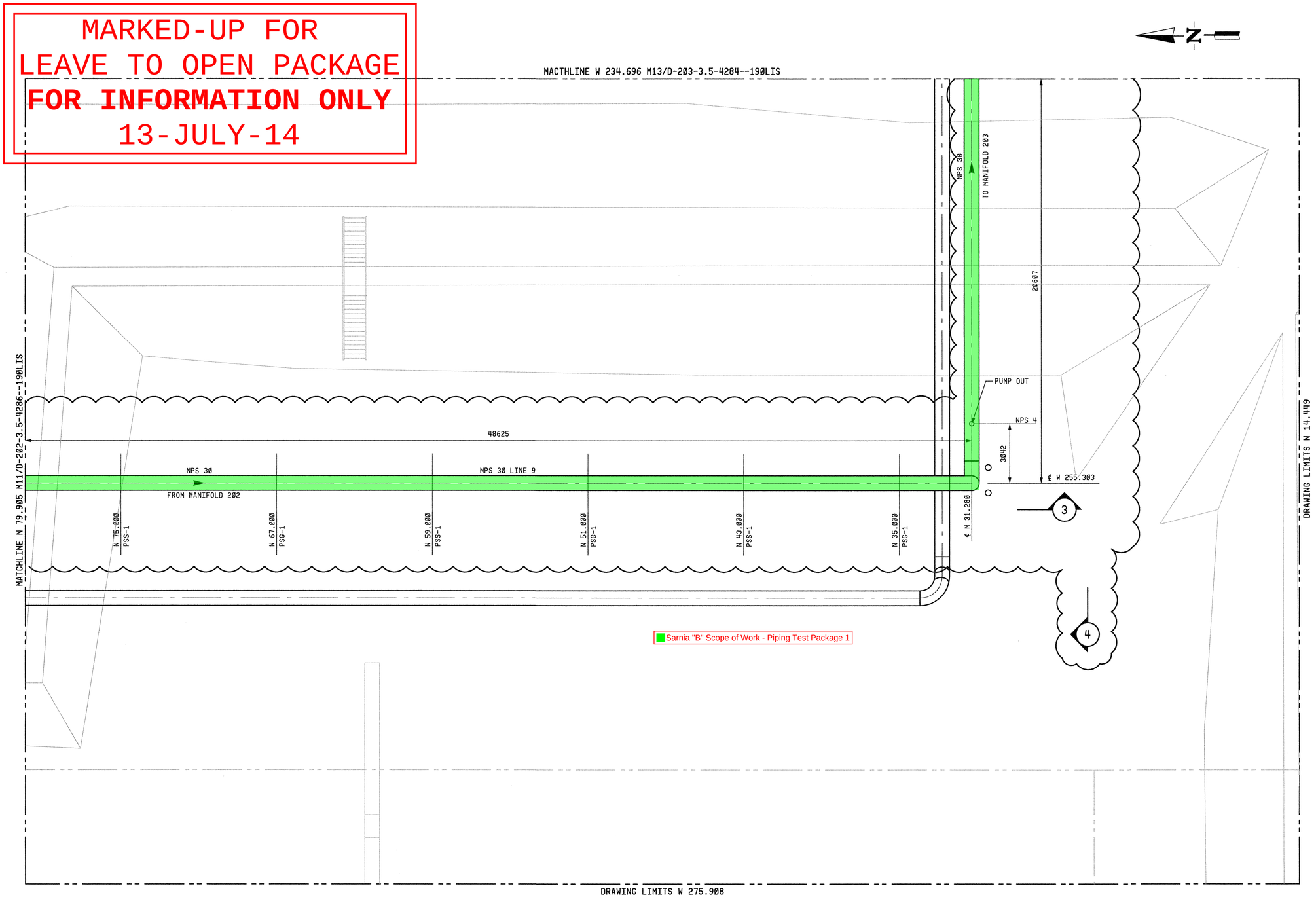

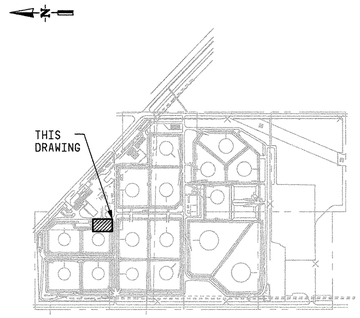

LOCATION PLAN

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES, COORDINATES AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
2. FOR PIPE SUPPORT DETAILS, SEE DRAWING M28C/D-3.2-63149--190LIS.

LEGEND:

- SCOTE OF WORK

15 NOV. 2013 REV.0
LICENSED PROFESSIONAL ENGINEER
J.W.D SHELDON
PROVINCE OF ONTARIO
419 710 11

Professional Engineers of Ontario
CERTIFICATE OF AUTHORIZATION
Jacobs Canada Inc.
Number 11252378

2014 CONSTRUCTION

REV:	LINE 9B REVERSAL PROJECT	
AFE: 12412237A80 (LIS)	DATE: 29 NOV 13	
BY:	APPR:	
CHK:	APPR:	

NO	SUBSEQUENT REVISION	DATE/BY	APPR

M5/D-3.2-20326--190LIS PIPING PLAN AREA 1
M2/D-3.2-SKM01--190LIS KEY PLAN
M29/D-3.2-63466--190LIS SECTIONS 3 AND 4

REFERENCE DRAWINGS

NO	REVISION	DATE/BY	APPROVE

ENBRIDGE
ENBRIDGE PIPELINES INC.
10201 JASPER AVENUE
EDMONTON ALBERTA CANADA

SARNIA (ON) TERMINAL
WEST MANIFOLD 202 TO SOUTH NO.1 MANIFOLD 203 HEADER
PIPING PLAN

DRAWN	RBG	CHECK	KWB	APPROVE	BSHELDON
DATE	08 AUG 13	SCALE	1:100	APPROVE	ETAMAYO

D-3.2-63545-0-190LIS | M110

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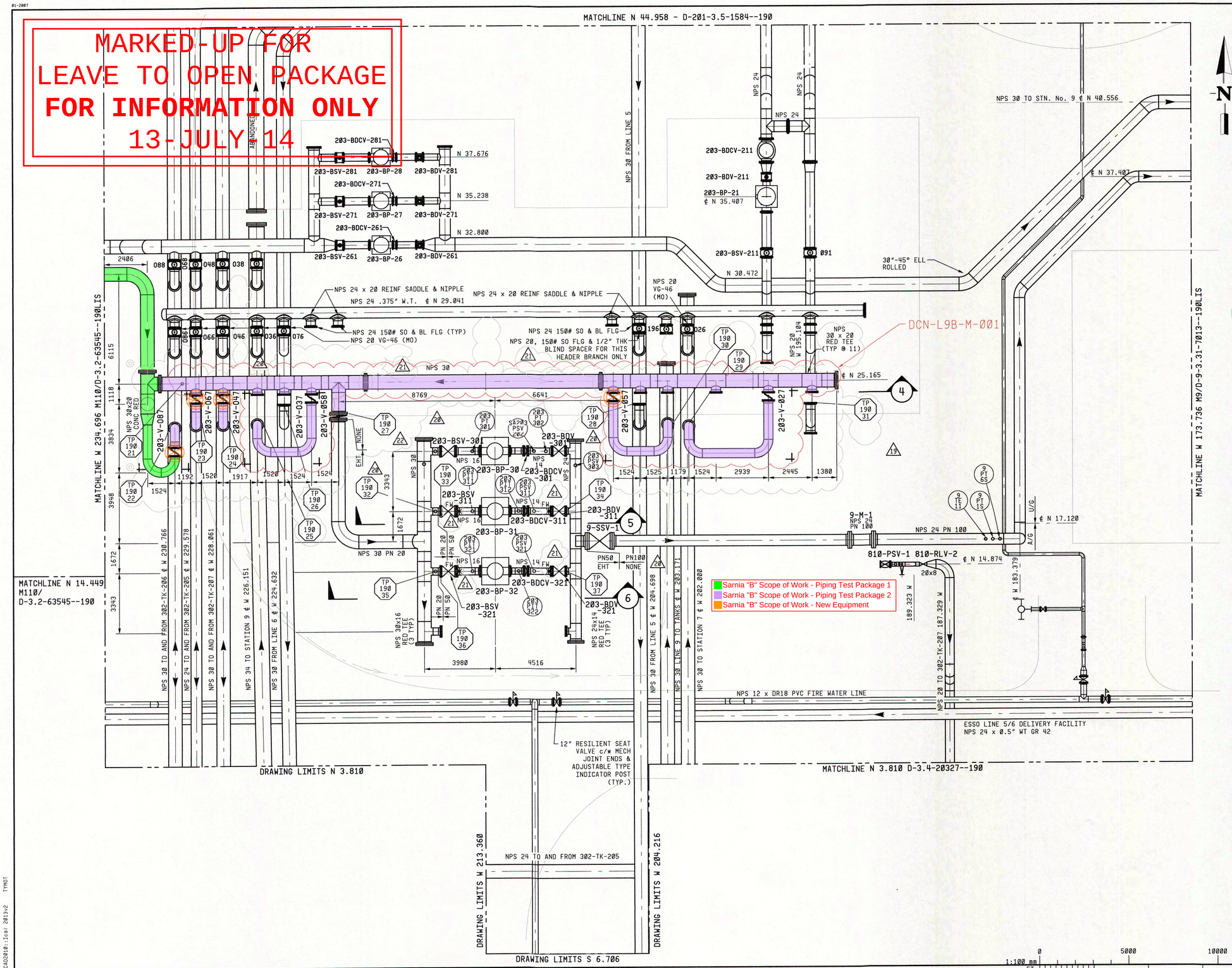
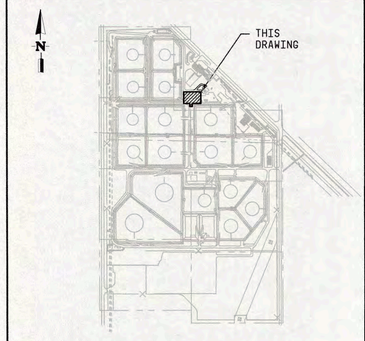
13-JULY-14





LOCATION PLAN

NOTES:
1. ALL DIMENSIONS IN MILLIMETERS, ALL CO-ORDINATES ARE IN METERS, UNLESS NOTED OTHERWISE.
2. DELETED 22
3. THIS DRAWING TO BE READ IN CONJUNCTION WITH D-203-3.5-4284-19-190LIS TO BE AS-BUILT POST CONSTRUCTION. 21
4. CONTRACTOR TO VERIFY ALL DIMENSIONS, ELEVATIONS, AND TIE-IN LOCATIONS PRIOR TO CONSTRUCTION.

LEGEND:
DCN-L9B-M-001
- SCOPE OF WORK 19

DCN-L9B-M-001

30 MAY 2014 ON.M.I
LICENSED PROFESSIONAL ENGINEER L.W.D. SHELDON PROVINCE OF ONTARIO
4/17/2014

Professional Engineers of Ontario
CERTIFICATE OF AUTHORIZATION
Jacobs Canada Inc.
Number 11252378

2014 CONSTRUCTION

REV:	LINE 9B REVERSAL PROJECT		
19	AFE: 1241237A80 (LIS)	DATE: 29 NOV 13	
	BY: RBG	APPR: BSHELDON	
	CHK: KWB	APPR: ETAMAYO	

NO	SUBSEQUENT REVISION	DATE/BY	APPR
20	DELETED PSS-1, REVISED SUPPORT CALL-OUT AND ADDED EHT LIMITS	28 FEB 14 RBG	JWS
21	ADDED FLG'S, DOUBLE FACED BLIND FLG'S, SPACER RINGS & FIELD WELDS	11 APR 14 RBG	JWS
22	REVISED ELEVATION, CHANGED TP'S REVISED PIPING, REMOVED SUPPORTS	09 MAY 14 RBG	JWS

M5/D-3.2-20326--190LIS PIPING PLAN
M29/D-3.2-63466--190LIS SECTIONS 3 AND 4
M29D/D-3.2-63470--190LIS SECTIONS 5 AND 6

REFERENCE DRAWINGS

18	AS BUILT AFE 1141239B80 (LBR)	14 MAY 12 STANTEC	JPF
17	AS BUILT AS PER FIELD MARK-UP	15 DEC 11 STANTEC	JPF
16	REVISED AS-BUILT AFE 8641237B03 (KAJ) AND REDRAWN IN AUTOCAD @ 1:100	27 AUG 09 STANTEC	JPF
15	FINS REVISIONS	27 AUG 09 STANTEC	KES
14	REVISED AS-BUILT AFE 9769B01	27 AUG 09 CL	JHL
13	SCANNED & REVISED AS-BUILT	27 AUG 09 COLT	

NO	REVISION	DATE/BY	APPROVE

ENBRIDGE
ENBRIDGE PIPELINES INC.
10201 JASPER AVENUE
EDMONTON ALBERTA CANADA

SARNIA (ON) TERMINAL
SOUTH NO.1 MANIFOLD 203
PIPING PLAN

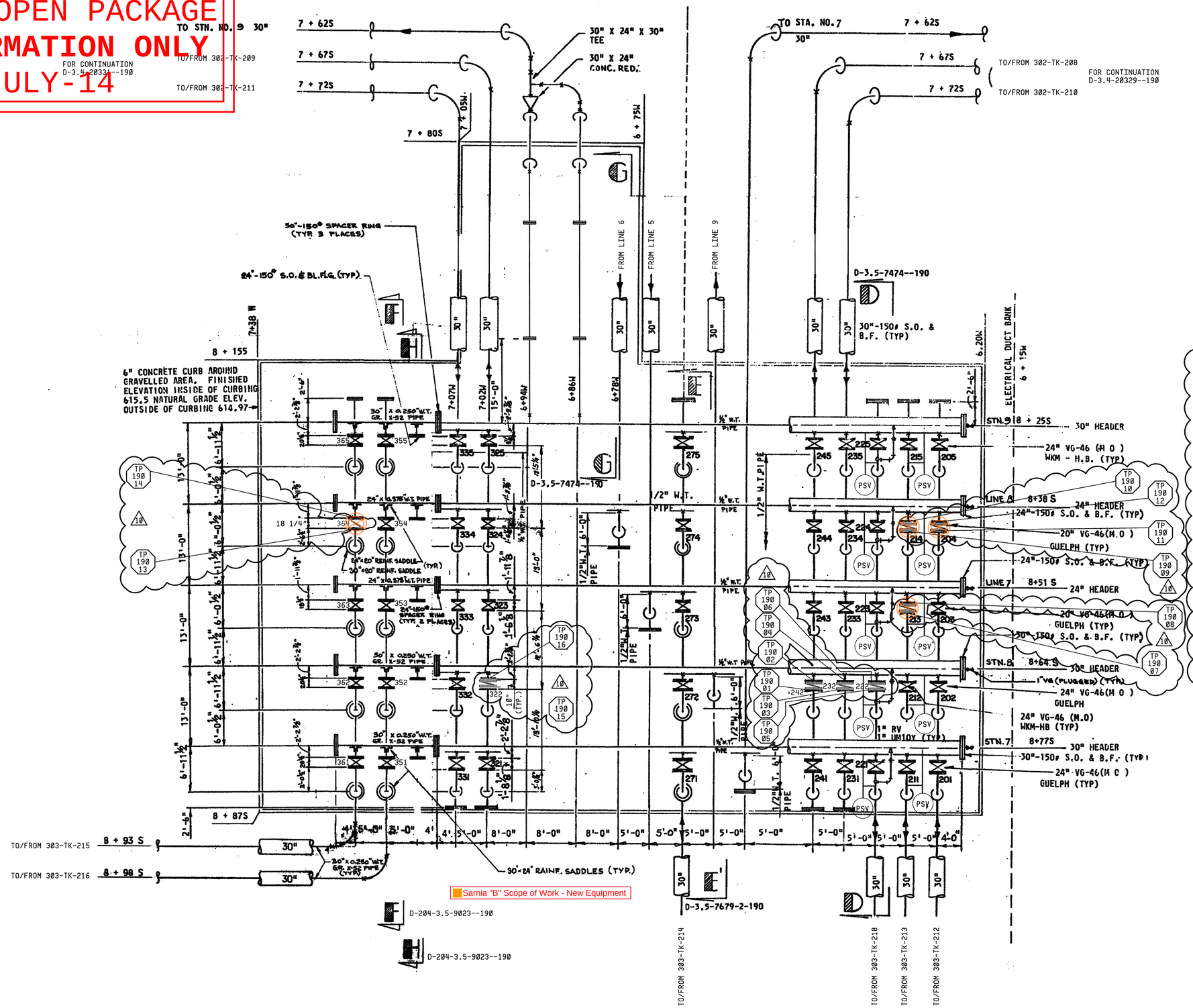
DRAWN	BFW	CHECK		APPROVE	
DATE	03 FEB 71	SCALE	1:100	APPROVE	

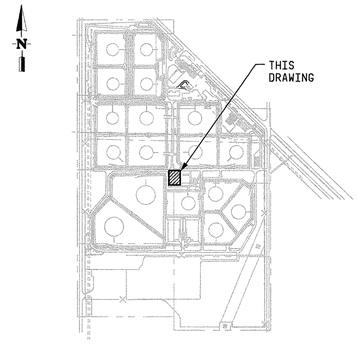
D-203-3.5-4284-22-190LIS | M13

ACAD2010::ical 2013x2 TYMOT

Save: C:/TEMPO/20551/L9B/190/033.5/0003/23A/D-203-3.5-4284-190LIS.DWG - Wed May 28, 2014 - 12:56:26

MARKED-UP FOR
LEAVE TO OPEN PACKAGE
FOR INFORMATION ONLY
13-JULY-14





LOCATION PLAN

NOTE:
1. ALL VALVES ARE PREFIXED BY 204-V- UNLESS NOTED OTHERWISE.

