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Le 19 septembre 2014

DOSSIER ÉLECTRONIQUE

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

**Objet : Pipelines Enbridge 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 OF-Fac-Oil-E101-2012-10 02
Demande d'autorisation de mise en service no 5**

Madame,

Enbridge présente respectueusement à l'Office national de l'énergie (« Office ») sa demande de mise en service partielle pour le Projet d'inversion de la canalisation 9B et d'accroissement de la capacité de la canalisation 9 (« Projet ») pour l'ensemble des activités de Sarnia « E » au terminal de Sarnia (« demande »). La canalisation 9A est actuellement en exploitation et dessert les clients; il est donc essentiel pour Enbridge de terminer l'installation de l'équipement et les activités de démarrage pendant les interruptions prévues. L'interruption liée à la demande est prévue le 7 octobre 2014.

Cette demande comprend l'installation de conduites d'aspiration et de vidange NPS 14 et NPS 20 au terminal de Sarnia pour faciliter le raccordement de l'unité de pompage 9-U-3 de la canalisation principale. Cette canalisation n'était pas incluse dans la demande originale du Projet parce que la taille des buses n'avait pas été finalisée. Par la présente, Enbridge avise l'ONÉ de cet ajout de portée mineure en vertu des conditions 1 et 2 de l'ordonnance XO-E101-003-2014. Cette modification est requise au terminal de Sarnia pour assurer l'efficacité et l'exploitation sécuritaire continue du réseau.

Enbridge présentera une série de demandes de mises en service de l'équipement aux installations du Projet, qui sera mis en service par la demande finale. Toutes les demandes précédant la demande finale de mise en service ne concernent que les raccordements électriques essentiels et les travaux minimes de raccordement des conduites devant être terminés avant la demande finale, afin de les coordonner aux interruptions prévues et de minimiser la perturbation du service. Enbridge s'engage entièrement à se conformer à toutes les conditions de l'ordonnance et elle

n'inversera pas le flux de la canalisation 9B avant d'avoir reçu toutes les approbations de mise en service.

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

Veuillez agréer, Madame, mes salutations distinguées.

Prabhat Chaturvedi, ing.
Spécialiste de la réglementation
LPC, Affaires réglementaires

Pièce jointe – Demande d'autorisation de mise en service partielle no 5



Pipelines Enbridge inc.

**Demande d'ordonnance en vertu de
l'article 47 de la *Loi sur l'Office national de l'énergie*
visant l'autorisation de mise en service des
installations**

**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 no 5
(Sarnia « E »)**

Le 19 septembre 2014

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1.0 APERÇU DU PROJET

Le 29 novembre 2012, Pipelines Enbridge inc. (« Enbridge ») a déposé une demande auprès de l'Office national de l'énergie (« ONÉ » ou « Office ») en vue d'obtenir l'autorisation de construire et d'exploiter 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 aux infrastructures ainsi que les modifications nécessaires pour porter la capacité annuelle de la canalisation 9 de 240 000 barils par jour (« bpj ») à 300 000 bpj et inverser le sens d'écoulement du tronçon du pipeline entre le poste de North Westover et le terminal de Montréal. Toutes les activités de construction se dérouleront aux six installations existantes d'Enbridge : le terminal de Sarnia, le poste de North Westover, le poste de Hilton, le poste de Cardinal, le poste de Terrebonne et le terminal de Montréal.

Conformément à l'approbation reçue de l'Office, l'ordonnance XO-E101-003-2014 de l'ONÉ exigeait le dépôt d'une demande de mise en service pour les installations. La présente demande d'autorisation de mise en service partielle englobe un ensemble de demandes de mises en service comme décrit à la section 1.1, Sarnia « E ».

La rubrique T du Guide de dépôt de l'ONÉ est constituée l'annexe 1 de la présente demande.

1.1 PORTÉE DES TRAVAUX

L'étendue des travaux compris dans cette demande d'autorisation de mise en service partielle vise les travaux suivants au **terminal de Sarnia**.

L'installation d'une nouvelle conduite d'aspiration et de vidange pour l'unité de pompage 9-U-3 du réseau principal, l'installation de deux nouvelles vannes à déviation triple de 20 po sur les conduits d'aspiration et de vidange pour l'unité de pompage 9-U-3 du réseau principal, l'installation de quatre manchettes de conduite dans la zone de la pompe de surpression et l'installation d'un flexible sur le réservoir de dépôt de la canalisation de vidange. La portée des travaux susmentionnée est illustrée dans les schémas du Projet à l'annexe 2.