LEGEND:
- SCOPE OF WORK 10

15 NOV. 2013
REV. 10
LICENSED PROFESSIONAL ENGINEER
J.W.D. SHELDON
PROVINCE OF ONTARIO
41977011

Professional Engineers of Ontario
CERTIFICATE OF AUTHORIZATION
Jacobs Canada Inc.
Number 11252378

2014 CONSTRUCTION

REV:	LINE 9B REVERSAL PROJECT		
AFE: 12412237A80 (LIS)		DATE: 29 NOV 13	
BY: RBG		APPR: BSHELDON	
CHK: KWB		APPR: ETAMAYO	
NO	SUBSEQUENT REVISION	DATE/BY	APPR

E34/D-204-4.013-28962--190LIS P & ID
E35/D-204-4.013-28964--190LIS P & ID

REFERENCE DRAWINGS

SCANNED DRAWING

NO	REVISION	DATE/BY	APPROVE
9	REVISED AS-BUILT AS PER FIELD VERIFICATION PROJECT	06 SEP 12 JACOBS	JPF
8	SCANNED AND FTNS REVISIONS	11/01/2001 STANTEC	KES

ENBRIDGE
ENBRIDGE PIPELINES INC.
10201 JASPER AVENUE
EDMONTON ALBERTA CANADA

SARNIA (ON) TERMINAL
SOUTH NO.2 MANIFOLD 204
PIPING PLAN

DRAWN	MG	CHECK	RFP	APPROVE	HCFROST
DATE	15 JUL 74	SCALE	1/8"-1'0"	APPROVE	CHBUCKLEE

D-204-3.5-7469-10-190LIS | M15

ACAD2010::Ical 2013v2 TYMOT

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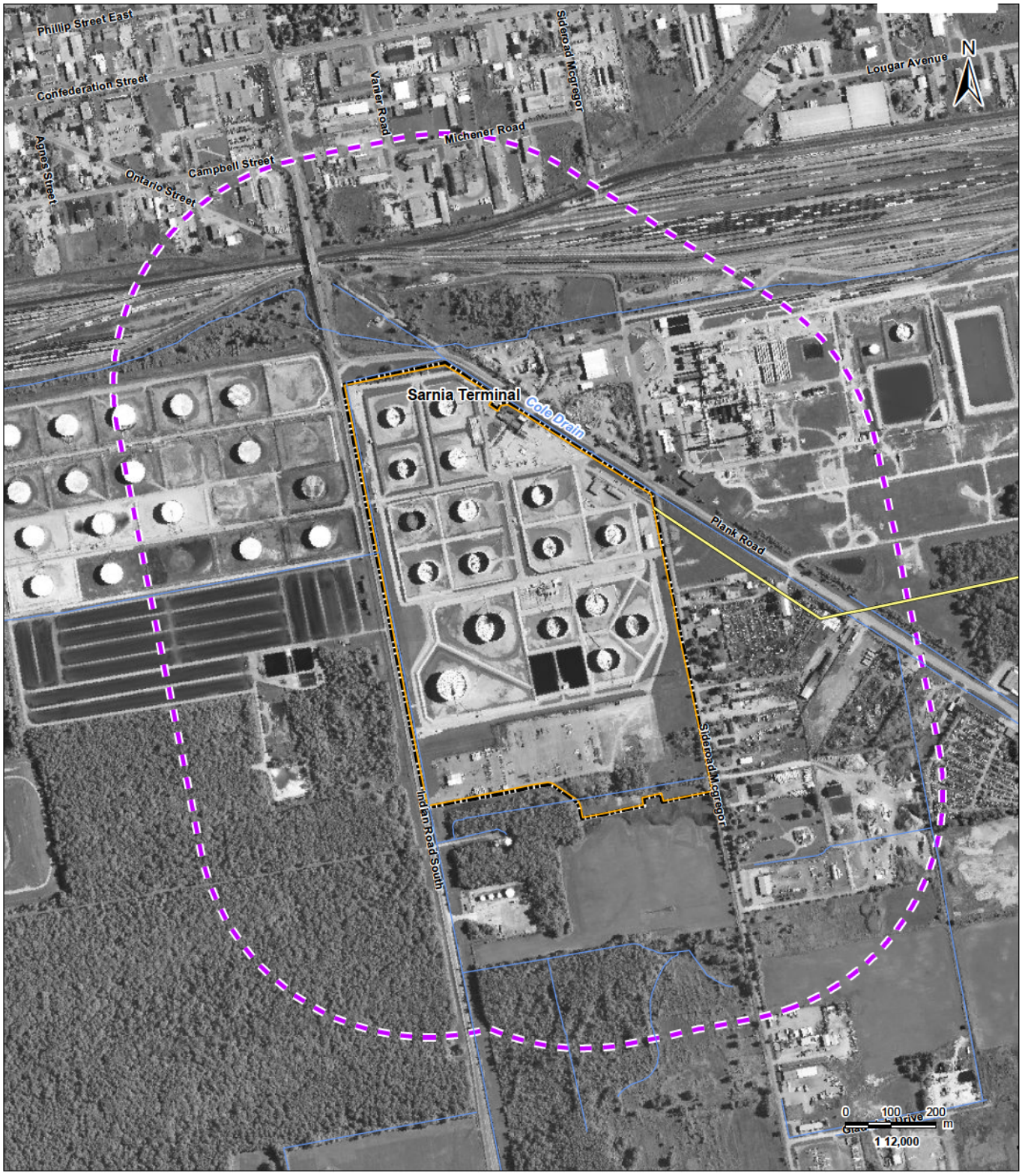

V:\01609\Active\160950468\planning\drawing\MXD\ESEIA_Figures_20120807\160950468_ESEIA_Fig4-1_Sarnia.mxd
Revised: 2012-11-26 By: searies

November 2012
160950468

Stantec

Legend

- Local Assessment Area
- Facility property line; Maximum possible extent of PDA
- Property Boundary
- Approximate Enbridge Centerline
- Watercourse

Notes

1. Coordinate System: Canada Lambert Conformal Conic
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Orthoimagery © Enbridge, 2006.

Client/Project

Enbridge Pipelines Inc.
Line 9B Reversal

Figure No.

4-1

Title

Aerial Map - Sarnia Terminal

MARKED-UP FOR
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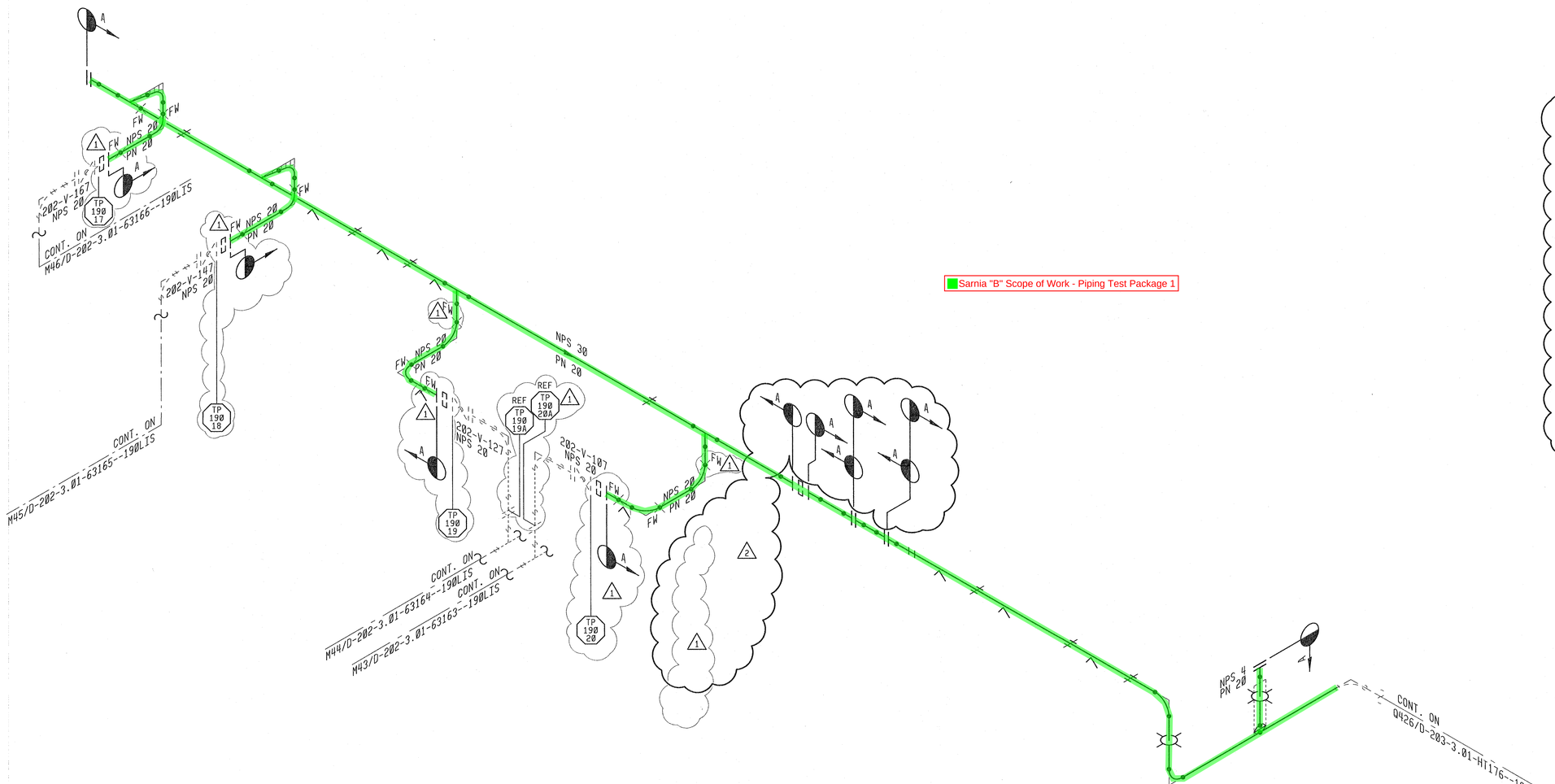
FOR INFORMATION ONLY
13-JULY-14



Sarnia "B" Scope of Work - Piping Test Package 1

NOTES:

1. HYDROTEST PIPING IN ACCORDANCE WITH FCS014-(2012) AND CSA Z662 OIL AND PIPELINE SYSTEMS LATEST EDITION.
2. INDICATES LIMITS OF HYDROTEST.
3. DO NOT HYDROTEST THROUGH RELIEF VALVES, CONTROL VALVES, INSTRUMENTATION AND EQUIPMENT.
4. LIQUID FILL & PRESSURING FOR HYDROTESTING THROUGH CHECK VALVES MUST BE DONE FROM THE UPSTREAM SIDE OF THE CHECK VALVE.
5. ALL psi AND kPa VALUES TO BE CHECKED BY AN ENGINEER BASED ON PROJECT REQUIREMENTS.
6. APPROXIMATE FILL VOLUME TO BE CALCULATED BY CONTRACTOR.
7. ALL HYDROTEST MATERIALS TO BE SUPPLIED BY CONTRACTOR.

PRESSURE TEST DETAILS							
TEST NUMBER	SECTION	MIN. TEST PRESSURE	MAX. TEST PRESSURE	MAX. OPER. PRESSURE	MIN. LEAK TEST PRESS.	APPROX. FILL VOL.	TEST DURATION (HRS)
	A - A	413 psi 2850 kPa	429 psi 2964 kPa	275 psi 1900 kPa	303 psi 2090 kPa	____ m^3	ABOVE GRADE - 1.25 HR STRENGTH TEST FOLLOWED BY VISUAL LEAK INSPECTION AND DETECTION BELOW GRADE - 4.25 HRS STRENGTH TEST FOLLOWED BY 4.25 HRS LEAK TEST

DCN-L9B-M-028

3 JULY 2014 Rev. 2 DCN-MAB

LICENSED PROFESSIONAL ENGINEER J.W.D. SHELDON PROVINCE OF ONTARIO 4197601

Professional Engineers of Ontario
CERTIFICATE OF AUTHORIZATION
Jacobs Canada Inc.
Number 11252378

2014 CONSTRUCTION

REV:	LINE 9B REVERSAL PROJECT	
0	AFE: 1241237A80 (LIS)	DATE: 29 NOV 13
	BY:	APPR:
	CHK:	APPR:

NO	SUBSEQUENT REVISION	DATE/BY	APPR
1	ADDED DOUBLE FACE BLIND FLANGES & SPACER RINGS	11 APR 14 TDT	JWS
2	ISSUED FOR DCN-L9B-M-028	04 JUL 14 GC	JWS

M57/D-202-3.01-63177--190LIS MATERIAL ID ISOMETRIC

REFERENCE DRAWINGS

NO	REVISION	DATE/BY	APPROVE

ENBRIDGE

ENBRIDGE PIPELINES INC.
10201 JASPER AVENUE
EDMONTON ALBERTA CANADA

SARNIA (ON) TERMINAL
WEST MANIFOLD 202
MANIFOLD HEADER
HYDROTEST ISOMETRIC

DRAWN	GC	CHECK	KWB	APPROVE	BSHELDON
DATE	23 AUG 13	SCALE	NTS	APPROVE	ETAMAYO

D-202-3.01-HT177-2-190LIS Q427

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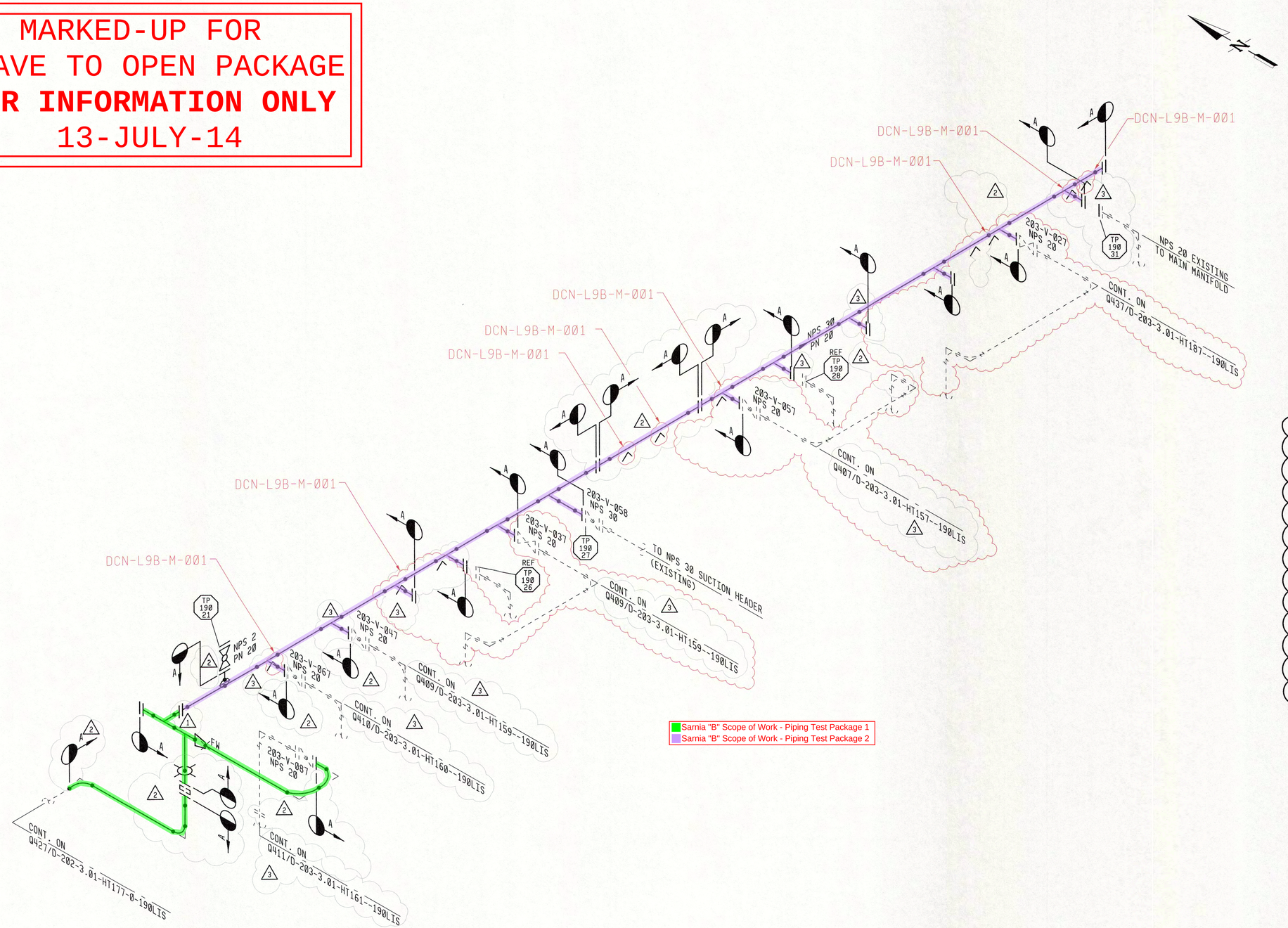
FOR INFORMATION ONLY
13-JULY-14



NOTES:

1. HYDROTEST PIPING IN ACCORDANCE WITH FCS014-(2012) AND CSA Z662 OIL AND PIPELINE SYSTEMS LATEST EDITION.
2. INDICATES LIMITS OF HYDROTEST.
3. DO NOT HYDROTEST THROUGH RELIEF VALVES, CONTROL VALVES, INSTRUMENTATION AND EQUIPMENT.
4. LIQUID FILL & PRESSURING FOR HYDROTESTING THROUGH CHECK VALVES MUST BE DONE FROM THE UPSTREAM SIDE OF THE CHECK VALVE.
5. ALL psi AND kPa VALUES TO BE CHECKED BY AN ENGINEER BASED ON PROJECT REQUIREMENTS.
6. APPROXIMATE FILL VOLUME TO BE CALCULATED BY CONTRACTOR.
7. ALL HYDROTEST MATERIALS TO BE SUPPLIED BY CONTRACTOR.

DCN-L9B-M-001

30 MAY 2014
LICENSED PROFESSIONAL ENGINEER
I.W.D. SHELDON
PROVINCE OF ONTARIO
Professional Engineers of Ontario
CERTIFICATE OF AUTHORIZATION
Jacobs Canada Inc.
Number 11252378

2014 CONSTRUCTION

REV:	LINE 9B REVERSAL PROJECT		
0	AFE: 1241237A80 (LIS)	DATE: 29 NOV 13	
	BY:	APPR:	
	CHK:	APPR:	

NO	SUBSEQUENT REVISION	DATE/BY	APPR
1	FLANGE ISOLATION KIT REMOVED	28 FEB 14 RBG	JWS
2	ADDED BREAK FLANGES	11 APR 14 KF	JWS
3	REMOVED PUPS	09 MAY 14 TDT	JWS

M56/D-203-3.01-63176--190LIS MATERIAL ID ISOMETRIC

REFERENCE DRAWINGS

NO	REVISION	DATE/BY	APPROVE

ENBRIDGE
ENBRIDGE PIPELINES INC.
10201 JASPER AVENUE
EDMONTON ALBERTA CANADA

SARNIA (ON) TERMINAL
SOUTH NO.1 MANIFOLD 203
MANIFOLD HEADER
HYDROTEST ISOMETRIC

DRAWN	GC	CHECK	CBS	APPROVE	BSHELDON
DATE	07 JUL 13	SCALE	NTS	APPROVE	ETAMAYO

D-203-3.01-HT176-3-190LIS Q426

PRESSURE TEST DETAILS

TEST NUMBER	SECTION	MIN. TEST PRESSURE	MAX. TEST PRESSURE	MAX. OPER. PRESSURE	MIN. LEAK TEST PRESS.	APPROX. FILL VOL.	TEST DURATION (HRS)
	A - A	413 psi 2850 kPa	429 psi 2964 kPa	275 psi 1900 kPa	303 psi 2090 kPa	____ m 3	ABOVE GRADE - 1.25 HR STRENGTH TEST FOLLOWED BY VISUAL LEAK INSPECTION AND DETECTION BELOW GRADE - 4.25 HRS STRENGTH TEST FOLLOWED BY 4.25 HRS LEAK TEST

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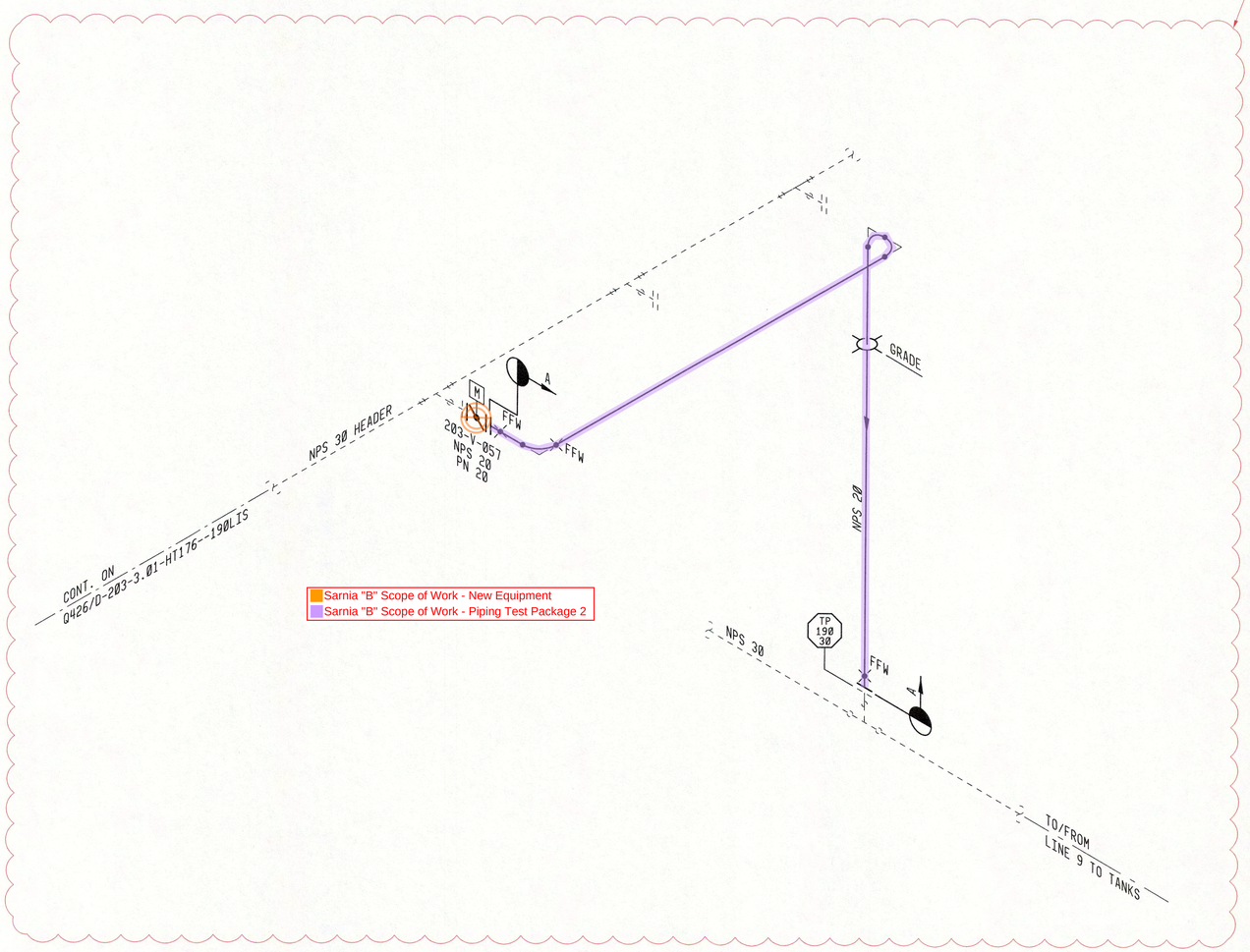
LEAVE TO OPEN PACKAGE
FOR INFORMATION ONLY
13-JULY-14

DCN-L9B-M-001



NOTES:

1. HYDROTEST PIPING IN ACCORDANCE WITH FCS014-(2012) AND CSA Z662 OIL AND PIPELINE SYSTEMS LATEST EDITION.
2. INDICATES LIMITS OF HYDROTEST.
3. DO NOT HYDROTEST THROUGH RELIEF VALVES, CONTROL VALVES, INSTRUMENTATION AND EQUIPMENT.
4. LIQUID FILL & PRESSURING FOR HYDROTESTING THROUGH CHECK VALVES MUST BE DONE FROM THE UPSTREAM SIDE OF THE CHECK VALVE.
5. ALL psi AND kPa VALUES TO BE CHECKED BY AN ENGINEER BASED ON PROJECT REQUIREMENTS.
6. APPROXIMATE FILL VOLUME TO BE CALCULATED BY CONTRACTOR.
7. ALL HYDROTEST MATERIALS TO BE SUPPLIED BY CONTRACTOR.

DCN-L9B-M-001

30 MAY 2014

LICENSED PROFESSIONAL ENGINEER
J.W.D. SHELDON
PROVINCE OF ONTARIO
4/7/2011

Professional Engineers of Ontario
CERTIFICATE OF AUTHORIZATION
Jacobs Canada Inc.
Number 11252378

2014 CONSTRUCTION

REV: 0	LINE 9B REVERSAL PROJECT	
AFE: 1241237A80 (LIS)	DATE: 09 MAY 14	
BY:	APPR:	
CHK:	APPR:	

NO	SUBSEQUENT REVISION	DATE/BY	APPR

NO	REVISION	DATE/BY	APPROVE

ENBRIDGE

ENBRIDGE PIPELINES INC.
10201 JASPER AVENUE
EDMONTON ALBERTA CANADA

SARNIA (ON) TERMINAL
SOUTH NO.1 MANIFOLD 203
203-V-057
HYDROTEST ISOMETRIC

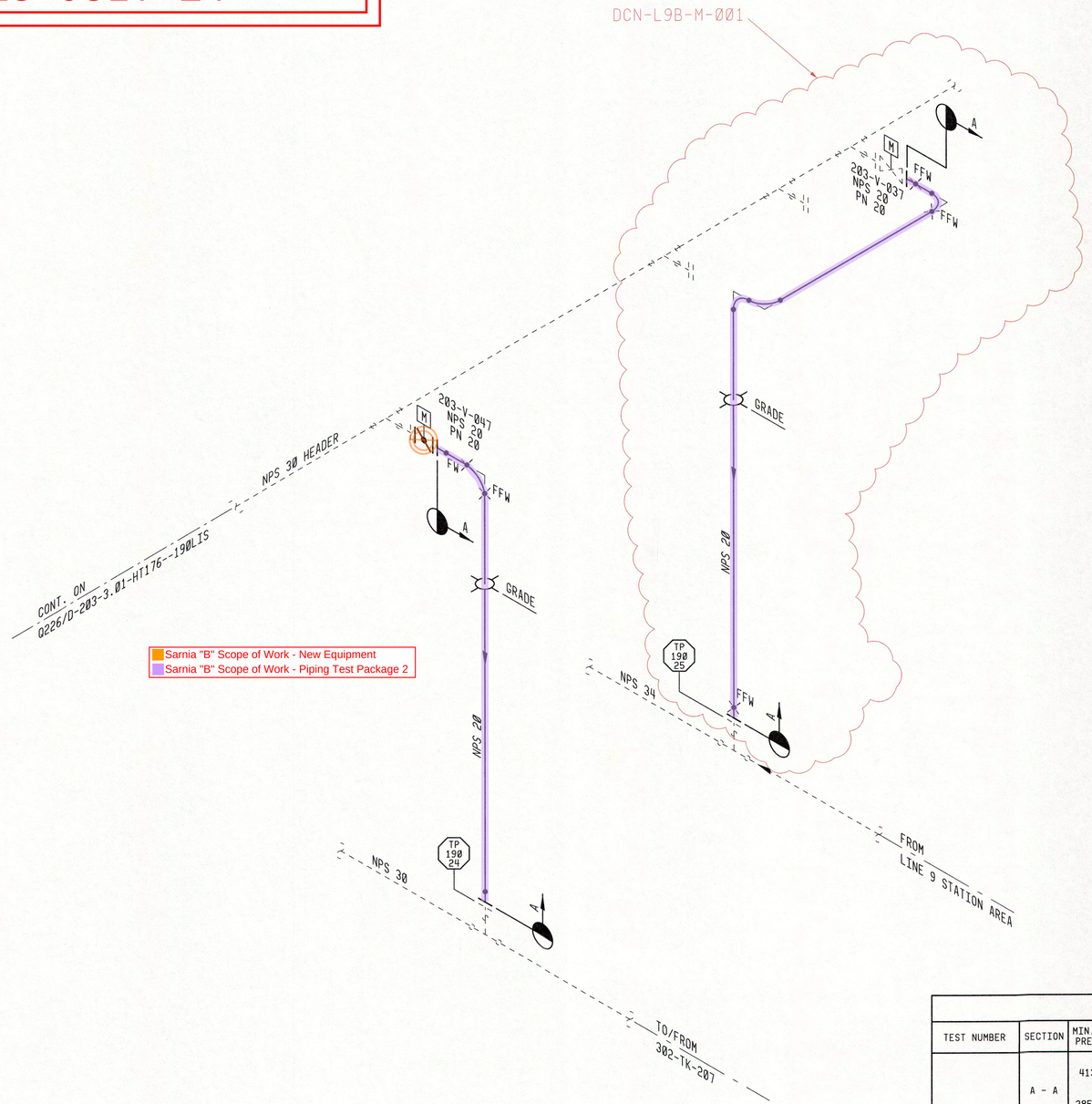
DRAWN	TDT	CHECK	KWB	APPROVE	BSHELDON
DATE	09 MAY 14	SCALE	NTS	APPROVE	ETAMAYO

D-203-3.01-HT157-0-190LIS Q407

PRESSURE TEST DETAILS

TEST NUMBER	SECTION	MIN. TEST PRESSURE	MAX. TEST PRESSURE	MAX. OPER. PRESSURE	MIN. LEAK TEST PRESS.	APPROX. FILL VOL.	TEST DURATION (HRS)
	A - A	413 psi 2850 kPa	429 psi 2964 kPa	275 psi 1900 kPa	303 psi 2090 kPa	____ m 3	ABOVE GRADE - 1.25 HR STRENGTH TEST FOLLOWED BY VISUAL LEAK INSPECTION AND DETECTION BELOW GRADE - 4.25 HRS STRENGTH TEST FOLLOWED BY 4.25 HRS LEAK TEST

MARKED-UP FOR
LEAVE TO OPEN PACKAGE
FOR INFORMATION ONLY
13-JULY-14



NOTES:

1. HYDROTEST PIPING IN ACCORDANCE WITH FCS014-(2012) AND CSA Z662 OIL AND PIPELINE SYSTEMS LATEST EDITION.
2. INDICATES LIMITS OF HYDROTEST.
3. DO NOT HYDROTEST THROUGH RELIEF VALVES, CONTROL VALVES, INSTRUMENTATION AND EQUIPMENT.
4. LIQUID FILL & PRESSURING FOR HYDROTESTING THROUGH CHECK VALVES MUST BE DONE FROM THE UPSTREAM SIDE OF THE CHECK VALVE.
5. ALL psi AND kPa VALUES TO BE CHECKED BY AN ENGINEER BASED ON PROJECT REQUIREMENTS.
6. APPROXIMATE FILL VOLUME TO BE CALCULATED BY CONTRACTOR.
7. ALL HYDROTEST MATERIALS TO BE SUPPLIED BY CONTRACTOR.

DCN-L9B-M-001

30 MAY 2014 DCN-M1
LICENSED PROFESSIONAL ENGINEER J.W.D. SHELDON PROVINCE OF ONTARIO
819 7011

Professional Engineers of Ontario
CERTIFICATE OF AUTHORIZATION
Jacobs Canada Inc.
Number 11252378

2014 CONSTRUCTION

REV: 0	LINE 9B REVERSAL PROJECT	
AFE: 1241237A80 (LIS)	DATE: 09 MAY 14	
BY:	APPR:	
CHK:	APPR:	

NO	SUBSEQUENT REVISION	DATE/BY	APPR

M39/D-203-3.01-63159--190LIS MATERIAL ID ISOMETRIC

REFERENCE DRAWINGS

NO	REVISION	DATE/BY	APPROVE

ENBRIDGE
ENBRIDGE PIPELINES INC.
10201 JASPER AVENUE
EDMONTON ALBERTA CANADA

SARNIA (ON) TERMINAL
SOUTH NO.1 MANIFOLD 203
203-V-047
HYDROTEST ISOMETRIC

DRAWN	JMJ	CHECK	KWB	APPROVE	BSHELDON
DATE	29 APR 14	SCALE	NTS	APPROVE	ETAMAYO

D-203-3.01-HT159-0-190LIS Q409

PRESSURE TEST DETAILS

TEST NUMBER	SECTION	MIN. TEST PRESSURE	MAX. TEST PRESSURE	MAX. OPER. PRESSURE	MIN. LEAK TEST PRESS.	APPROX. FILL VOL.	TEST DURATION (HRS)
	A - A	413 psi 2850 kPa	429 psi 2964 kPa	275 psi 1900 kPa	303 psi 2090 kPa	____ m 3	ABOVE GRADE - 1.25 HR STRENGTH TEST FOLLOWED BY VISUAL LEAK INSPECTION AND DETECTION BELOW GRADE - 4.25 HRS STRENGTH TEST FOLLOWED BY 4.25 HRS LEAK TEST

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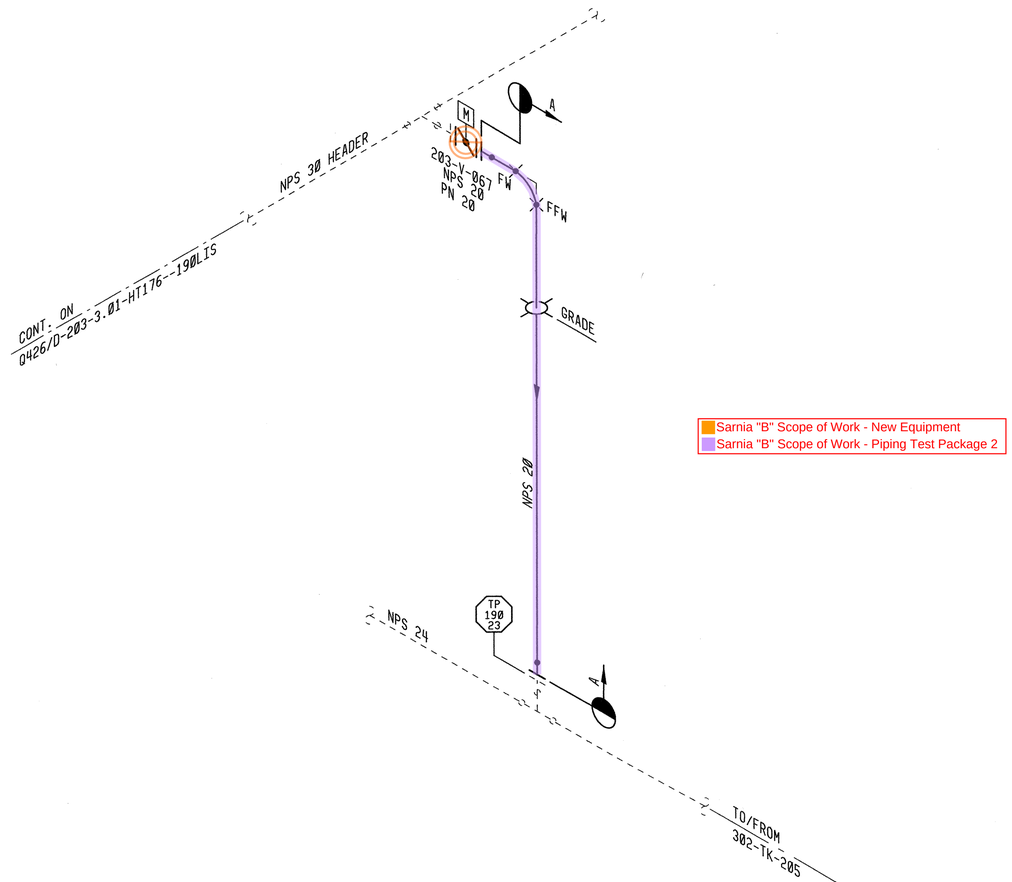
LEAVE TO OPEN PACKAGE
FOR INFORMATION ONLY
13-JULY-14



Sarnia "B" Scope of Work - New Equipment
Sarnia "B" Scope of Work - Piping Test Package 2

NOTES:

1. HYDROTEST PIPING IN ACCORDANCE WITH FCS014-(2012) AND CSA Z662 OIL AND PIPELINE SYSTEMS LATEST EDITION.
2. INDICATES LIMITS OF HYDROTEST.
3. DO NOT HYDROTEST THROUGH RELIEF VALVES, CONTROL VALVES, INSTRUMENTATION AND EQUIPMENT.
4. LIQUID FILL & PRESSURING FOR HYDROTESTING THROUGH CHECK VALVES MUST BE DONE FROM THE UPSTREAM SIDE OF THE CHECK VALVE.
5. ALL psi AND kPa VALUES TO BE CHECKED BY AN ENGINEER BASED ON PROJECT REQUIREMENTS.
6. APPROXIMATE FILL VOLUME TO BE CALCULATED BY CONTRACTOR.
7. ALL HYDROTEST MATERIALS TO BE SUPPLIED BY CONTRACTOR.

PRESSURE TEST DETAILS

TEST NUMBER	SECTION	MIN. TEST PRESSURE	MAX. TEST PRESSURE	MAX. OPER. PRESSURE	MIN. LEAK TEST PRESS.	APPROX. FILL VOL.	TEST DURATION (HRS)
	A - A	413 psi 2850 kPa	429 psi 2964 kPa	275 psi 1900 kPa	303 psi 2090 kPa	____ m 3	ABOVE GRADE - 1.25 HR STRENGTH TEST FOLLOWED BY VISUAL LEAK INSPECTION AND DETECTION BELOW GRADE - 4.25 HRS STRENGTH TEST FOLLOWED BY 4.25 HRS LEAK TEST

5 MAY 2014 REV.0
LICENSED PROFESSIONAL ENGINEER
J.W.D. SHELDON
PROVINCE OF ONTARIO
4197 10 11

Professional Engineers of Ontario
CERTIFICATE OF AUTHORIZATION
Jacobs Canada Inc.
Number 11252378

2014 CONSTRUCTION

REV: 0	LINE 9B REVERSAL PROJECT	
AFE: 1241237A80 (LIS)	DATE: 09 MAY 14	
BY:	APPR:	
CHK:	APPR:	

NO	SUBSEQUENT REVISION	DATE/BY	APPR

M40/D-203-3.01-63160--190LIS MATERIAL ID ISOMETRIC

REFERENCE DRAWINGS

NO	REVISION	DATE/BY	APPROVE

ENBRIDGE
ENBRIDGE PIPELINES INC.
10201 JASPER AVENUE
EDMONTON ALBERTA CANADA

SARNIA (ON) TERMINAL
SOUTH NO.1 MANIFOLD 203
203-V-067
HYDROTEST ISOMETRIC

DRAWN	JMJ	CHECK	KWB	APPROVE	BSHELDON
DATE	29 APR 14	SCALE	NTS	APPROVE	ETAMAYO

D-203-3.01-HT160-0-190LIS Q410

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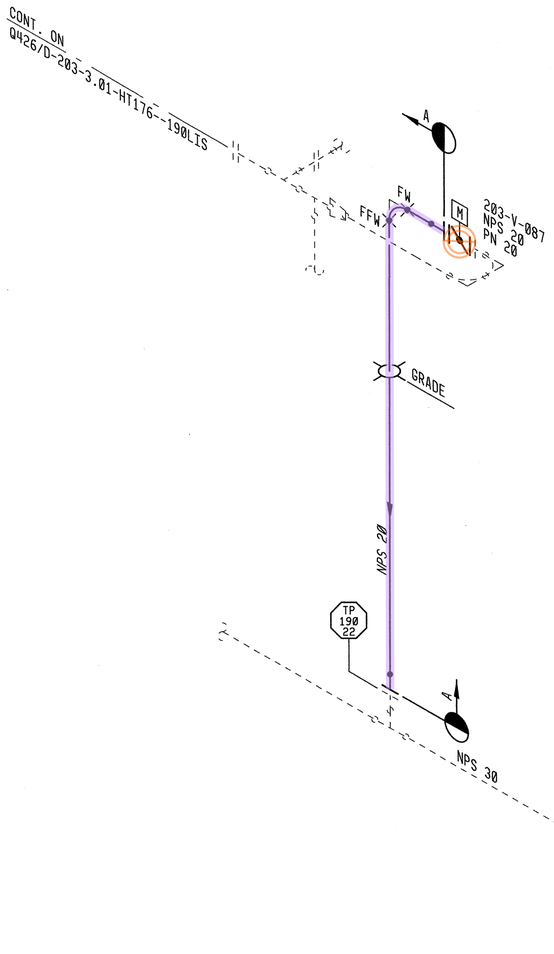
FOR INFORMATION ONLY
13-JULY-14



Sarnia "B" Scope of Work - New Equipment
Sarnia "B" Scope of Work - Piping Test Package 2

NOTES:

1. HYDROTEST PIPING IN ACCORDANCE WITH FCS014-(2012) AND CSA Z662 OIL AND PIPELINE SYSTEMS LATEST EDITION.
2. INDICATES LIMITS OF HYDROTEST.
3. DO NOT HYDROTEST THROUGH RELIEF VALVES, CONTROL VALVES, INSTRUMENTATION AND EQUIPMENT.
4. LIQUID FILL & PRESSURING FOR HYDROTESTING THROUGH CHECK VALVES MUST BE DONE FROM THE UPSTREAM SIDE OF THE CHECK VALVE.
5. ALL psi AND kPa VALUES TO BE CHECKED BY AN ENGINEER BASED ON PROJECT REQUIREMENTS.
6. APPROXIMATE FILL VOLUME TO BE CALCULATED BY CONTRACTOR.
7. ALL HYDROTEST MATERIALS TO BE SUPPLIED BY CONTRACTOR.