Tous les travaux de canalisation et d'électricité seront réalisés et testés avant le raccordement prévu. L'interruption de service pour réaliser ces travaux est prévue le 7 octobre 2014 et la conduite du poste sera isolée avant l'interruption et drainée avant le raccordement.

Les nouveaux flexibles, le clapet à bille et le clapet de non-retour ont été testés avec succès comme indiqué au Tableau 3.3-1. La conduite a été testée avec succès comme décrit dans le Tableau 3.4-1.

L'inspection des particules magnétiques, l'examen radiographique et les essais hydrostatiques ont été réalisés sur les tronçons de la conduite. Les inspections par ultrasons et les essais hydrostatiques seront réalisés sur les vannes selon les normes d'Enbridge qui dépassent les codes applicables de l'industrie. De plus, les soudures ont été inspectées de façon visuelle et non destructive conformément à la norme CSA Z662-11. Enbridge confirme que la circonférence entière de chaque joint soudé a été vérifiée au moyen d'un contrôle radiographique conformément à l'article 17 du *Règlement de l'Office national de l'énergie sur les pipelines terrestres*.

2.0 NORMES ET SPÉCIFICATIONS

Voici un résumé général des règlements, des normes, des codes, des spécifications et des procédures qui ont servi de référence dans la conception et le choix des matériaux. Ils seront également observés durant la construction, l'inspection, les essais et la mise en service du Projet.

- 1) *Règlement de l'Office national de l'énergie sur les pipelines terrestres*
- 2) Association canadienne de normalisation, Réseaux de canalisations de pétrole et de gaz (« 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 essais de la canalisation
- 9) API 598 – Inspection et essais des soupapes
- 10) API 594 – Conception du clapet de non-retour
- 11) API 602 – Clapet de non-retour en acier forgé
- 12) API 6D – Caractéristiques des soupapes du pipeline
- 13) ASME Sec. IX – Code sur les chaudières et les réservoirs sous pression

Enbridge assurera la présence d'un inspecteur sur place durant l'installation de l'assemblage pour s'assurer du respect des règlements, des normes, des codes, des spécifications et des procédures. L'inspecteur procédera également à un contrôle de la qualité détaillé et approuvera l'installation avant sa mise en service.

3.0 DESCRIPTION DES INSTALLATIONS SOUMISES À DES ESSAIS DE PRESSION

3.1 Pression maximale d'exploitation

La pression maximale d'exploitation (« PMS ») approuvée pour le flexible, les robinets à vannes et les clapets de non-retour qui seront installés au terminal de Sarnia est de 4 964 kPa (720 psi). La PMS pour la nouvelle conduite est indiquée au Tableau 3.4-1.

3.2 Emplacement

Les travaux relatifs aux essais hydrostatiques ont lieu au terminal de Sarnia d'Enbridge. Voir les cartes aériennes de l'emplacement à l'annexe 3.

3.3 Résumé des essais sur l'équipement au terminal de Sarnia

Tout l'équipement du terminal de Sarnia a réussi les essais de pression, conformément aux normes d'essais internes d'Enbridge qui dépassent les codes applicables de l'industrie.

Tableau 3.3-1 : Résumé des essais sur le nouvel équipement au terminal de Sarnia

No S.	Équipement	Numéro d'étiquette	Taille	Pression nominale (psi)	Essai		Fabricant
					Type d'essai	Résultats des essais	
1	Robinet-vanne à guillotine	203-USV-31	610 mm (NPS 24)	1440	hydrostatique	Réussi	SPX
2	Robinet-vanne à guillotine	203-UDV-31	610 mm (NPS 24)	1440	hydrostatique	Réussi	SPX
3	Clapet de non-retour à double battant	203-BDCV-311	356 mm (NPS 14)	720	hydrostatique	Réussi	Goodwin
4	Clapet de non-retour à double battant	203-BDCV-321	356 mm (NPS 14)	720	hydrostatique	Réussi	Goodwin
5	Flexible	S. O.	102 mm (NPS 4)	720	hydrostatique	Réussi	Pression du flexible

Voir l'annexe 4 pour consulter les dessins isométriques indiquant l'emplacement de cet équipement au terminal de Sarnia. Les documents relatifs à la série d'essais figurent à l'annexe 5.