PRESSURE TEST DETAILS

TEST NUMBER	SECTION	MIN. TEST PRESSURE	MAX. TEST PRESSURE	MAX. OPER. PRESSURE	MIN. LEAK TEST PRESS.	APPROX. FILL VOL.	TEST DURATION (HRS)
	A - A	413 psi 2850 kPa	429 psi 2964 kPa	275 psi 1900 kPa	303 psi 2090 kPa	____ m 3	ABOVE GRADE - 1.25 HR STRENGTH TEST FOLLOWED BY VISUAL LEAK INSPECTION AND DETECTION BELOW GRADE - 4.25 HRS STRENGTH TEST FOLLOWED BY 4.25 HRS LEAK TEST

5 MAY 2014 REV. 0
LICENSED PROFESSIONAL ENGINEER J.W.D. SHELDON PROVINCE OF ONTARIO
4197011

Professional Engineers of Ontario
CERTIFICATE OF AUTHORIZATION
Jacobs Canada Inc.
Number 11252378

2014 CONSTRUCTION

REV:	LINE 9B REVERSAL PROJECT	
AFE: 1241237A80 (LIS)	DATE: 09 MAY 14	
BY:	APPR:	
CHK:	APPR:	

NO	SUBSEQUENT REVISION	DATE/BY	APPR

M56/D-203-3.01-63176--190LIS MATERIAL ID ISOMETRIC

REFERENCE DRAWINGS

NO	REVISION	DATE/BY	APPROVE

ENBRIDGE
ENBRIDGE PIPELINES INC.
10201 JASPER AVENUE
EDMONTON ALBERTA CANADA

SARNIA (ON) TERMINAL
SOUTH NO.1 MANIFOLD 203
203-V-087
HYDROTEST ISOMETRIC

DRAWN	JMJ	CHECK	KWB	APPROVE	BSHELDON
DATE	09 MAY 14	SCALE	NTS	APPROVE	ETAMAYO

D-203-3.01-HT161-0-190LIS Q411

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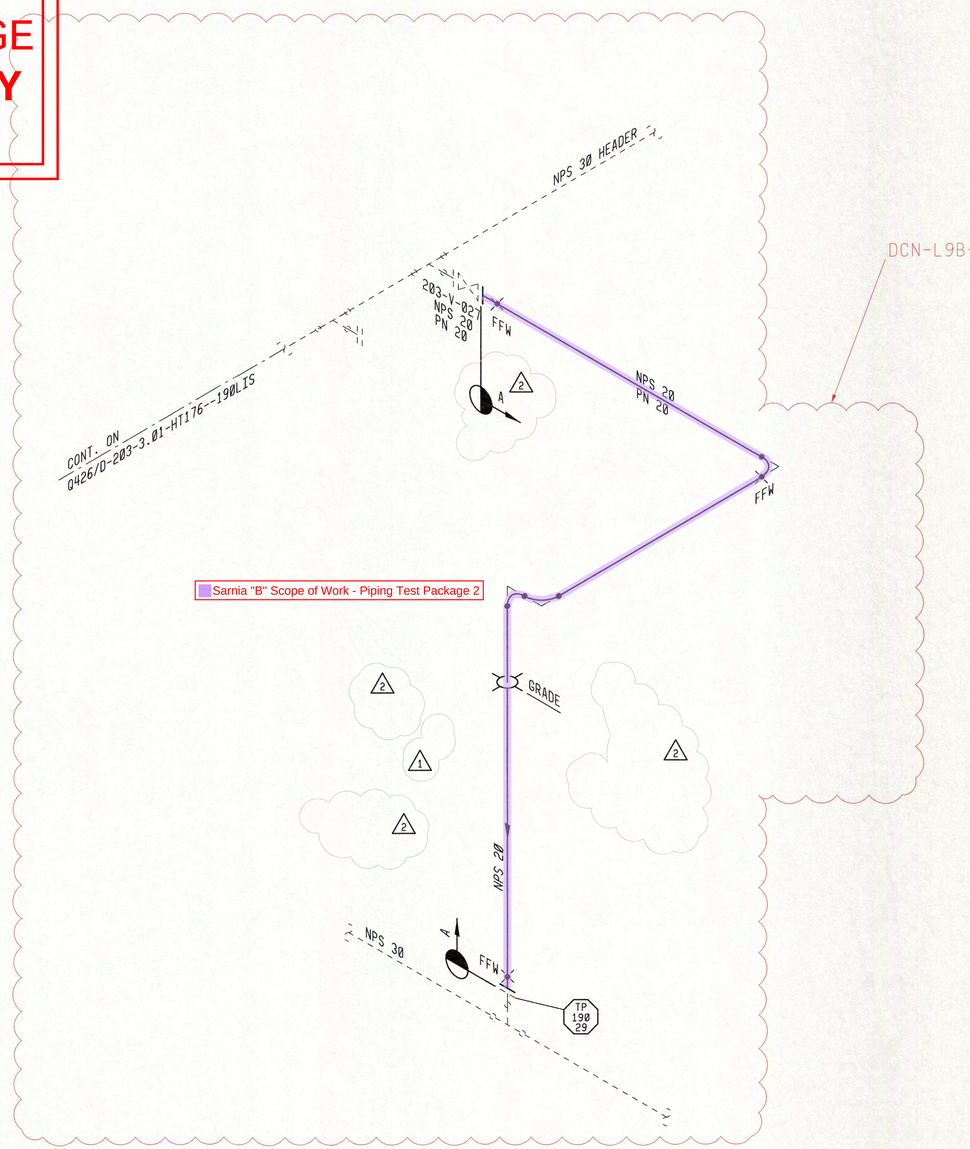
13-JULY-14



NOTES:

1. HYDROTEST PIPING IN ACCORDANCE WITH FCS014-(2012) AND CSA Z662 OIL AND PIPELINE SYSTEMS LATEST EDITION.
2. INDICATES LIMITS OF HYDROTEST.
3. DO NOT HYDROTEST THROUGH RELIEF VALVES, CONTROL VALVES, INSTRUMENTATION AND EQUIPMENT.
4. LIQUID FILL & PRESSURING FOR HYDROTESTING THROUGH CHECK VALVES MUST BE DONE FROM THE UPSTREAM SIDE OF THE CHECK VALVE.
5. ALL psi AND kPa VALUES TO BE CHECKED BY AN ENGINEER BASED ON PROJECT REQUIREMENTS.
6. APPROXIMATE FILL VOLUME TO BE CALCULATED BY CONTRACTOR.
7. ALL HYDROTEST MATERIALS TO BE SUPPLIED BY CONTRACTOR.

DCN-L9B-M-001

30 MAY 2014
LICENSED PROFESSIONAL ENGINEER
J.W.D. SHELDON
PROVINCE OF ONTARIO
100197011

Professional Engineers of Ontario
CERTIFICATE OF AUTHORIZATION
Jacobs Canada Inc.
Number 11252378

2014 CONSTRUCTION

REV: 0	LINE 9B REVERSAL PROJECT		
AFE: 1241237A80 (LIS)		DATE: 29 NOV 13	
BY:		APPR:	
CHK:		APPR:	
NO	SUBSEQUENT REVISION	DATE/BY	APPR
1	REMOVED FLANGE ISOLATION KIT	28 FEB 14 RBG	JWS
2	ADDED NEW HYDROTEST LIMITS	09 MAY 14 TDT	JWS

M67/D-203-3.01-63187--190LIS MATERIAL ID ISOMETRIC

REFERENCE DRAWINGS

NO	REVISION	DATE/BY	APPROVE

ENBRIDGE
ENBRIDGE PIPELINES INC.
10201 JASPER AVENUE
EDMONTON ALBERTA CANADA

SARNIA (ON) TERMINAL
SOUTH NO.1 MANIFOLD 203
203-V-027
HYDROTEST ISOMETRIC

DRAWN	TDT	CHECK	KWB	APPROVE	BSHELDON
DATE	14 AUG 13	SCALE	NTS	APPROVE	ETAMAYO

D-203-3.01-HT187-2-190LIS Q437

PRESSURE TEST DETAILS

TEST NUMBER	SECTION	MIN. TEST PRESSURE	MAX. TEST PRESSURE	MAX. OPER. PRESSURE	MIN. LEAK TEST PRESS.	APPROX. FILL VOL.	TEST DURATION (HRS)
	A - A	413 psi 2850 kPa	429 psi 2964 kPa	275 psi 1900 kPa	303 psi 2090 kPa	____ m 3	ABOVE GRADE - 1.25 HR STRENGTH TEST FOLLOWED BY VISUAL LEAK INSPECTION AND DETECTION BELOW GRADE - 4.25 HRS STRENGTH TEST FOLLOWED BY 4.25 HRS LEAK TEST

[3] 20" Triple Offset Valves

204-V-213
204-V-364
204-V-214

United Valve

Pressure Test Report

9916 Gulf Freeway
Houston, Texas 77034

Date: 07/10/2014 Work Order#: 90486

Customer: Zwick Valves North America, LLC Customer PO#: 1308-012

customer address

work performed

1) Pretest to API 598 per Zwick procedure with Zwick technician present to assist - Freddie 281-478-4701
2) Advise Kyle when pretest is complete
3) Test per Enbridge Spec EES110-2011 with witness 6/18 @ 8 AM
   - 1 hour chart recorded shell test
   - Hydrotest preferred direction first @ 319 psi on seat 5 minutes
   - Air test preferred direction @ 80 psi for 5 minutes

type of test: API 598

tested by: Jose A. Flores

line item description: 20 150 ZWICK WCB BFV

item#	*body heat#*	*bonnet heat#*	*serial#*	*notes*
01	C5983		14-01-58344	PASSED 204-V-214
02	C4051		12-06-50571	PASSED 204-V-364
04	A7403		14-03-58896	PASSED 204-V-213
05	C4866		12-08-51508	PASSED

END OF TEST REPORT

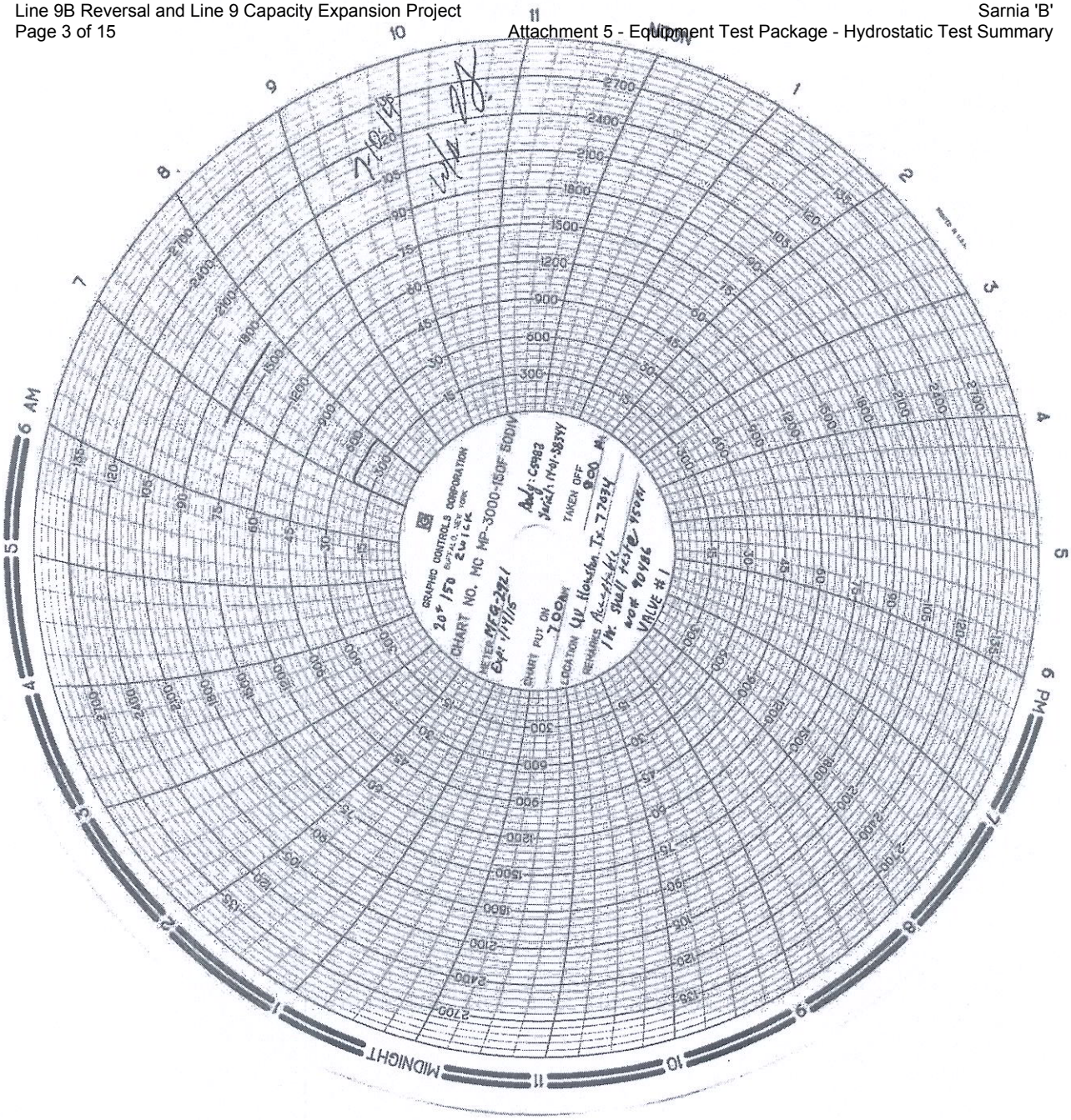
THIS VALVE IS NOT PART OF THIS PACKAGE.

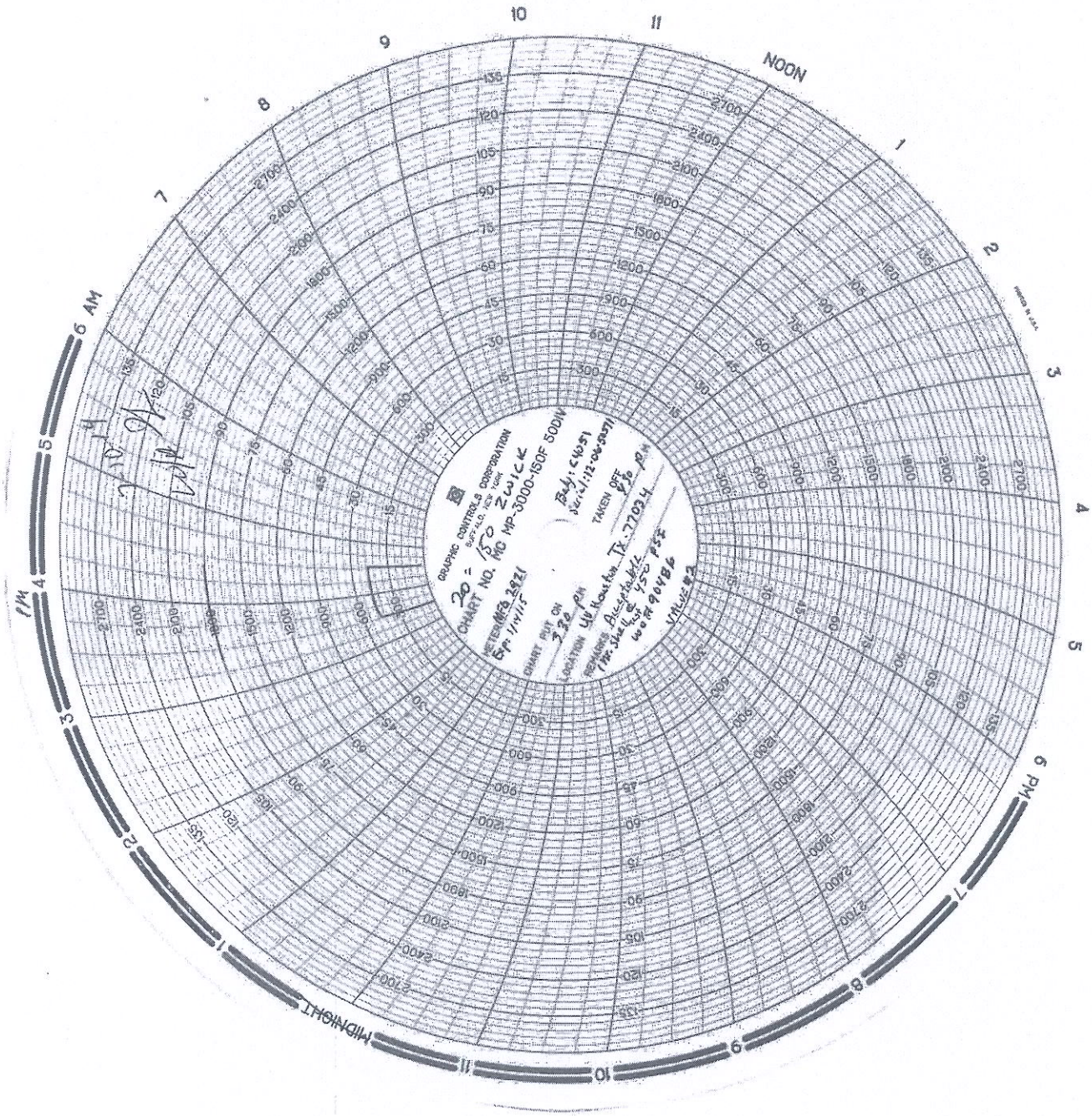
The above items were tested in accordance with and passed all the criterion as listed below: API 598

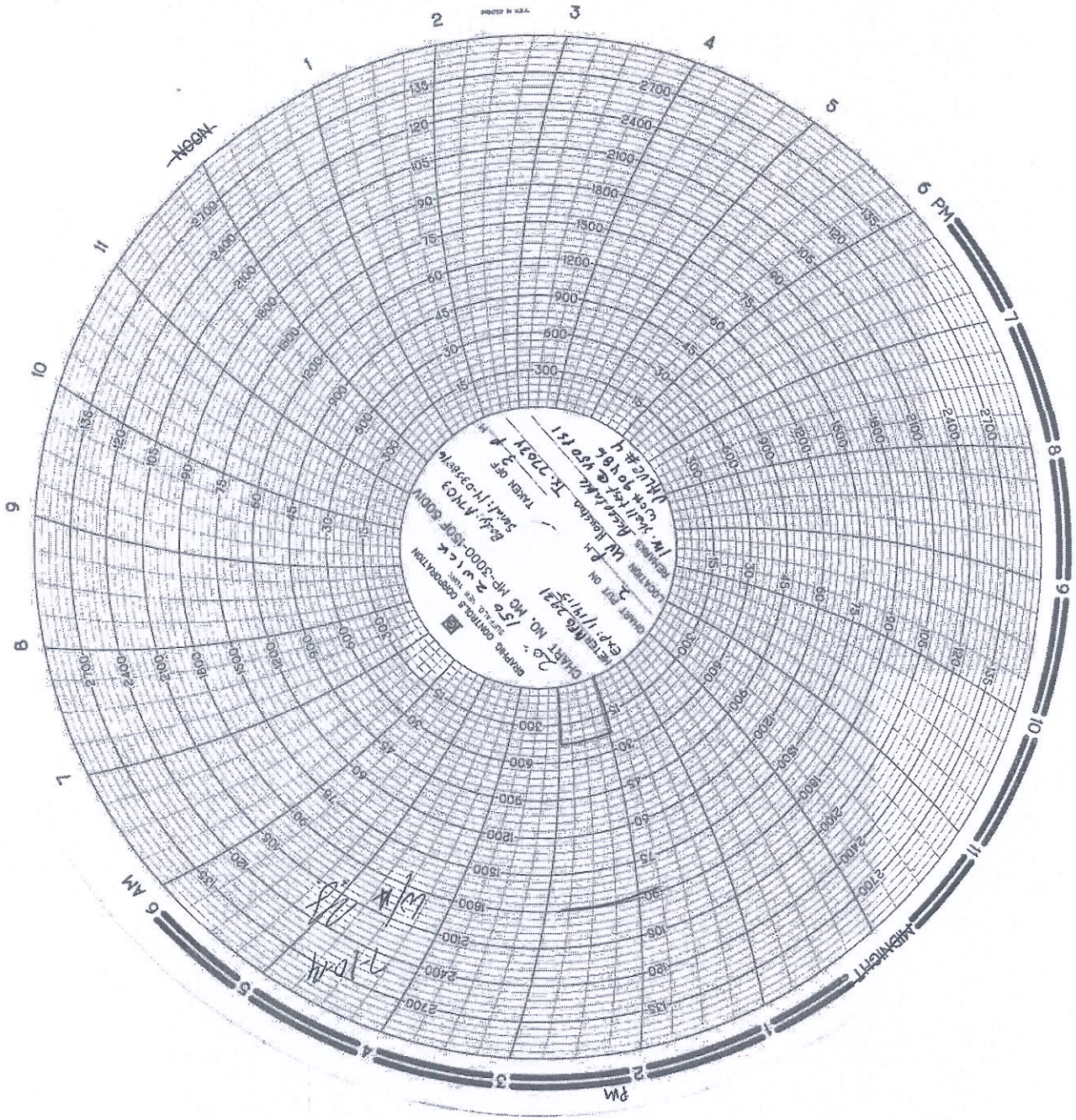
Test parameters: **L/P Seats:** 80 PSI Duration: 5 MIN **Backseat:**
H/P Seats: 319 PSI Duration: 5 MIN **Shell:** 450 PSI Duration: 60 MIN

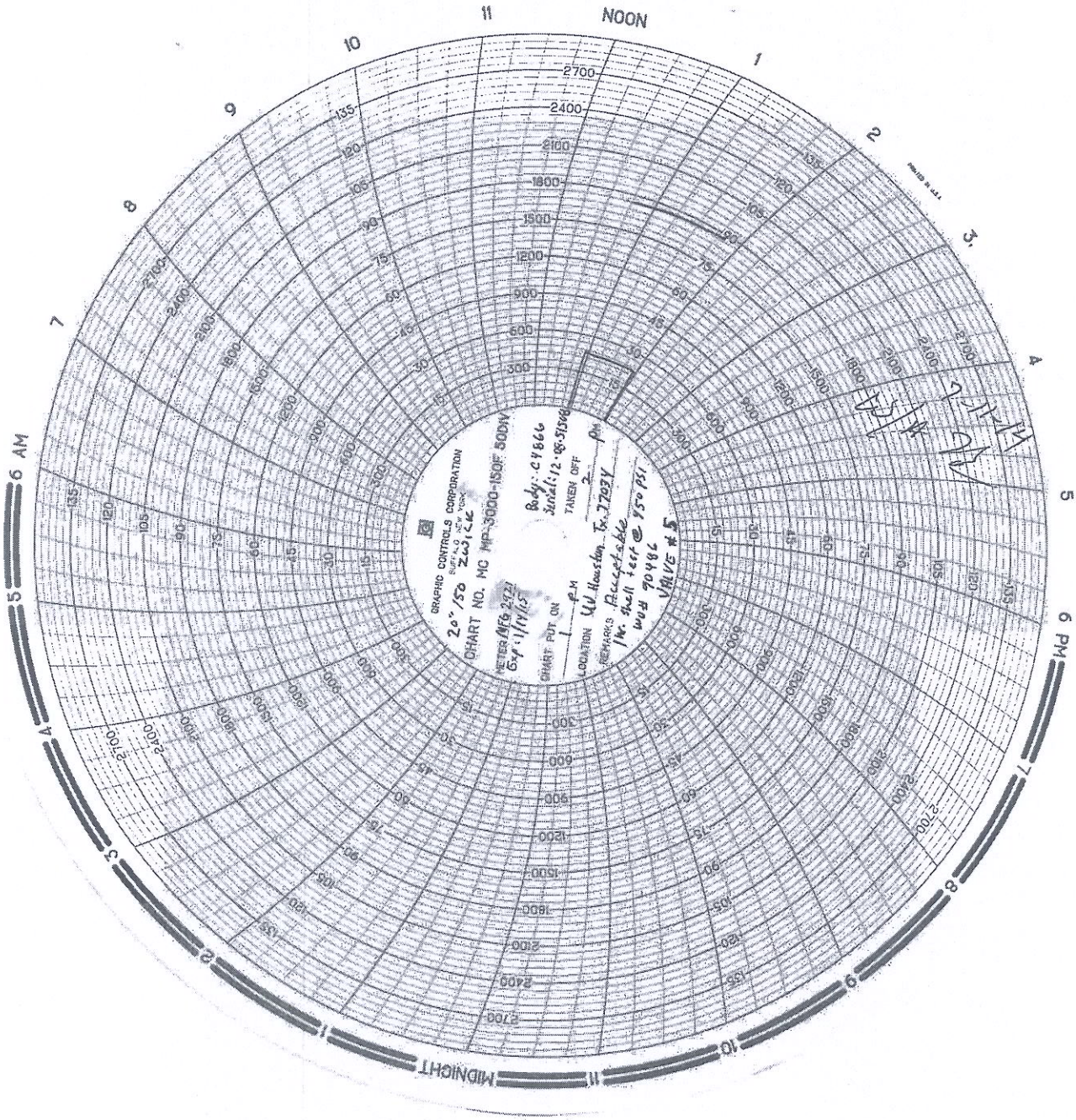
Test certified by: Jose A. Flores
Jose A. Flores

Test witnessed by: _____ of _____


GRAPHIC CONTROLS CORPORATION
BUFFALO, NEW YORK
20" 150
CHART NO. MC MP-3000-150F 500/0
METER MC-2921
Exp. 1/1/15
CHART PUT ON 7:00 AM
LOCATION GL Hawkins, Tx
REMARKS Acc. Hydro Test
Inv. Shell 45178 4500
VALVE #1
TAKEN OFF 9:00 AM
MIDNIGHT
NOON


GRAPHIC CONTROLS CORPORATION
MO MP-3000-150F 500W
CHART NO.
TAKEN OFF
CHART PUT ON
LOCATION
REMARKS
MIDNIGHT
NOON
6 AM
6 PM


NOON
6 PM
MIDNIGHT
6 AM
CHART No. 15e MP-3000-1SQF
Exp: 11/11/15
Test Date 23-21
Test Pressure 2,100 psig
Test Duration 4 hrs
Test Medium Water
Line #4
Weld #'s 1 thru 90
Test Pressure 2,100 psig
Test Duration 4 hrs
Test Medium Water
Line #4
Weld #'s 1 thru 90


NOON
MIDNIGHT
6 AM
6 PM
BARTON
BARTON CHART CO.
GRAPHIC CONTROLS CORPORATION
BUFFALO NEW YORK
CHART NO. MC MP-3000-150F 8DAY
METER MFG 2022
CHART PUT ON
LOCATION
REMARKS
TAKEN OFF
Body: C4866
Lid: 12-65-5196
Lid Houston Tx. 77293
Inc. shell test @ 750 psi
VALVE #5

[3] 20" Triple Offset Valves

203-V-087
203-V-057
203-V-047

United Valve

Pressure Test Report

9916 Gulf Freeway
Houston, Texas 77034

Date: 06/18/2014 **Work Order #**90045

Customer: Zwick Valves North America, LLC **Customer Po #** 1308-012

Work Performed:
1) Pretest to API 598 per Zwick procedure with Zwick technician present to assist - Freddie 281-478-4701
2) Advise Kyle when pretest is complete
3) Test per Enbridge Spec EES110-2011 with witness 6/18 @ 8 AM
- 1 hour chart recorded shell test
- Hydrotest preferred direction first @ 319 psi on seat 5 minutes
- Air test preferred direction @ 80 psi for 5 minutes
- Repeat seat hydrotest for non-preferred direction
- Repeat seat air test for non-preferred direction
- zero leakage allowed
4) Provide gauge calibration

Type of Test: API 598 **Tested By:** Jose A. Flores

Line Item Description
20 150 ZWICK WCB BUTTERFLY

Item #	Body Heat #	Bonnet Heat #	Serial #	Notes	
02	C4046		12-06-50569	PASSED	203-V-087
03	C4137		11-11-47546	PASSED	203-V-047
04	C4065		11-11-47547	SEAT LEAK	
05	C5661		14-01-58345	PASSED	203-V-057

THIS VALVE WAS REJECTED.

The above items were tested in accordance with and passed all the criterion as listed below: API 598

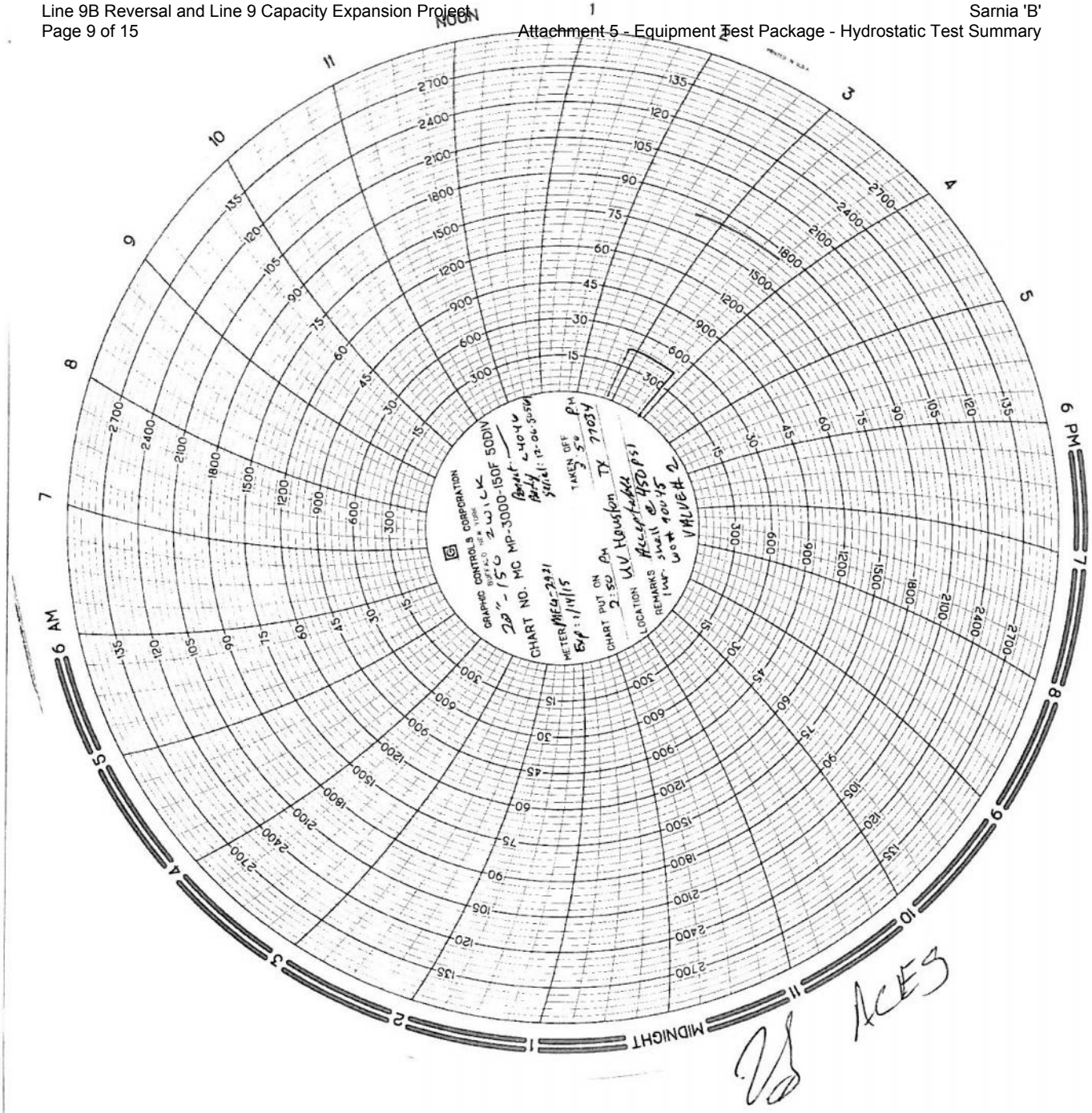
Test Parameters:

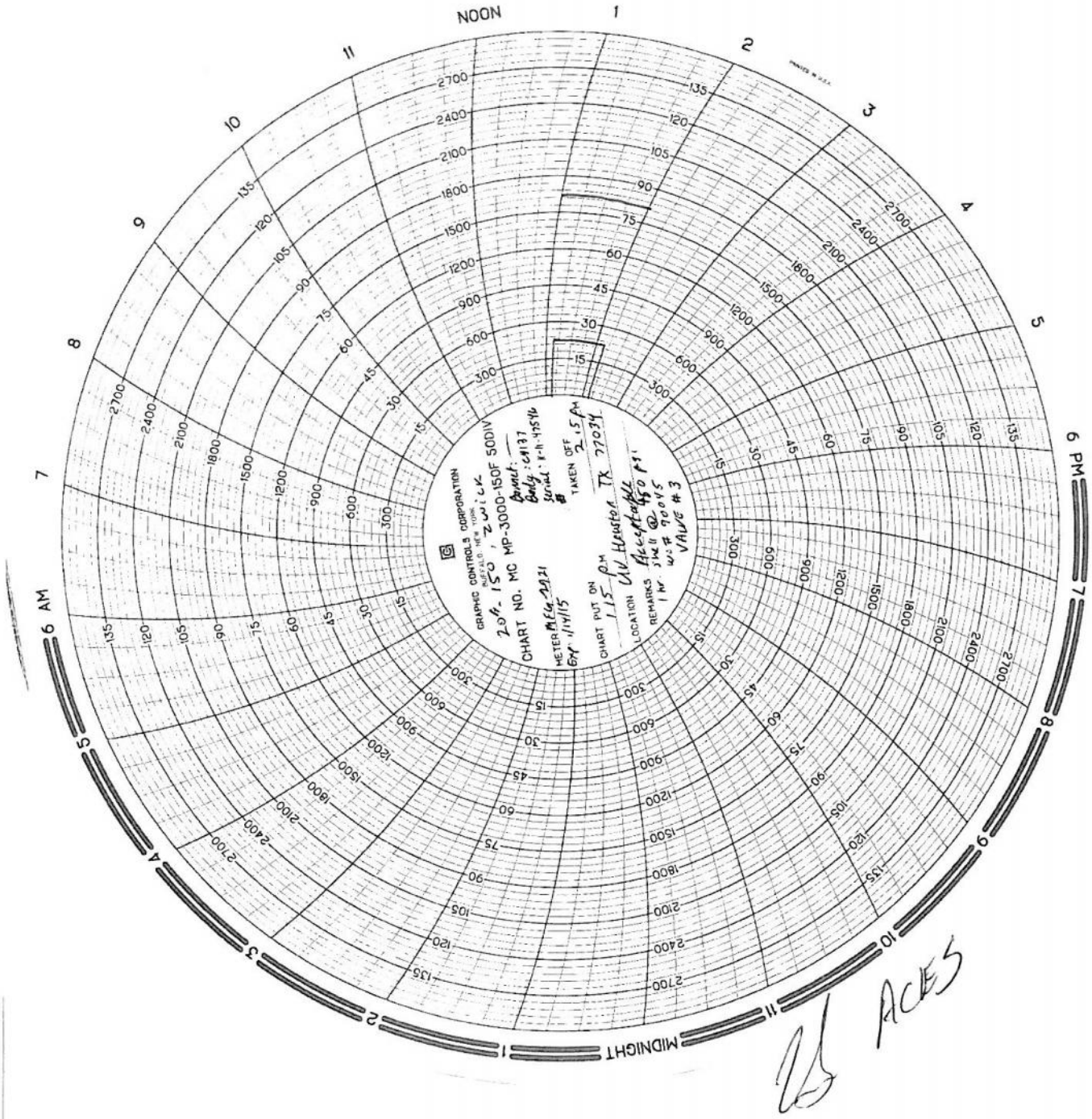
L/P Seats: 80 PSI **Duration:** 5 MIN **Backseat:** **Duration:**

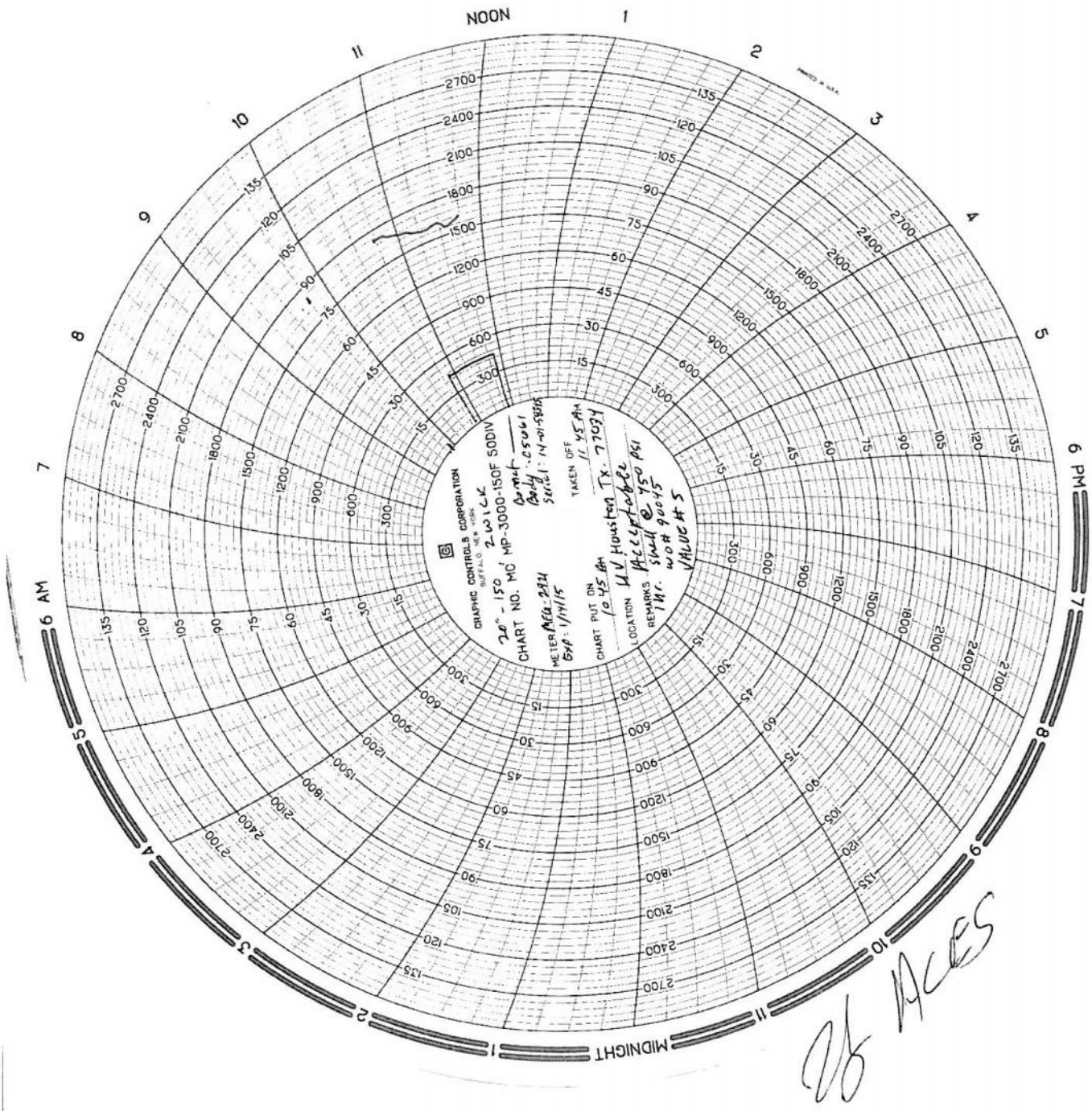
H/P Seats: 319 PSI **Duration:** 5 MIN **Shell:** **Duration:**

Test certified by: Jose A. Flores

Test witnessed by: [signature] **of** ACES


NOON
MIDNIGHT
6 AM
6 PM
GRAPHIC CONTROLS CORPORATION
CHART NO. MC MP-3000-150F 50DIV
METER
CHART PUT ON
TAKEN OFF
LOCATION
REMARKS
ACES


NOON
MIDNIGHT
6 AM
6 PM
GRAPHIC CONTROLS CORPORATION
CHART NO. MC MP-3000-150F 500IV
METER
CHART PUT ON
LOCATION
REMARKS
TAKEN OFF
VALVE #3
ACES


NOON
MIDNIGHT
6 AM
6 PM
GRAPHIC CONTROLS CORPORATION
BUFFALO, NEW YORK
CHART NO. MC MP-3000-150F 50DIV
METER RUN
TAKEN OFF
CHART PUT ON
LOCATION
REMARKS
Acceptable @ 750 psi
Shut in 90 min.
WO# 90045
VALVE # 5

[4] 20" Triple Offset Valves

204-V-204
203-V-067

United Valve

9916 Gulf Freeway
Houston, Texas 77034

Pressure Test Report

Date: 06/19/2014 **Work Order #**89965

Customer: Zwick Valves North America, LLC **Customer Po #** P1308-012M-UNITED-3

Work Performed:
1) Pretest per Zwick procedure with witness
2) Test per Enbridge Spec EES110-2011 with witness 6/18 @ 8 AM
- 1 hour chart recorded shell test
- Hydrotest preferred direction first @ 319 psi on seat 5 minutes
- Air test preferred direction @ 80 psi for 5 minutes
- Repeat seat hydrotest for non-preferred direction
- Repeat seat air test for non-preferred direction
- zero leakage allowed
3) Provide gauge calibration

Type of Test: API 598 **Tested By:** Jose A. Flores

Line Item Description
20 150 ZWICK WCB BUTTERFLY

Item #	Body Heat #	Bonnet Heat #	Serial #	Notes
01	C4143		12-0650564	SEAT LEAK
02	C5661		14-1058353	PASSED 203-V-067
03	A6790		12-0851604	PASSED 204-V-204
04	C4051		12-06-50571	SEAT LEAK
05	A7403		14-03-58896	SEAT LEAK

THESE VALVES WERE REJECTED.