3.4 Résumé des essais sur les conduites au terminal de Sarnia

Toutes les conduites ont réussi les essais de pression, conformément aux normes d'essai internes d'Enbridge qui dépassent les codes applicables de l'industrie.

Tableau 3.4-1 : Résumé des essais sur les conduites au terminal de Sarnia

Série d'essais	PMS (kPa)	Taille	Épaisseur de la paroi (mm)	Qualité	Longueur du tuyau	Type	Fabricant	Renseignements sur les essais	
								Type d'essai	Résultats des essais
1	9930	356 mm (NPS 14)	12,7	290	19350	SMLS	V&M	hydrostatique	Réussi
1	9930	508 mm (NPS 20)	12,7	359	3200	SAFP	SeAH Steel Corp.	hydrostatique	Réussi
2	4964	356 mm (NPS 14)	9,53	290	2578	SRÉ	SeAH Steel Corp.	hydrostatique	Réussi
2	4964	406 mm (NPS 16)	9,53	290	2214	SRÉ	SeAH Steel Corp.	hydrostatique	Réussi

Voir l'annexe 4 pour consulter les dessins isométriques. Le léger degré d'élévation au terminal de Sarnia n'a aucun effet important sur les pressions des fluides.

3.4.1 Série d'essais 1

L'essai hydrostatique sur les tronçons de la conduite au terminal de Sarnia (indiqués à l'annexe 4) (PMS de 9930 kPa/1440 psi) compris dans la série d'essais 1 a été effectué avec succès avec de l'eau le 13 septembre 2014. Les essais ont été supervisés par l'inspecteur d'Enbridge, André Bégin.

Les conduites soumises aux essais dans cette série étaient exposées et accessibles au moment des essais.

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

Date de l'essai	Le 13 septembre 2014
Liquide d'essai	Eau potable
Lieu de l'essai	Terminal de Sarnia d'Enbridge
Pression d'essai cible	2200 psi
Démarrage de l'essai à pression effective	2220,6 psi
Arrêt de l'essai à pression effective	2215,9 psi
Durée de l'essai	1,33 heure
Démarrage et arrêt de l'essai à température effective	16,1 C (début), 15,0 C (fin)
Résultat	Réussi

Une fois l'essai de résistance effectué, une inspection visuelle a été effectuée sur la conduite pour déceler d'éventuelles fuites lors de l'essai d'étanchéité alors que la pression se situait entre 1725,3 psi et 1726,4 psi.

Le rapport sur les essais de pression dûment signé, le tableau des essais et les certificats de calibrage pour la série d'essais 1 figurent à l'annexe 6.

3.42. Série d'essais 2 du terminal de Sarnia

Les essais hydrostatiques effectués sur les tronçons de la conduite au terminal de Sarnia (indiqués à l'annexe 4) Annexe 4 – Dessins isométriques – Terminal de Sarnia (PMS de 4964 kPa/720 psi) compris dans la série d'essais 2 ont été réalisés avec succès avec de l'eau le 12 septembre 2014. L'inspecteur d'Enbridge, André Bégin a supervisé les essais

Les conduites soumises aux essais dans cette série étaient exposées et accessibles au moment des essais.

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

Date de l'essai	Le 12 septembre 2014
Liquide d'essai	Eau traitée
Lieu de l'essai	Atelier LamSar
Pression d'essai cible	1110 psi
Démarrage de l'essai à pression effective	1105,1 psi
Arrêt de l'essai à pression effective	1106,6 psi
Durée de l'essai	1,33 heure
Démarrage et arrêt de l'essai à température effective	16,1 C (début), 15,0 C (fin)
Résultat	Réussi

Une fois l'essai de résistance effectué, une inspection visuelle a été effectuée sur la conduite pour déceler d'éventuelles fuites lors de l'essai d'étanchéité alors que la pression se situait entre 835,3 psi et 835,8 psi.

Le rapport sur les essais de pression dûment signé, le tableau des essais et les certificats de calibrage pour la série d'essais 2 figurent à l'annexe 7.

4.0 PERMIS D'UTILISATION D'EAU POUR LES ESSAIS SOUS PRESSION

Aucun permis d'utilisation d'eau n'a été nécessaire pour les essais hydrostatiques.