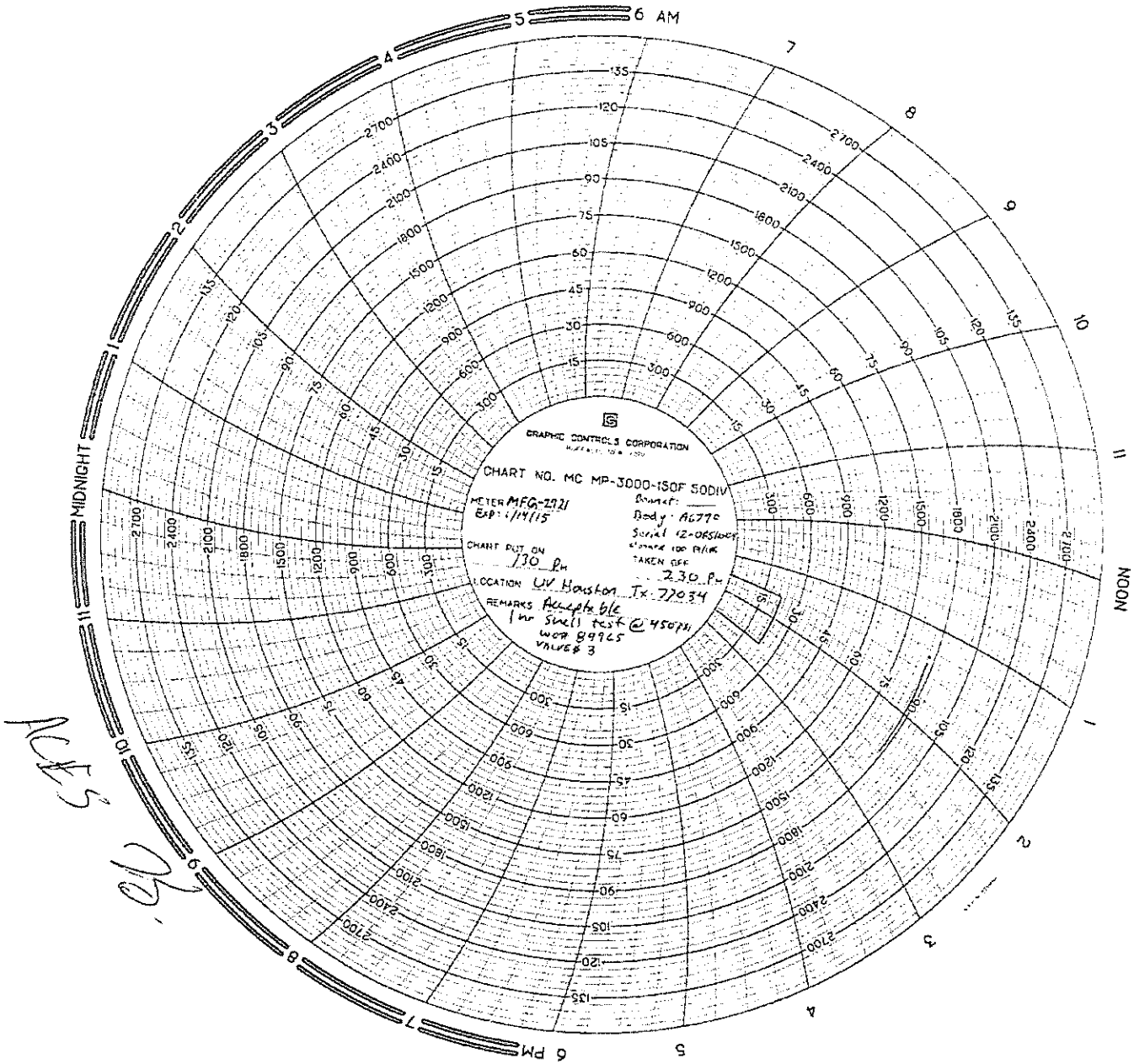
The above items were tested in accordance with and passed all the criterion as listed below: API 598

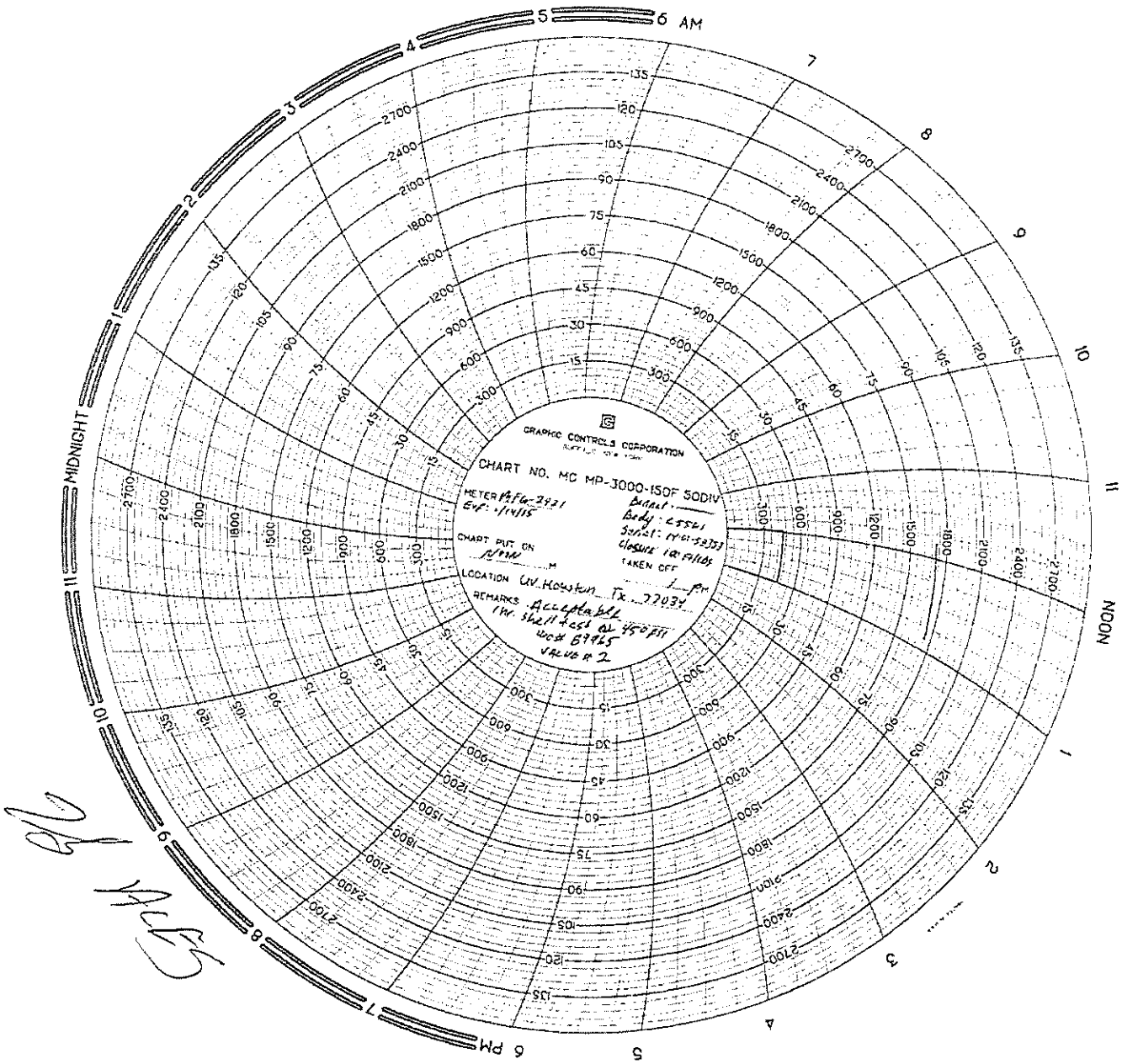
Test Parameters:

L/P Seats:	80 PSI	**Duration:**	5 MIN	**Backseat:**	**Duration:**
H/P Seats:	319 PSI	**Duration:**	5 MIN	**Shell:**	**Duration:**

Test certified by: Jose A. Flores

Test witnessed by: _____ **of** ACE3


6 AM
NOON
6 PM
MIDNIGHT
GRAPHIC CONTROLS CORPORATION
CHART NO. MC MP-3000-1SOF 50DIV
METER MFG-2921
EXP: 1/14/15
CHART PUT ON
1:30 PM
LOCATION UV Houston Tx 77034
REMARKS Acceptable
1 hr Shell test @ 450psi
WO# 89965
VALVE# 3
TAKEN OFF
2:30 PM


GRAPHIC CONTROLS CORPORATION
CHART NO. MC MP-3000-150F 500IV
METER
CHART PUT ON
LOCATION UV. Houston Tx. 77034
REMARKS Acceptable
MIDNIGHT
NOON
6 AM
6 PM

CFCS-FRM-RHT-016-r01.docx
November 2010

Request for Hydrotest

Canadian Facilities Construction Services

ENBRIDGE

Contractor LamSar Inc. **Test No.:** 4450-19

Location ~~LamSar Shop~~ SARNIA TERMINAL **Test Date:** July 19, 2014

AFE/Project: 1241237A80(LIS) **Job Description:** SA Line 9B Reversal/Expansion

Hydrotest Drawing Number D-203-3.01-HT176-3-190LIS Q426, D-202-3.01-HT177-2-190LIS Q427

Test Media **WATER** YES **AIR** _____ **OTHER** _____

Volume (m³) 67.3

Pipe Sizes 30" & 20"

Pipe Grade 30" Gr.448 Cat I, 20" Gr.290 Cat I

Test Media Source Treated Water from Frack Tanks

Permit No N/A **Federal** N/A **Provincial** N/A **Municipal** N/A

Authorization/Permission	Begin
Treatment prior to test	N/A
Treatment after test	N/A
Disposal of test media	Pumped back to Frack Tanks for testing, treating and disposal.
Notes	

Requested by:

Name (Print): Dave Fletcher

Signature: _____

Date: July 12, 2014

Hydrostatic Test QA Checklist

LP Canadian Construction Services

LP-F-INSP-025-HTQC-R0.DOT

Contractor:	LamSar Inc.	**Date:**	July 98, 2014
Project:	Line 9B Reversal/Expansion	**Test No.:**	4450-19
Location:	~~LamSar Shop~~ SARNIA TERMINAL	**AFE#:**	1241237A80(LIS)
		CWP #:	N/A

This checklist must be completed and attached to the hydrostatic test records prior to turnover. The following information must be completed prior to the hydrostatic tests as per Operations and Maintenance Manual Book 3: Pipeline Facilities, Section 07-02-01:

Task	Yes / No	Date	NOTES
Notifications	Y	19/07/14	
Test Section Drawing	Y	19/07/14	
Review Materials Documentation	Y	19/07/14	
Establishing intended maximum operating pressure (MOP), and for deviations to existing MOP approval by Engineering	Y	19/07/14	
All NDE Reviewed	Y	19/07/14	
Equipment List	Y	19/07/14	
Pre Hydro-Package Approvals	Y	19/07/14	
Environmental Concerns / Issues	Y	19/07/14	All water pumped back to Frak Tanks.
Safety precautions specific to the circumstances, including setback distances for workers and the public	Y	19/07/14	Warning Signs
Pre-job Meeting with Workers	Y	19/07/14	
Calibration of Test Instruments	Y	19/07/14	
Pressure Recorder Set	Y	19/07/14	
Test Acceptance Criteria	Y	19/07/14	

Contractor Representative:

Name (Print): Natalya Davydenko

Signature:

Date: 19/07/2014

Company Representative:

Name (Print): Andre Begin

Signature:

Date: 19/07/2014

If the contractor has their own form that meets all information on this form the Contractor's form may be used.

MPCFCS-PTR-065-R2

Pressure Test Equipment Report

Canadian Facilities Construction Services

ENBRIDGE

Page 1 of 1

CONTRACTOR	**LamSar Inc.**	**TEST DATE**	**July 19/2014**
PROJECT	**SA Line 9B Reversal/Expansion**	**TEST No.**	**4450-19**
LOCATION	~~LamSar Shop~~ SARNIA TERMINAL	**AFE**	**1241237A80 (LIS)**
DRAWING #.	**D-203-3.01-HT176-3-190LIS, Q426** **D-202-3.01-HT177-2-190LIS, Q427**	**CWP #**	**N/A**

PIPE DATA

NPS/OD	WT	Grade	Length	Manufacturer	Type
30"	12.7mm	Gr.448 Cat I	483'-0"(147.2m)	Sumitomo	SAW
20"	9.5mm	Gr. 290 Cat I	80'-0"(24.3m)	SeAH Steel Corp.	ERW

TEST DATA

Test Medium	Fill Volume
Treated Water	67.3 Cubic Meters

	REFERENCE INSTRUMENTS		TEST EQUIPMENT		
	Deadweight Pressure	**Liquid in Glass Thermometer**	**Pressure Recorder**	**Pressure Gauge**	**Temperature Recorder**
Make	Fluke	Fluke	Bristol	Wika	Dri-Flo II
Range	0-5000 psi	-238 F to 1832 F	0-1000 psi	0-1000 psi	0 F to 150F
Serial No.	23023003 ✓	2640571WS ✓	P1002 ✓	LN-1000-1A/2A/7/16 ✓ ✓	#002678 ✓

	CALIBRATION VERIFICATION BEFORE TEST				CALIBRATION VERIFICATION AFTER TEST			
	25% Test Pressure (T.P.)	**50% T.P.**	**75% T.P.**	**100% T.P.**	**100% T.P.**	**75% T.P.**	**50% T.P.**	**25% T.P.**
Deadweight	100 psi	212 psi	320 psi	420 psi	418 psi	319 psi	212 psi	106 psi
Pressure Recorder	100 psi	212 psi	320 psi	420 psi	418 psi	319 psi	212 psi	106 psi
Pressure Gauge	100 psi	212 psi	320 psi	420 psi	418 psi	319 psi	212 psi	106 psi

Test	Aim Test Pressure	Minimum	Maximum	Duration
Strength	425psig	413psig	429psig	4.25 hr
Leak	320psig	303psig	N/A	4.25 hr

See Accompanying Pages for Pressure and Temperature Records

Contractor Representative:

(Print) ~~Dave Fletcher~~ Natalya Davydenko

(Sign)

Date: **July 19/2014**

Enbridge Representative:

(Print) **Andre Begin**

(Sign)

Date: **July 19/2014**

Pressure Test Data Report

LP Canadian Construction Services

LP-F-INSP-024-PTR-R0.DOT

CONTRACTOR NAME: LamSar Inc.

LOCATION: ~~LamSar Shop~~ SARNIA TERMINAL

PROJECT / AFE: SA Line 9B Reversal/Expansion 1241237A80(LIS)

Page 1of 4

TEST NO.: 4450-19

TEST DATE: July 19, 2014

DRAWING NO.: D-203-3.01-HT176-3-190LIS, Q426
D-202-3.01-HT177-2-190LIS, Q427

CWP NO.: N/A

TIME	DEADWEIGHT PRESSURE psi	TEMPERATURE°F			REMARKS (Weather, Volumes Added/Bled Off)
		AMBIENT (Thermometer)	PIPE MEDIUM (Recorder)	GROUND Thermocouple)	
4:15	0.0	74.1	70	67	Begin Test, Run in Charts
4:20	0.0	74.0	70	67	Stabilize
4:30	0.0	70.6	75	67	Stabilize
4:40	100	70.4	75	67	Begin 25% Pressure up
4:50	100	70.9	75	67	Stabilize
5:00	212.5	67.9	70	67	Begin 50% Pressure up
5:10	212.6	67.9	70	67	Stabilize
5:20	320.6	67.9	70	67	Begin 75% Pressure up
5:30	320.1	67.9	70	67	Stabilize
5:40	424.1	67.9	70	67	100% Pressure up
5:50	425.1	67.9	70	67	Stabilize
6:00	420.0	67.9	70	67	Stabilize
6:15	413	67.9	70	67	Pump Cavitation, Increase Pressure
6:30	421	67.9	70	67	Begin Strength Test, 100% Pressure up
6:45	421	67.9	70	67	Hold 4Hr. 15 min.
7:00	421	67.9	70	67	Hold
7:15	421	67.9	70	67	Hold

Contractor Representative

Natalya Davydenko
Print

Sign

July 19, 2014
Date

Company Representative

Andre Begin
Print

Sign

July 19,2014
Date

Pressure Test Data Report

LP Canadian Construction Services

LP-F-INSP-024-PTR-R0.DOT

CONTRACTOR NAME: LamSar Inc.

LOCATION: ~~LamSar Shop~~ SARNIA TERMINAL ✓

PROJECT / AFE: SA Line 9B Reversal/Expansion 1241237A80(LIS)

Page 2of 4

TEST NO.: 4450-19

TEST DATE: July 19, 2014

DRAWING NO.: D-203-3.01-HT176-3-190LIS, Q426
D-202-3.01-HT177-2-190LIS, Q427

CWP NO.: N/A

TIME	DEADWEIGHT PRESSURE psi	TEMPERATURE°F			REMARKS (Weather, Volumes Added/Bled Off)
		AMBIENT (Thermometer)	PIPE MEDIUM (Recorder)	GROUND Thermocouple)	
7:30	421	67.9	70	67	Hold
7:45	421	65	68	65	Hold
8:00	421	65	68	65	Hold
8:15	421	65	68	65	Hold
8:30	420	65	68	65	Hold
8:45	420	66	68	65	Hold
9:00	420	66	68	65	Hold
9:15	420	66	68	65	Hold
9:30	420	66	68	65	Hold
9:45	420	66	68	65	Hold
10:00	420	66	68	65	Hold
10:15	420	66	68	65	Hold
10:30	420	65	66	64	Hold
10:45	420	65	66	64	End Strength Test, 100% Press.
11:00	420	65	66	64	Begin Leak Test, 100% Press.
11:15	420	65	66	64	Hold
11:30	420	64	65	64	Hold

Contractor Representative

Natalya Davydenko
Print

Sign

July 19, 2014
Date

Company Representative

Andre Begin
Print

Sign

July 19,2014
Date

Pressure Test Data Report

LP Canadian Construction Services

LP-F-INSP-024-PTR-R0.DOT

CONTRACTOR NAME: LamSar Inc.

LOCATION: ~~LamSar Shop~~ SARNIA TERMINAL

PROJECT / AFE: SA Line 9B Reversal/Expansion 1241237A80(LIS)

Page 3of 4

TEST NO.: 4450-19

TEST DATE: July 19, 2014

DRAWING NO.: D-203-3.01-HT176-3-190LIS, Q426
D-202-3.01-HT177-2-190LIS, Q427

CWP NO.: N/A

TIME	DEADWEIGHT PRESSURE psi	TEMPERATURE°F			REMARKS (Weather, Volumes Added/Bled Off)
		AMBIENT (Thermometer)	PIPE MEDIUM (Recorder)	GROUND Thermocouple)	
11:45	420	64	65	64	Hold
12:00	420	64	65	64	Hold
12:15	420	64	65	64	Hold
12:30	420	64	65	64	Hold
12:45	420	64	64	63	Hold
1:00	420	64	64	63	Hold
1:15	419	63	63	63	Hold
1:30	419	63	63	63	Hold
1:45	419	63	63	63	Hold
2:00	419	63	63	63	Hold
2:15	419	63	63	63	Hold
2:30	419	63	63	63	Hold
2:45	419	63	63	63	Hold
3:00	418	63	63	63	Hold
3:15	418	63	63	63	Hold
3:30	418	63	63	63	End Leak Test, 100% Press. Down
3:45	319	62	62	63	Begin 75% Press. Down

Contractor Representative

Natalya Davydenko
Print

Sign

July 19, 2014
Date

Company Representative

Andre Begin
Print

Sign

July 19,2014
Date

Pressure Test Data Report

LP Canadian Construction Services

LP-F-INSP-024-PTR-R0.DOT

CONTRACTOR NAME: LamSar Inc.