5.0 DÉCLARATION DU DIRECTEUR DE PROJET

Le soussigné, Larry Smerechinski, déclare :

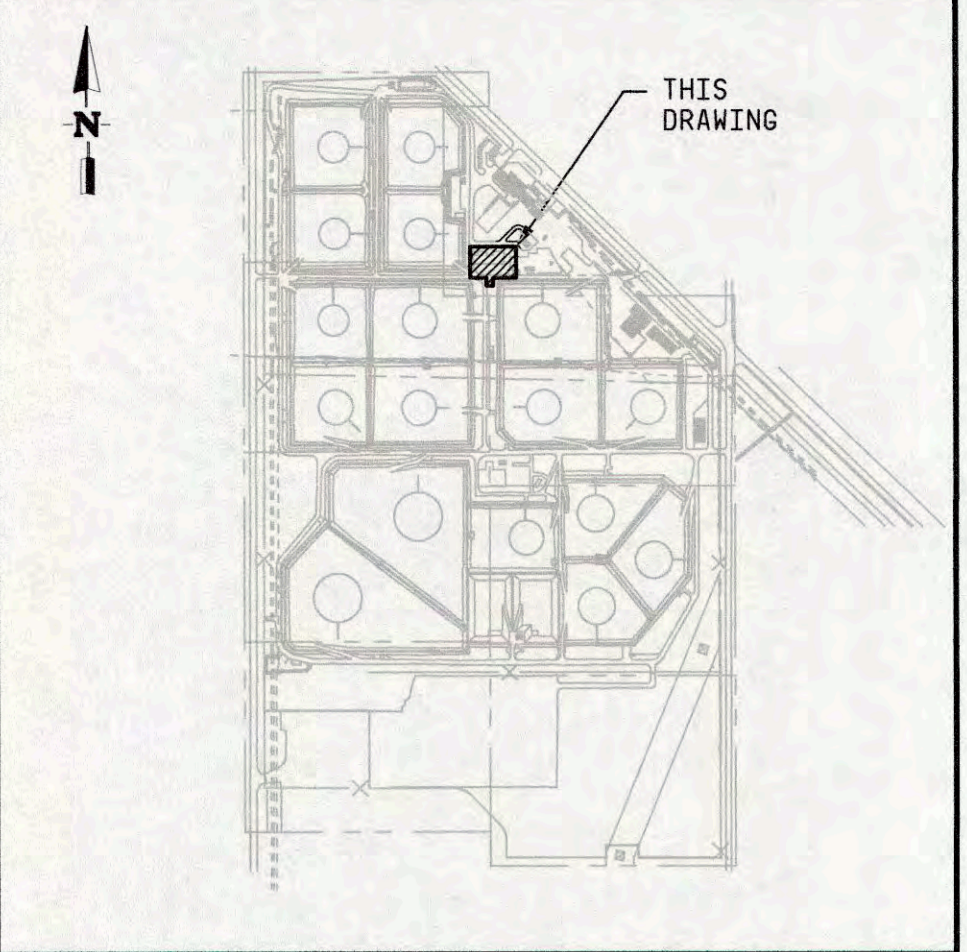
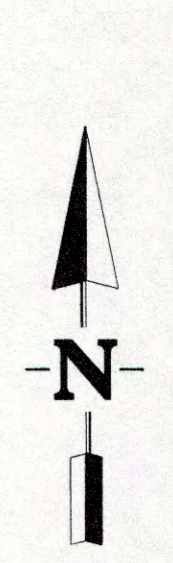
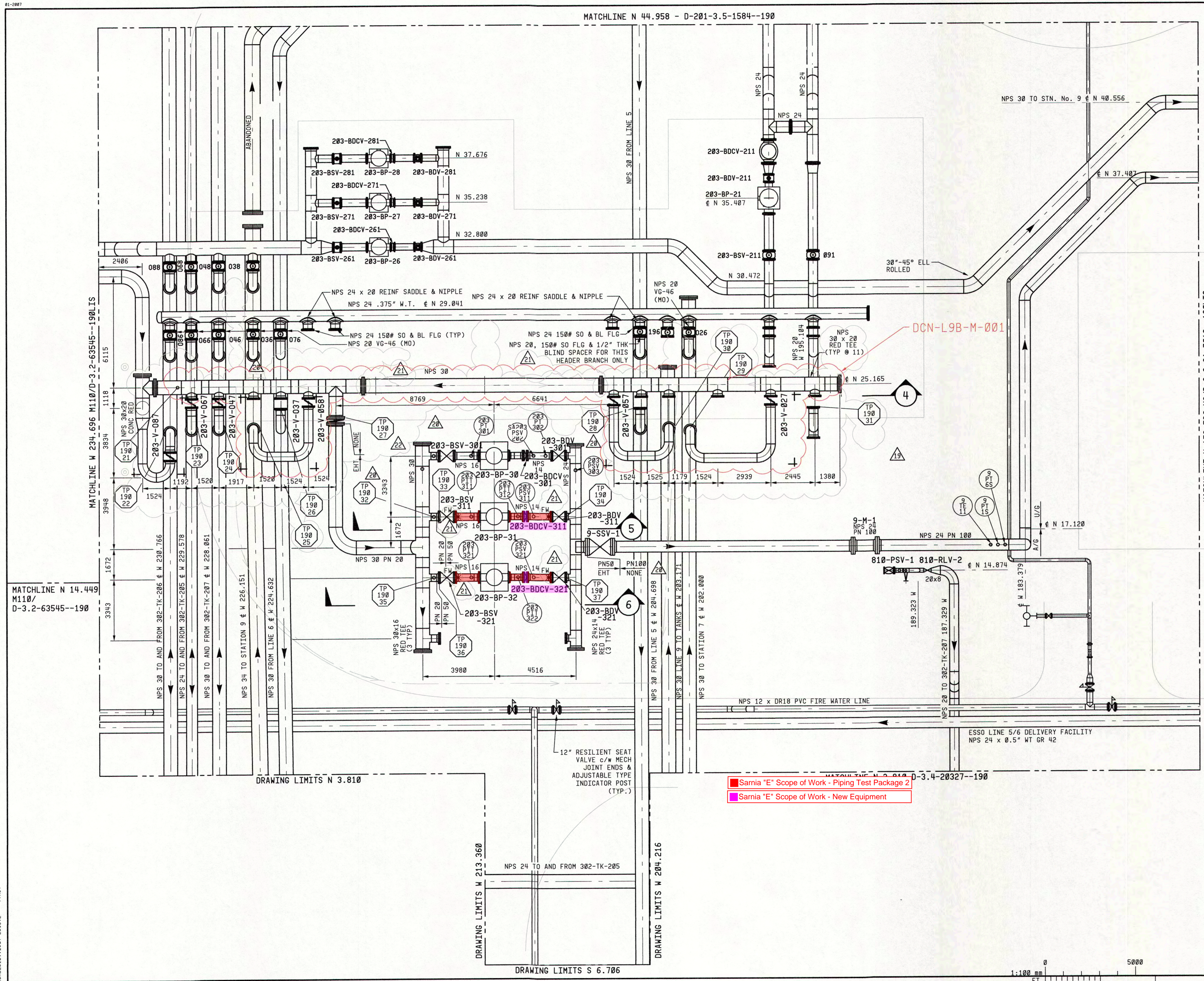
être le directeur principal, Conception des installations, employé par Pipelines Enbridge inc. et le responsable des questions touchant la conception du projet d'inversion de la canalisation 9B et d'accroissement de la capacité de la canalisation 9, lequel a été approuvé aux termes de l'ordonnance XO-E101-003-2014 de l'ONÉ. J'ai évalué et revu les aspects techniques de la demande. Ainsi, je possède une connaissance directe des faits et des questions mentionnés aux présentes et je confirme que les énoncés suivants sont exacts :

- a) L'examen par ultrasons et les essais hydrostatiques sur tous les équipements et la conduite présentés dans la demande d'autorisation de mise en service ont été effectués avec succès sous la supervision directe d'un représentant de la société.
- b) Tous les journaux de bord, tableaux des essais, etc., sont signés et datés par le représentant de la société.
- c) Aucun permis d'utilisation d'eau n'a été nécessaire pour l'essai.
- d) Tous les dispositifs de commande et de sécurité associés à la vanne seront inspectés et mis à l'essai pour en vérifier les fonctionnalités avant d'être mis en service.
- e) La pression d'essai n'est pas tombée au déça de 97,5 % de la pression minimale requise pour un essai de résistance sur aucun essai de pression.
- f) Les versions les plus récentes de tous les codes et les normes de l'industrie ont été appliqués, y compris, mais sans s'y limiter, les dernières versions de la norme CSA Z662-11 et du *Règlement de l'Office national de l'énergie sur les pipelines terrestres*.

Le
19 septembre 2014

Larry Smerechinski
Directeur principal, Conception des installations

Date



NOTES:

- ALL DIMENSIONS IN MILLIMETERS, ALL CO-ORDINATES ARE IN METERS, UNLESS NOTED OTHERWISE.
- DELETED
- THIS DRAWING TO BE READ IN CONJUNCTION WITH D-203-3.5-4204-19-190LIS TO BE AS-BUILT POST CONSTRUCTION.
- CONTRACTOR TO VERIFY ALL DIMENSIONS, ELEVATIONS, AND TIE-IN LOCATIONS PRIOR TO CONSTRUCTION.

LEGEND:

- SCOPE OF WORK

DCN-L9B-M-001

30 May 2014
 W.D. SHELDON
 LICENSED PROFESSIONAL ENGINEER
 PROVINCE OF ONTARIO
 41971011

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

2014 CONSTRUCTION

REV	DESCRIPTION	DATE	BY	APP
19	LINE 9B REVERSAL PROJECT	29 NOV 13	RBG	B.SHELDON
18	DELETED PSS-1, REVISED SUPPORT CALL-OUT AND ADDED EHT LIMITS	28 FEB 14	RBG	JWS
17	ADDED FLG'S, DOUBLE FACED BLIND FLG'S, SPACER RINGS & FIELD WELDS	11 APR 14	RBG	JWS
16	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

NO	DESCRIPTION	DATE	BY	APP
18	AS BUILT AFE 1141239800 (LBR)	14 MAY 12	STANTEC	JPF
17	AS BUILT AS PER FIELD MARK-UP	15 DEC 11	STANTEC	JPF
16	REVISED AS-BUILT AFE 0641237803 (KAJ) AND REDRAWN IN AUTOCAD @ 1:100	27 AUG 09	STANTEC	JPF
15	FTNS REVISIONS	27 AUG 09	STANTEC	KES
14	REVISED AS-BUILT AFE 9769801	27 AUG 09	CL	JHL
13	SCANNED & REVISED AS-BUILT	27 AUG 09	COLT	