LOCATION: ~~LamSar Shop~~ Sarnia Terminal

PROJECT / AFE: SA Line 9B Reversal/Expansion 1241237A80(LIS)

Page 4of 4

TEST NO.: 4450-19

TEST DATE: July 19, 2014

DRAWING NO.: D-203-3.01-HT176-3-190LIS, Q426
D-202-3.01-HT177-2-190LIS, Q427

CWP NO.: N/A

TIME	DEADWEIGHT PRESSURE psi	TEMPERATURE°F			REMARKS (Weather, Volumes Added/Bled Off)
		AMBIENT (Thermometer)	PIPE MEDIUM (Recorder)	GROUND Thermocouple)	
3:50	319	62	62	63	Begin 50% Pressure Down
4:00	212	62	62	63	Stabilize
4:05	212	62	62	63	End 50%, Pressure Down
4:10	106	63	62	63	Begin 25%, Pressure Down
4:15	106	63	62	63	Stabilize
4:20	0	62	62	63	Run out Charts
4:25	0	62	62	63	End Test

Contractor Representative

Natalya Davydenko
Print

Sign

July 19, 2014
Date

Company Representative

Andre Begin
Print

Sign

July 19,2014
Date

STEWART INSTRUMENTS
A Division of Donald A. Stewart Limited

1107 Moore Line, R.R.#1
Mooretown, Ontario NON 1MO
Bus./Res. Phone: (519) 867-5361
Fax: (519) 867-2496

April 25, 2014

LamSar Inc.,
608 McGregor Road,
P. O. Box 338,
Sarnia, Ontario.
N7T 7J2

Att: Max Lessard

CALIBRATION REPORT

Type: Fluke Pressure Module
Model: 700P30
Serial #23023003 ✓
Range: 0 – 5000 PSI

Calibration Date: April 25, 2014

Calibrator	Module
0	0
1000	1000
2000	2000
3000	3000
4000	4000
5000	5000

This is to certify that this instrument has been inspected and tested against standards traceable to N.I.S.T.

Donald A. Stewart
DAS:grs

ITM INSTRUMENTS INC.

TORONTO
16975 Leslie Street
Newmarket, ON
L3Y 9A1
Tel: (905) 952-3750
Fax: (905) 952-3751

MONTRÉAL
20800 Boul. Industriel
Ste-Anne-de-Bellevue, QC
H9X 0A1
Tel: (514) 457-7280
Fax: (514) 457-4329

CALGARY
10505 48th St SE, Suite #101
Calgary, AB
T2C 2B7
Tel: (403) 272-9332
Fax: (403) 248-5194

EDMONTON
3452 91st St. NW,
Edmonton, AB
T6E 5R1
Tel: (780) 409-9278
Fax: (780) 409-9279

www.itm.com - information@itm.com

Calibration Certificate

Customer: *LAMSAR INC*

Certificate: 32349-00-1

UNIT IDENTIFICATION

Manufacturer: **FLUKE**
Serial: **26470571WS**
Model: **51-II**
ID: **N/A**
Description: **DIGITAL THERMOMETER**

CALIBRATION DATE

Calibration Date: **16-Jul-2014**
Due Date: **16-Jul-2015**

CALIBRATION CONDITIONS

Temperature: **19.97 °C**
Humidity: **53 %**
Barometric Pressure: **N/A**

GENERAL INFORMATION

Procedure: **FLUKE 51-II: (SPEC:1Y) /5500** Rev: **1**
As Received: **Within Specifications**
As Returned: **As Received**
Data Type: **As Found-As Left** Adjusted: **No**
Remark: **N/A**

STANDARDS USED

ID	Manufacturer	Model	Cal Date	Due Date
INV009	FLUKE	5500A	20-Dec-2013	20-Dec-2014

The calibration was performed using measurement standards traceable to the National Measurement Institute Standards (NMIS) part of the National Research Council of Canada (NRC) or the National Institute of Standards and Technology (NIST), or to accepted instrinsic standards or measurement, or is derived by ratio type self-calibration techniques. Measurement uncertainties given in this report are based on a coverage factor of k=2 corresponding to a confidence level of approximately 95%.

Calibrated by: *G. Ykema*

Approved by:

ITM INSTRUMENTS INC.

TORONTO
16975 Leslie Street
Newmarket, ON
L3Y 9A1
Tel: (905) 952-3750
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T6E 5R1
Tel: (780) 409-9278
Fax: (780) 409-9279

www.itm.com - information@itm.com

Test Results

Test Description	True Value	Reading	Lower limit	Upper limit	Units	Test Status	Exp Uncert
BACKLIGHT TEST							
Result of Operator Evaluation						Pass	
---------- INPUT T1 ----------							
THERMOCOUPLE TYPE J							
1000 °C		1000	999	1001	°C	Pass	6.0e-001 °C
600.0 °C		600.1	599.4	600.6	°C	Pass	1.4e-001 °C
300.0 °C		300.2	299.6	300.4	°C	Pass	1.4e-001 °C
100.0 °C		100.2	99.7	100.3	°C	Pass	1.2e-001 °C
0.0 °C		0.2	-0.3	0.3	°C	Pass	1.2e-001 °C
-150.0 °C		-149.6	-150.6	-149.4	°C	Pass	2.2e-001 °C
THERMOCOUPLE TYPE K							
1300 °C		1300	1299	1301	°C	Pass	6.6e-001 °C
1000 °C		1000	999	1001	°C	Pass	6.1e-001 °C
600.0 °C		600.0	599.4	600.6	°C	Pass	2.1e-001 °C
200.0 °C		200.1	199.6	200.4	°C	Pass	2.1e-001 °C
0.0 °C		0.1	-0.3	0.3	°C	Pass	1.4e-001 °C
-150.0 °C		-149.8	-150.6	-149.4	°C	Pass	2.6e-001 °C
HOLD TEST							
Result of Operator Evaluation						Pass	

E & E PROCESS INSTRUMENTATION

CERTIFICATE OF CALIBRATION

This instrument was calibrated on the date shown to manufacturer's specifications using standards with accuracies traceable to National Institute of Standards and Technology (NIST) and in compliance with ISO/IEC-17025:2005. Calibration results relate to this item only.

Description:	RENTAL RECORDER	Customer:	LAM SAR MECHANICAL
		Customer Code:	LAMSAR
Manufacturer	BRISTOL	Customer P.O.:	4450
Recorder Type:	PRESSURE	E & E Ref.:	EE986163-1
Asset No:	P1002 ✓	Tolerance:	+/-1%FSD (10psig)
Range (Part or Full):	FULL (1000psig)	As Left Condition:	IN TOLERANCE

Uncertainty Statement : The reported expanded measurement uncertainty (see current published Calibration Scope) is stated as the standard uncertainty measurement multiplied by the coverage factor K = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 percent. The test accuracy ratio of this calibration is at least 4:1 unless otherwise stated in the remarks at the end of the tabulation of results.

Standards Used in Calibration

Instrument	Model	Serial No.	Traceability No.	Recall Date
CHANDLER D.W.T.	23-1	21868	52481	SEPT.22/14

Environmental Conditions:

Temperature:	24.6°C
Humidity:	37%RH
Barometric Pressure:	29.43inHg
Calibration Date:	JULY 16/14
Customer Due date:	JULY 16/15

Calibration by: _____ Technician

Reviewed by: _____ Quality Rep.

Note: This Certificate may not be reproduced other than in full except with prior written approval of the issuing laboratory.

Form: CAL011 Rev 2

Page 1 of 2

40 North Rivermede Road, Unit 4, Concord, ON L4K 2H3 • Phone: (905) 669-4857
Website: www.eeprocess.com • Email: sales@eeprocess.com • Fax: (905) 669-2158

TABULATION OF RESULTS

Recorder Type:	PRESSURE	E & E Ref.:	EE986163-1
Asset No:	P1002	Tolerance:	+/-1%FSD (10psig)

As Found			As Left		
Standard (psig)	**UUT (psig)**	**Error (psig)**	**Standard (psig)**	**UUT (psig)**	**Error (psig)**
			0	0	0
			200	200	0
			400	400	0
			600	600	0
			800	800	0
			1000	1003	+3
			800	805	+5
			600	607	+7
			400	408	+8
			200	206	+6
			0	0	0

Remarks:

864 Philip Street E.
Sarnia, ON N7T 7W2
Phone (519) 336-7301
Fax (519) 336-8082
www.provincialcontrols.com

Certificate of Calibration

Report Number CTR-D5483

Provincial Reference:	PC-17640

Manufacturer	Model	Gauge Number	Calibration Date	Expiration Date
US Gauge	0-1000PSI	LN-1000-1A ✓	7/16/2014	7/16/2015

Model Uncertainty
+/- ASME 2A of span (0.5%)

Customer:	Lamsar Mechanical
Purchase Order:	4450

All calibrations are performed in a controlled environment by qualified personnel using instrumentation and methods which guarantee that specifications claimed are reliable. The above item has been inspected and tested to comply with the relevant specifications, in accordance with the above purchase order

As Left Results — 1000 PSI

Reference Reading	Gauge Reading	Allowable Tolerance	Difference	Difference (% of reading	Condition
0	0.0	5.0	0.0	0	Pass
499	500.0	5.0	-0.9	-3	Pass
1000	1000.0	5.0	0.3	1	Pass
498.9	500.0	5.0	-1.1	-3.666666667	Pass
0	0.0	5.0	0.0	0	Pass

Deadweight S/N 66937.0

Reference Standards used in this calibration are traceable to the National Institute of Standards and Technology through the following report numbers:

Report Number	Manufacturer	SR#	Uncertainty
0191-256225	Crystal Engineering	256225	0.25% of Full Scale

Calibrated By: _____ Inspected By: _____

864 Philip Street E.
Sarnia, ON N7T 7W2
Phone (519) 336-7301
Fax (519) 336-8082
www.provincialcontrols.com

Certificate of Calibration

Report Number CTR-D5484

Provincial Reference:	PC-17640

Manufacturer	Model	Gauge Number	Calibration Date	Expiration Date
US Gauge	0-1000PSI	LN-1000-2A	7/16/2014	7/16/2015

Model Uncertainty
+/- ASME 2A of span (0.5%)

Customer:	Lamsar Mechanical
Purchase Order:	4450

All calibrations are performed in a controlled environment by qualified personnel using instrumentation and methods which guarantee that specifications claimed are reliable. The above item has been inspected and tested to comply with the relevant specifications, in accordance with the above purchase order

As Left Results — **1000 PSI**

Reference Reading	Gauge Reading	Allowable Tolerance	Difference	Difference (% of reading	Condition
0	0.0	5.0	0.0	0	Pass
503	500.0	5.0	3.1	10.33333333	Pass
1000	1000.0	5.0	0.2	0.666666667	Pass
503.3	500.0	5.0	3.3	11	Pass
0	0.0	5.0	0.0	0	Pass

Deadweight S/N 66937.0

Reference Standards used in this calibration are traceable to the National Institute of Standards and Technology through the following report numbers:

Report Number	Manufacturer	SR#	Uncertainty
0191-256225	Crystal Engineering	256225	0.25% of Full Scale

Calibrated By: _____

Inspected By: _____

864 Philip Street E.
Sarnia, ON N7T 7W2
Phone (519) 336-7301
Fax (519) 336-8082
www.provincialcontrols.com

Certificate of Calibration

Report Number CTR-D5487

Provincial Reference:	PC-17640

Manufacturer	Model	Gauge Number	Calibration Date	Expiration Date
Mc Daniel	0-1000PSI	L-1000-7 ✓	7/16/2014	7/16/2015

Model Uncertainty
+/- ASME 2A of span (0.5%)

Customer:	Lamsar Mechanical
Purchase Order:	4450

All calibrations are performed in a controlled environment by qualified personnel using instrumentation and methods which guarantee that specifications claimed are reliable. The above item has been inspected and tested to comply with the relevant specifications, in accordance with the above purchase order

As Left Results — **1000 PSI**

Reference Reading	Gauge Reading	Allowable Tolerance	Difference	Difference (% of reading	Condition
0	0.0	5.0	0.0	0	Pass
498	500.0	5.0	-2.2	-7.333333333	Pass
1001	1000.0	5.0	0.5	1.666666667	Pass
497.4	500.0	5.0	-2.6	-8.666666667	Pass
0	0.0	5.0	0.0	0	Pass

Deadweight S/N 66937.0

Reference Standards used in this calibration are traceable to the National Institute of Standards and Technology through the following report numbers:

Report Number	Manufacturer	SR#	Uncertainty
0191-256225	Crystal Engineering	256225	0.25% of Full Scale

Calibrated By: _____ Inspected By: _____

864 Philip Street E.
Sarnia, ON N7T 7W2
Phone (519) 336-7301
Fax (519) 336-8082
www.provincialcontrols.com

Certificate of Calibration

Report Number CTR-D5486

Provincial Reference:	PC-17640

Manufacturer	Model	Gauge Number	Calibration Date	Expiration Date
Wika	0-1000PSI	LN-1000-16	7/16/2014	7/16/2015

Model Uncertainty
+/- ASME 2A of span (0.5%)

Customer:	Lamsar Mechanical
Purchase Order:	4450

All calibrations are performed in a controlled environment by qualified personnel using instrumentation and methods which guarantee that specifications claimed are reliable. The above item has been inspected and tested to comply with the relevant specifications, in accordance with the above purchase order

As Left Results — **1000 PSI**

Reference Reading	Gauge Reading	Allowable Tolerance	Difference	Difference (% of reading	Condition
0	0.0	5.0	0.0	0	Pass
497	500.0	5.0	-2.8	-9.333333333	Pass
997	1000.0	5.0	-2.8	-9.333333333	Pass
496.8	500.0	5.0	-3.2	-10.66666667	Pass
0	0.0	5.0	0.0	0	Pass

Deadweight S/N 66937.0

Reference Standards used in this calibration are traceable to the National Institute of Standards and Technology through the following report numbers:

Report Number	Manufacturer	SR#	Uncertainty
0191-256225	Crystal Engineering	256225	0.25% of Full Scale

Calibrated By: _____

Inspected By: _____

INSTRUMENTS
STEWART INSTRUMENTS
A Division of Donald A. Stewart Limited

1107 Moore Line, R.R.#1
Mooretown, Ontario NON 1MO
Bus./Res. Phone: (519) 867-5361
Fax: (519) 867-2496

June 24, 2014

LamSar Inc.,
608 McGregor Road,
P. O. Box 338,
Sarnia, Ontario.
N7T 7J2

Att: Kyle Winter

CALIBRATION REPORT

Type: Dri-Flo II Temperature Recorder
Serial: #-002678
Range: 0 – 150'F

Calibration Date – June 24, 2014

Calibrator	Recorder
32	32
70	70
119	119

This is to certify that this instrument has been inspected and tested against standards traceable to N.I.S.T.

Donald A. Stewart
DAS:grs

LamSar INC
INDUSTRIAL CONTRACTORS

Volume of Pipe Calculation

Pipe Size	Pipe Sch.	Ft Lg	Gallons [UK]	Gallons [US]	Litres
30	XS	483	13,799.9	16,573.0	62735.7

PIPE O.D.	Pipe Wall	PIPE I.D.	Ft Lg	Gallons [UK]	Gallons [US]	Litres
30	0.5	29	483	13,799.9	16,573.0	62,735.8

CFCS-FRM-RHT-016-r01.docx
November 2010

Request for Hydrotest

Canadian Facilities Construction Services

ENBRIDGE

Contractor LamSar Inc. **Test No.:** 4450-20

Location LamSar Shop **Test Date:** July 18, 2014

AFE/Project: 1241237A80(LIS) **Job Description:** SA Line 9B Reversal/Expansion

Hydrotest Drawing Number D-203-3.01-HT176-3-190LIS Q426

Test Media **WATER** YES **AIR** _____ **OTHER** _____

Volume (m^3) 18.2

Pipe Sizes 30" & 20"

Pipe Grade 30" Gr.448 Cat I, 20" Gr.290 Cat I

Test Media Source Shop Potable Water

Permit No N/A **Federal** N/A **Provincial** N/A **Municipal** N/A

Authorization/Permission	
Treatment prior to test	N/A
Treatment after test	N/A
Disposal of test media	To shop drains
Notes	

Requested by:

Name (Print): Terry Morden

Signature: _____

Date: July 17, 2014

MPFCS-CKL-HTQC-025-r00.docx
December 2010

Hydrostatic Test QA Checklist

Canadian Facility Construction Services

ENBRIDGE

Contractor: LamSar Inc.
Project: Sarnia Line 9B Reversal/ Expansion
Location: LamSar Shop

Date: July 18/2014
Test No.: 4450-20
AFE#: 1241237A80 (LIV)
CWP #: N/A

This checklist must be completed and attached to the hydrostatic test records prior to turnover. The following information must be completed prior to the hydrostatic tests as per Operations and Maintenance Manual Book 3: Pipeline Facilities, Section 07-02-01:

Task	Yes / No	Date	NOTES
Notifications	Y	18/07/2014	
Test Section Drawing	Y	18/07/2014	
Review Materials Documentation	Y	18/07/2014	
Establishing intended maximum operating pressure (MOP), and for deviations to existing MOP approval by Engineering	Y	18/07/2014	
All NDE Reviewed	Y	18/07/2014	
Equipment List	Y	18/07/2014	
Pre Hydro-Package Approvals	Y	18/07/2014	
Environmental Concerns / Issues	N/A	N/A	
Safety precautions specific to the circumstances, including setback distances for workers and the public	N/A	N/A	
Pre-job Meeting with Workers	Y	18/07/2014	
Calibration of Test Instruments	Y	18/07/2014	
Pressure Recorder Set	Y	18/07/2014	
Test Acceptance Criteria	Y	18/07/2014	

Contractor Representative:

Name (Print): Terry Morden
Signature:
Date: July 18/2014

Company Representative:

Name (Print): Andre Begin
Signature:
Date: July 18/2014

If the contractor has their own form that meets all information on this form the Contractor's form may be used.

MPCFCS-PTR-065-R2

Pressure Test Equipment Report

Canadian Facilities Construction Services

ENBRIDGE

Page 1 of 1

CONTRACTOR	LamSar Inc.	TEST DATE	July 18/2014
PROJECT	SA Line 9B Reversal/Expansion	TEST No.	4450-20
LOCATION	LamSar Shop	AFE	1241237A80 (LIS)
DRAWING #.	D-203-3.01-HT176-3-190LIS, Q426	CWP #	N/A

PIPE DATA

NPS/OD	WT	Grade	Length	Manufacturer	Type
30"	12.7mm	Gr.448 Cat I	124'-0"(37.9m)	Sumitomo	SAW
20"	9.5mm	Gr. 290 Cat I	15'-0"(4.7m)	SeAH Steel Corp.	ERW

TEST DATA

Test Medium	Fill Volume
Shop Portable Water	18.2 Cubic Meters

	REFERENCE INSTRUMENTS		TEST EQUIPMENT		
	Deadweight Pressure	Liquid in Glass Thermometer	Pressure Recorder	Pressure Gauge	Temperature Recorder
Make	Fluke	Fluke	Barton	Wika	Barton
Range	0-5000 psi	-238 F to 1832 F	0-500 psi	0-1000 psi	0 F to 150F
Serial No.	2395137	26470619WS	B874	LN-1000-59 LN-1000-18	B874

	CALIBRATION VERIFICATION BEFORE TEST				CALIBRATION VERIFICATION AFTER TEST			
	25% Test Pressure (T.P.)	50% T.P.	75% T.P.	100% T.P.	100% T.P.	75% T.P.	50% T.P.	25% T.P.
Deadweight	99.4 psi	205.8 psi	311.3 psi	424 psi	424 psi	322.5 psi	207.4 psi	102.1 psi
Pressure Recorder	99 psi	205 psi	311 psi	424 psi	424 psi	322 psi	207 psi	102 psi
Pressure Gauge	100 psi	207 psi	312 psi	424 psi	424 psi	323 psi	207 psi	102 psi

Test	Aim Test Pressure	Minimum	Maximum	Duration
Strength	425psig	413psig	429psig	4.25 hr
Leak	320psig	303psig	N/A	4.25 hr

See Accompanying Pages for Pressure and Temperature Records

Contractor Representative:

(Print) Terry Morden

(Sign)

Date: July 18/2014

Enbridge Representative:

(Print) Andre Begin

(Sign)

Date: July 18/2014

Pressure Test Data Report

LP Canadian Construction Services

LP-F-INSP-024-PTR-R0.DOT

CONTRACTOR NAME: LamSar Inc.