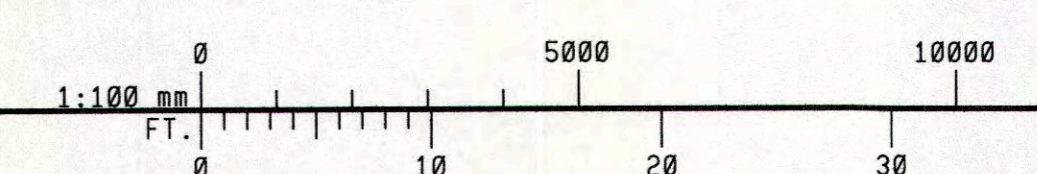
NO REVISION DATE/BY APPROVE



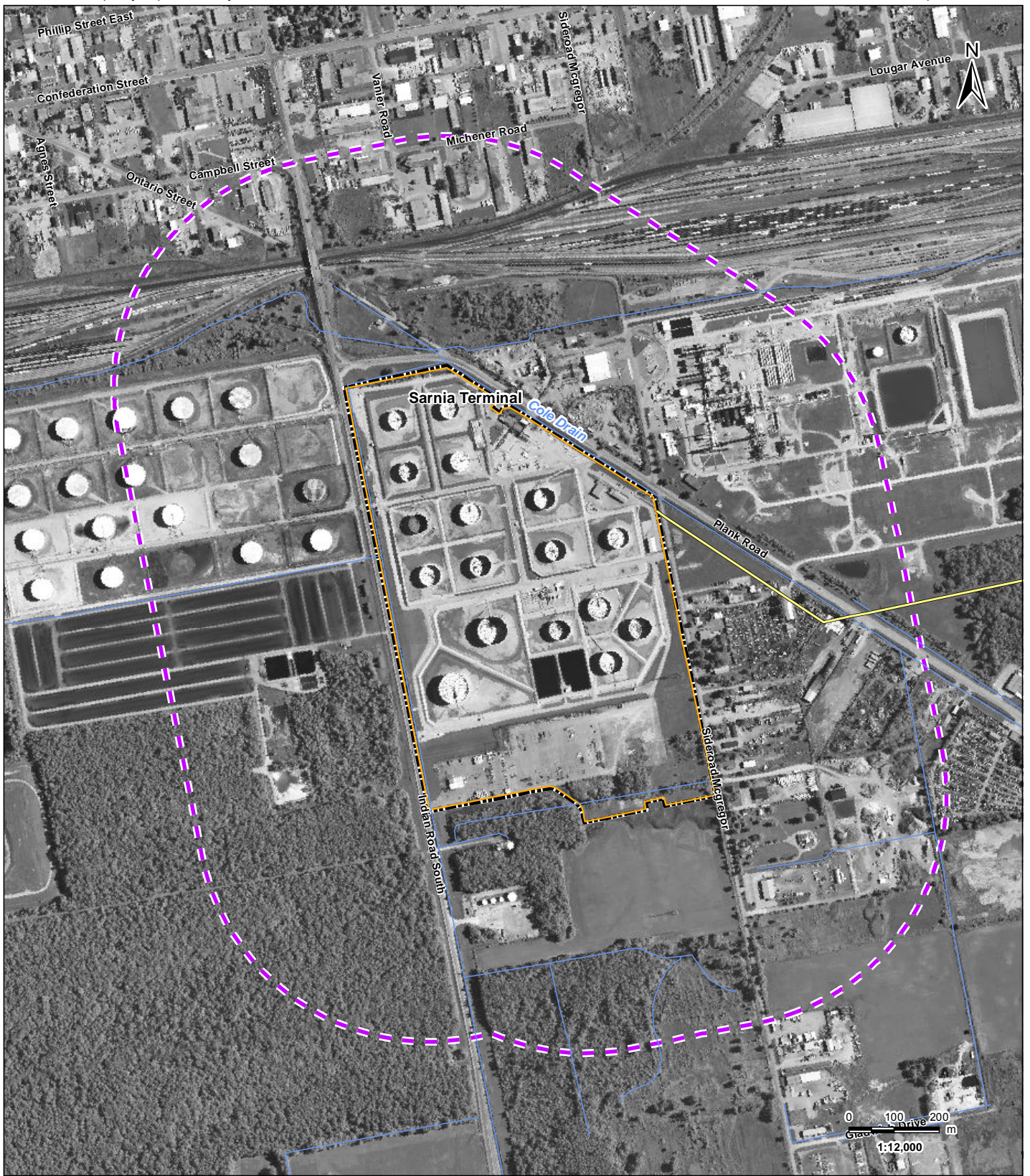
ENBRIDGE PIPELINES INC.
 10201 JASPER AVENUE
 EDMONTON ALBERTA CANADA

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

DRAWN	CHECK	APPROVE
BFW		
DATE 03 FEB 71	SCALE 1:100	APPROVE
D-203-3.5-4204-22-190LIS		M13



ACAD2010:Local 2013/2 TYN01



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 Revised: 2012-11-26 By: searles