LOCATION: LamSar Shop

PROJECT / AFE: SA Line 9B Reversal/Expansion 1241237A80(LIS)

Page 1of 4

TEST NO.: 4450-20

TEST DATE: July 18, 2014

DRAWING NO.: D-203-3.01-HT176-3-190LIS, Q426

CWP NO.: N/A

TIME	DEADWEIGHT PRESSURE psi	TEMPERATURE°F			REMARKS (Weather, Volumes Added/Bled Off)
		AMBIENT (Thermometer)	PIPE MEDIUM (Recorder)	GROUND Thermocouple)	
9:55	0.0	70.6	66	N/A	Begin Test, Run in Charts
10:15	0.0	70.8	66	N/A	Stabilize
10:25	99.4	71.0	66	N/A	Begin 25% Press. Up
10:30	99.7	71.2	66	N/A	Stabilize
10:40	205.8	71.3	66	N/A	Begin 50% Press. Up
10:45	206.0	71.4	66	N/A	Stabilize
10:50	311.3	71.6	67	N/A	Begin 75% Press. Up
10:55	311.5	71.8	67	N/A	Stabilize
11:05	421.7	72.1	67	N/A	Begin Strength Test, 100% Press. Up
11:15	421.9	72.4	67	N/A	Hold 4hr. 15 min. - Stabilize
11:30	422.1	72.7	67	N/A	Hold
11:45	422.2	72.9	68	N/A	Hold
12:00	422.3	73.1	68	N/A	Hold
12:15	422.5	73.3	68	N/A	Hold
12:30	422.8	73.6	68	N/A	Hold
12:45	423.0	73.9	68	N/A	Hold
1:00	423.1	74.0	68	N/A	Hold

Contractor Representative

Terry Morden
Print

Sign

July 18, 2014
Date

Company Representative

Andre Begin
Print

Sign

July 18 ,2014
Date

Pressure Test Data Report

LP Canadian Construction Services

LP-F-INSP-024-PTR-R0.DOT

CONTRACTOR NAME: LamSar Inc.

LOCATION: LamSar Shop

PROJECT / AFE: SA Line 9B Reversal/Expansion 1241237A80(LIS)

Page 2of 4

TEST NO.: 4450-20

TEST DATE: July 18, 2014

DRAWING NO.: D-203-3.01-HT176-3-190LIS, Q426

CWP NO.: N/A

TIME	DEADWEIGHT PRESSURE psi	TEMPERATURE°F			REMARKS (Weather, Volumes Added/Bled Off)
		AMBIENT (Thermometer)	PIPE MEDIUM (Recorder)	GROUND Thermocouple)	
1:15	423.2	74.2	68	N/A	Hold
1:30	423.3	74.3	68	N/A	Hold
1:45	423.4	74.4	68	N/A	Hold
2:00	423.4	74.5	68	N/A	Hold
2:15	423.5	74.5	68	N/A	Hold
2:30	423.5	74.4	68	N/A	Hold
2:45	423.6	74.6	68	N/A	Hold
3:00	423.7	74.7	68	N/A	Hold
3:15	423.8	74.8	68	N/A	Hold
3:25	424.0	74.9	68	N/A	End Strength Test, 100% Press. Down
3:30	322.5	75.0	68	N/A	Begin Leak Test, 75% Press. Down
3:45	323.0	75.2	68	N/A	Hold 4 hr. 15min. - Stabilize
4:00	324.1	75.3	68	N/A	Hold
4:15	325.1	75.3	68	N/A	Hold
4:30	325.3	75.3	68	N/A	Hold
4:45	325.5	75.4	68	N/A	Hold
5:00	325.8	75.6	68	N/A	Hold

Contractor Representative

Terry Morden
Print

Sign

July 18, 2014
Date

Company Representative

Andre Begin
Print

Sign

July 18, 2014
Date

Pressure Test Data Report

LP Canadian Construction Services

LP-F-INSP-024-PTR-R0.DOT

CONTRACTOR NAME: LamSar Inc.

LOCATION: LamSar Shop

PROJECT / AFE: SA Line 9B Reversal/Expansion 1241237A80(LIS)

Page 3of 4

TEST NO.: 4450-20

TEST DATE: July 18, 2014

DRAWING NO.: D-203-3.01-HT176-3-190LIS, Q426

CWP NO.: N/A

TIME	DEADWEIGHT PRESSURE psi	TEMPERATURE°F			REMARKS (Weather, Volumes Added/Bled Off)
		AMBIENT (Thermometer)	PIPE MEDIUM (Recorder)	GROUND Thermocouple)	
5:15	326.0	75.7	68	N/A	Hold
5:30	326.3	75.8	68	N/A	Hold
5:45	326.5	75.9	68	N/A	Hold
6:00	326.6	76.0	68	N/A	Hold
6:15	326.8	76.1	68	N/A	Hold
6:30	327.0	76.2	68	N/A	Hold
6:45	327.4	76.3	68	N/A	Hold
7:00	327.8	76.4	68	N/A	Hold
7:15	328.2	76.5	68	N/A	Hold
7:30	328.7	76.7	68	N/A	Hold
7:45	329.6	76.9	68	N/A	Hold
7:55	331.0	77.1	68	N/A	End Leak Test, 75% Press. Down
8:05	207.4	77.2	68	N/A	Begin 50% Press. Down
8:10	207.5	77.2	68	N/A	Stabilize
8:15	102.0	77.2	68	N/A	Begin 25% Press. Down
8:20	102.1	77.2	68	N/A	Stabilize
8:25	0.0	77.2	68	N/A	Run out Charts

Contractor Representative

Terry Morden
Print

Sign

July 18, 2014
Date

Company Representative

Andre Begin
Print

Sign

July 18, 2014
Date

Pressure Test Data Report

LP Canadian Construction Services

LP-F-INSP-024-PTR-R0.DOT

CONTRACTOR NAME: LamSar Inc.

LOCATION: LamSar Shop

PROJECT / AFE: SA Line 9B Reversal/Expansion 1241237A80(LIS)

Page 4of 4

TEST NO.: 4450-20

TEST DATE: July 18, 2014

DRAWING NO.: D-203-3.01-HT176-3-190LIS, Q426

CWP NO.: N/A

TIME	DEADWEIGHT PRESSURE psi	TEMPERATURE°F			REMARKS (Weather, Volumes Added/Bled Off)
		AMBIENT (Thermometer)	PIPE MEDIUM (Recorder)	GROUND Thermocouple)	
8:35	0.0	77.2	68	N/A	End Test
				N/A	
				N/A	
				N/A	
				N/A	
				N/A	
				N/A	
				N/A	
				N/A	
				N/A	
				N/A	
				N/A	
				N/A	
				N/A	
				N/A	
				N/A	
				N/A	
				N/A	

Contractor Representative

Terry Morden
Print

Sign

July 18, 2014
Date

Company Representative

Andre Begin
Print

Sign

July 18, 2014
Date

STEWART INSTRUMENTS
A Division of Donald A. Stewart Limited

1107 Moore Line, R.R.#1
Mooretown, Ontario NON 1MO
Bus./Res. Phone: (519) 867-5361
Fax: (519) 867-2496

April 25, 2014

LamSar Inc.,
608 McGregor Road,
P. O. Box 338,
Sarnia, Ontario.
N7T 7J2

Att: Max Lessard

CALIBRATION REPORT

Type: Fluke Pressure Calibrator
Model: 7175000G
Serial #2395137
Range: 0 – 5000 PSI

Calibration Date – April 25, 2014

Calibrator	Pressure Calibrator
0	0
1000	1000
2000	2000
3000	3000
4000	3999.5
5000	4999

This is to certify that this instrument has been inspected and tested against standards traceable to N.I.S.T.

Donald A. Stewart
DAS:grs

ITM INSTRUMENTS INC.

TORONTO
16975 Leslie Street
Newmarket, ON
L3Y 9A1
Tel: (905) 952-3750
Fax: (905) 952-3751

MONTRÉAL
20800 Boul. Industriel
Ste-Anne-de-Bellevue, QC
H9X 0A1
Tel: (514) 457-7280
Fax: (514) 457-4329

CALGARY
10505 48th St SE, Suite #101
Calgary, AB
T2C 2B7
Tel: (403) 272-9332
Fax: (403) 248-5194

EDMONTON
3452 91st St. NW,
Edmonton, AB
T6E 5R1
Tel: (780) 409-9278
Fax: (780) 409-9279

www.itm.com - information@itm.com

Calibration Certificate

Customer: *LAMSAR INC*

Certificate: 17706-00-1

UNIT IDENTIFICATION

Manufacturer: **FLUKE**
Serial: **26470619WS**
Model: **51 II**
ID: **N/A**
Description: **DIGITAL THERMOMETER**

CALIBRATION DATE

Calibration Date: **27-Mar-2014**
Due Date: **27-Mar-2015**

CALIBRATION CONDITIONS

Temperature: **22.01 °C**
Humidity: **13 %**
Barometric Pressure: **N/A**

GENERAL INFORMATION

Procedure: **FLUKE 51-II: (SPEC:1Y) /5500** Rev: **1**
As Received: **Within Specifications**
As Returned: **As Received**
Data Type: **As Found-As Left** Adjusted: **No**
Remark: **N/A**

STANDARDS USED

ID	Manufacturer	Model	Cal Date	Due Date
INV009	FLUKE	5500A	20-Dec-2013	20-Dec-2014

The calibration was performed using measurement standards traceable to the National Measurement Institute Standards (NMIS) part of the National Research Council of Canada (NRC) or the National Institute of Standards and Technology (NIST), or to accepted instrinsic standards or measurement, or is derived by ratio type self-calibration techniques. Measurement uncertainties given in this report are based on a coverage factor of k=2 corresponding to a confidence level of approximately 95%.

Calibrated by: *G. Ykema*

Approved by:

ITM INSTRUMENTS INC.

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www.itm.com - information@itm.com

Test Results

Test Description	True Value	Reading	Lower limit	Upper limit	Units	Test Status	Exp Uncert
BACKLIGHT TEST							
Result of Operator Evaluation						Pass	
---------- INPUT T1 ----------							
THERMOCOUPLE TYPE J							
1000 °C		1000	999	1001	°C	Pass	6.0e-001 °C
600.0 °C		600.0	599.4	600.6	°C	Pass	1.4e-001 °C
300.0 °C		300.0	299.6	300.4	°C	Pass	1.4e-001 °C
100.0 °C		99.9	99.7	100.3	°C	Pass	1.2e-001 °C
0.0 °C		-0.1	-0.3	0.3	°C	Pass	1.2e-001 °C
-150.0 °C		-150.1	-150.6	-149.4	°C	Pass	2.2e-001 °C
THERMOCOUPLE TYPE K							
1300 °C		1300	1299	1301	°C	Pass	6.6e-001 °C
1000 °C		1000	999	1001	°C	Pass	6.1e-001 °C
600.0 °C		600.3	599.4	600.6	°C	Pass	2.1e-001 °C
200.0 °C		200.4	199.6	200.4	°C	Pass	2.1e-001 °C
0.0 °C		0.3	-0.3	0.3	°C	Pass	1.4e-001 °C
-150.0 °C		-149.5	-150.6	-149.4	°C	Pass	2.6e-001 °C
HOLD TEST							
Result of Operator Evaluation						Pass	

STEWART INSTRUMENTS
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1107 Moore Line, R.R.#1
Mooretown, Ontario N0N 1M0
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Fax: (519) 867-2496

07-Jan-14

Enbridge,
P. O. Box 128,
1010 Plank Rd.,
Sarnia, Ontario
N7T 7H8

CALIBRATION REPORT

Type: Barton Pressure & Temperature Recorder
Serial #B874 ✓
Range 0 to 500 PSI
0 to 150'F

	Recorder	Calibrator
Temperature 'F	32	32
	91	91
	137	137
Pressure PSI	0	0
	100	100
	200	200
	300	300
	400	400
	500	500

This is to certify that this instrument has been inspected and tested against standards traceable to N.I.S.T.

Certified by Donald A. Stewart
DAS:grs

864 Philip Street E.
Sarnia, ON N7T 7W2
Phone (519) 336-7301
Fax (519) 336-8082
www.provincialcontrols.com

Certificate of Calibration

Report Number CTR-D5481

Provincial Reference:	PC-17633

Manufacturer	Model	Gauge Number	Calibration Date	Expiration Date
Wika	0-1000PSI	LN-1000-59 ✓	7/15/2014	7/15/2015

Model Uncertainty
+/- ASME 2A of span (0.5%)

Customer:	Lamsar Mechanical
Purchase Order:	4450

All calibrations are performed in a controlled environment by qualified personnel using instrumentation and methods which guarantee that specifications claimed are reliable. The above item has been inspected and tested to comply with the relevant specifications, in accordance with the above purchase order

As Left Results

				1000 PSI	
Reference Reading	Gauge Reading	Allowable Tolerance	Difference	Difference (% of reading	Condition
0	0.0	5.0	0.0	0	Pass
502	500.0	5.0	1.7	5.666666667	Pass
1000	1000.0	5.0	0.2	0.666666667	Pass
498.9	500.0	5.0	-1.1	-3.666666667	Pass
0	0.0	5.0	0.0	0	Pass

Deadweight S/N 66937.0

Reference Standards used in this calibration are traceable to the National Institute of Standards and Technology through the following report numbers:

Report Number	Manufacturer	SR#	Uncertainty
0191-256225	Crystal Engineering	256225	0.25% of Full Scale

Calibrated By: _____

Inspected By: _____

864 Philip Street E.
Sarnia, ON N7T 7W2
Phone (519) 336-7301
Fax (519) 336-8082
www.provincialcontrols.com

Certificate of Calibration

Report Number CTR-D5482

Provincial Reference:	PC-17633

Manufacturer	Model	Gauge Number	Calibration Date	Expiration Date
Wika	0-1000PSI	LN-1000-18 ✓	7/15/2014	7/15/2015

Model Uncertainty
+/- ASME 2A of span (0.5%)

Customer:	Lamsar Mechanical
Purchase Order:	4450

All calibrations are performed in a controlled environment by qualified personnel using instrumentation and methods which guarantee that specifications claimed are reliable. The above item has been inspected and tested to comply with the relevant specifications, in accordance with the above purchase order

As Left Results

				1000 PSI	
Reference Reading	Gauge Reading	Allowable Tolerance	Difference	Difference (% of reading	Condition
0	0.0	5.0	0.0	0	Pass
497	500.0	5.0	-3.0	-10	Pass
1002	1000.0	5.0	1.9	6.333333333	Pass
499.7	500.0	5.0	-0.3	-1	Pass
0	0.0	5.0	0.0	0	Pass

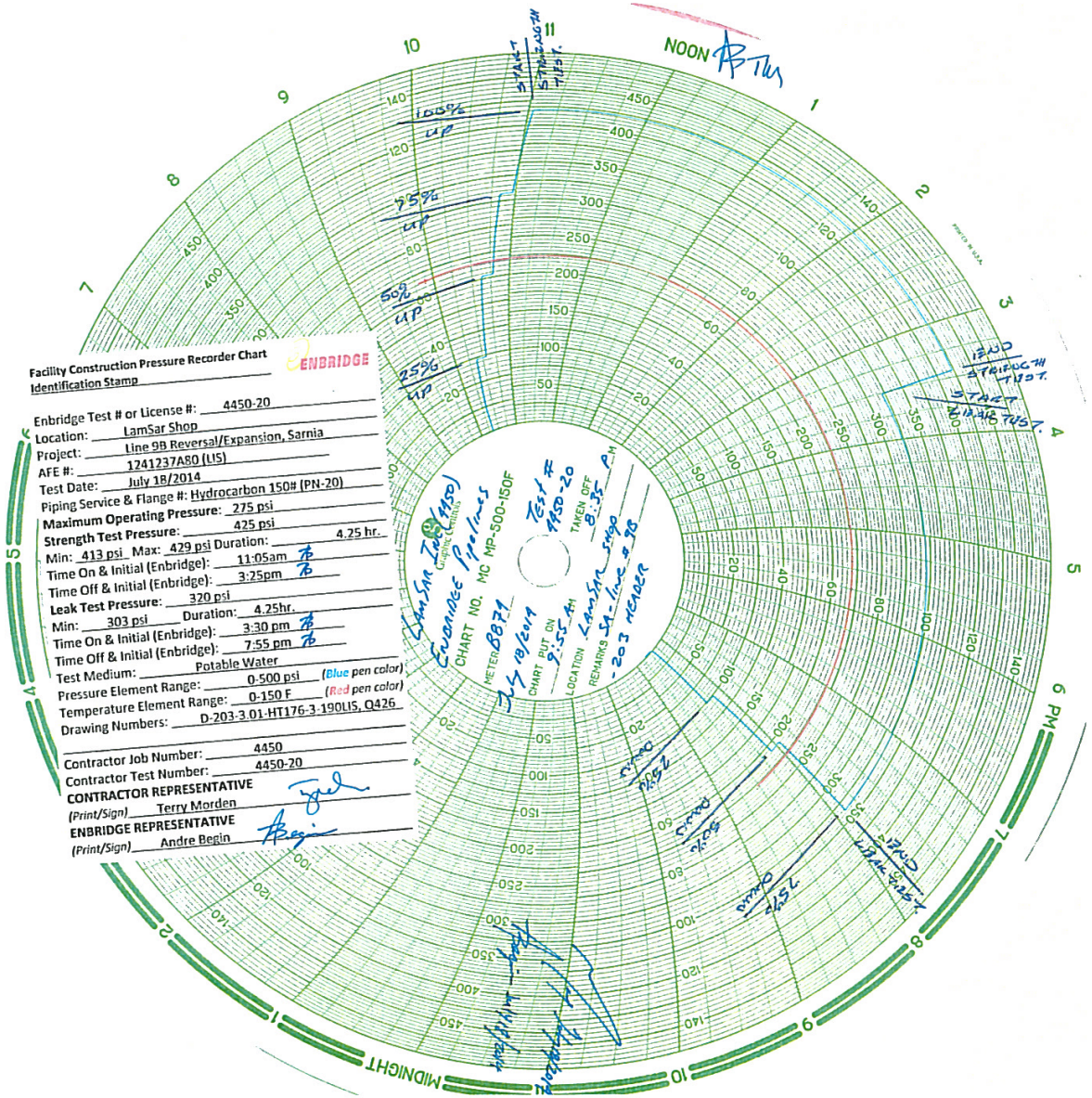
Deadweight S/N 66937.0

Reference Standards used in this calibration are traceable to the National Institute of Standards and Technology through the following report numbers:

Report Number	Manufacturer	SR#	Uncertainty
0191-256225	Crystal Engineering	256225	0.25% of Full Scale

Calibrated By: _____

Inspected By: _____



Facility Construction Pressure Recorder Chart
Identification Stamp

ENBRIDGE

Enbridge Test # or License #: 4450-20
Location: LamSar Shop
Project: Line 9B Reversal/Expansion, Sarnia
AFE #: 1241237A80 (LIS)
Test Date: July 18/2014
Piping Service & Flange #: Hydrocarbon 150# (PN-20)
Maximum Operating Pressure: 275 psi
Strength Test Pressure: 425 psi
Min: 413 psi Max: 429 psi Duration: 4.25 hr.
Time On & Initial (Enbridge): 11:05am TB
Time Off & Initial (Enbridge): 3:25pm TB
Leak Test Pressure: 320 psi
Min: 303 psi Duration: 4.25hr.
Time On & Initial (Enbridge): 3:30 pm TB
Time Off & Initial (Enbridge): 7:55 pm TB
Test Medium: Potable Water
Pressure Element Range: 0-500 psi (Blue pen color)
Temperature Element Range: 0-150 F (Red pen color)
Drawing Numbers: D-203-3.01-HT176-3-190LIS, Q426

Contractor Job Number: 4450
Contractor Test Number: 4450-20
CONTRACTOR REPRESENTATIVE
(Print/Sign) Terry Morden
ENBRIDGE REPRESENTATIVE
(Print/Sign) Andre Begin