November 2012
 160950468



Legend

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

Notes

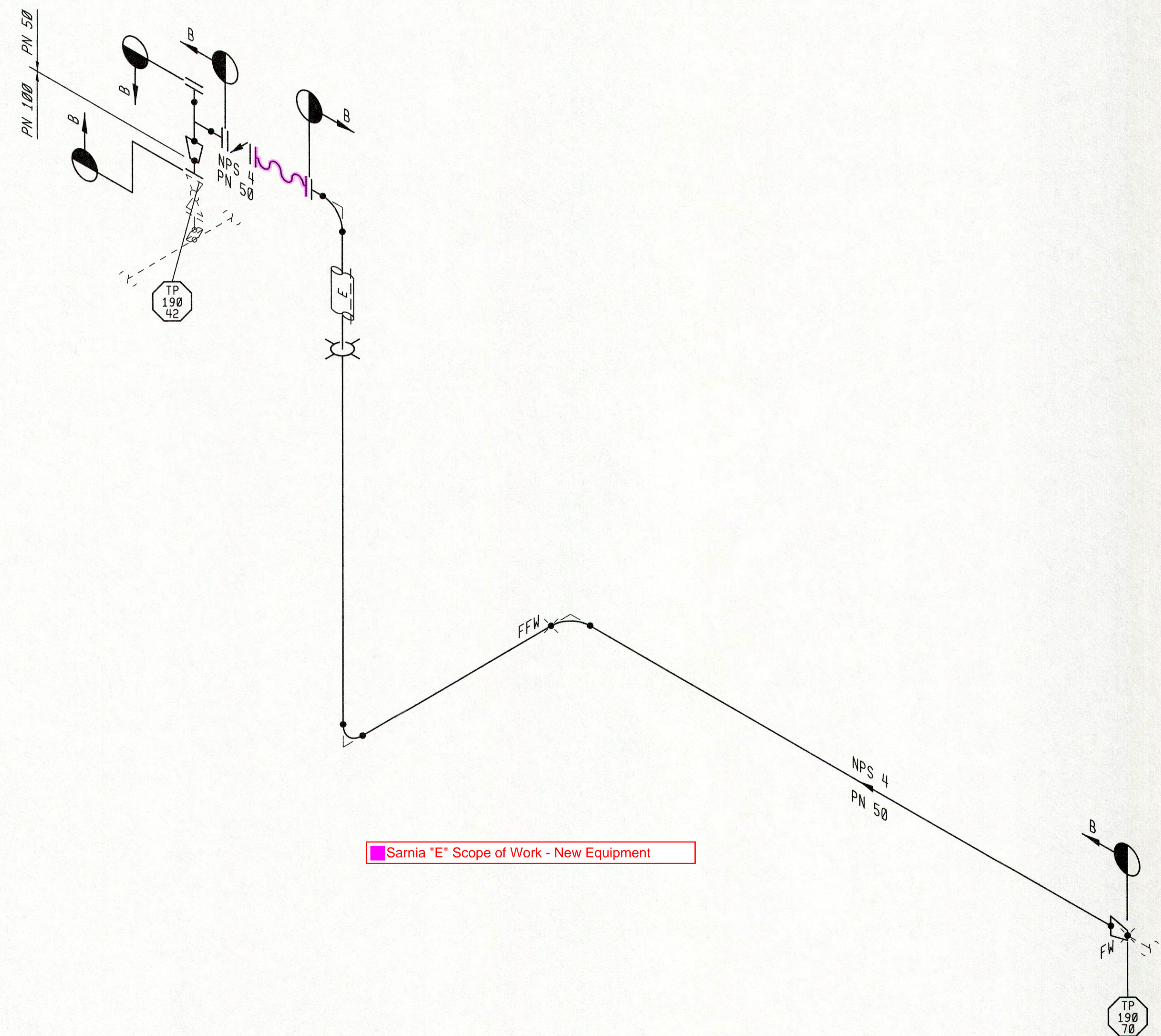
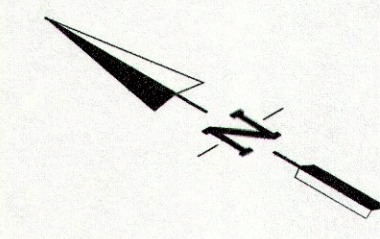
1. Coordinate System: Canada Lambert Conformal Conic
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Orthoimagery © Enbridge, 2006.

Client/Project

Enbridge Pipelines Inc.
 Line 9B Reversal

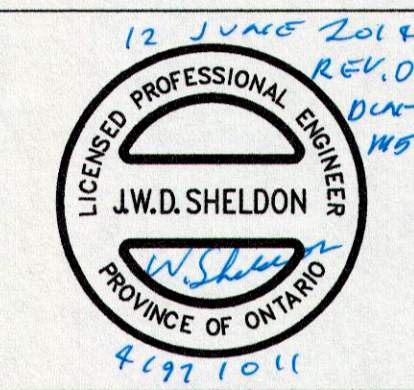
Title

Sarnia Terminal



- 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.
 8. (TIE-IN PORTION)
 100% X-RAY. IF CARBER TOOL IS NOT PRACTICAL. THE CONNECTION WILL BE CONSIDERED AS A CLOSURE WELD. UPON APPROVAL FROM ENBRIDGE.

DCN-L9B-M-005



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

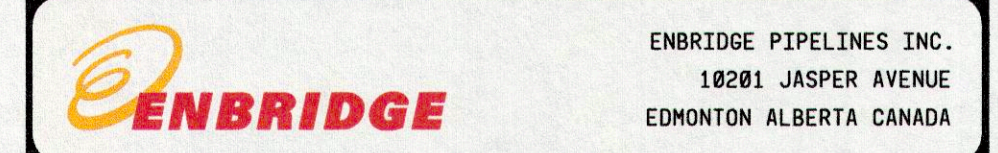
2014 CONSTRUCTION

REV: 0	LINE 9B REVERSAL PROJECT		
AFE: 1241237A80 (LIS)	DATE: 13 JUN 14		
BY:	APPR:		
CHK:	APPR:		
NO	SUBSEQUENT REVISION	DATE/BY	APPR

M83/D-9-3.01-SKM26--190LIS MATERIAL ID ISOMETRIC
 REFERENCE DRAWINGS

NO	REVISION	DATE/BY	APPROVE
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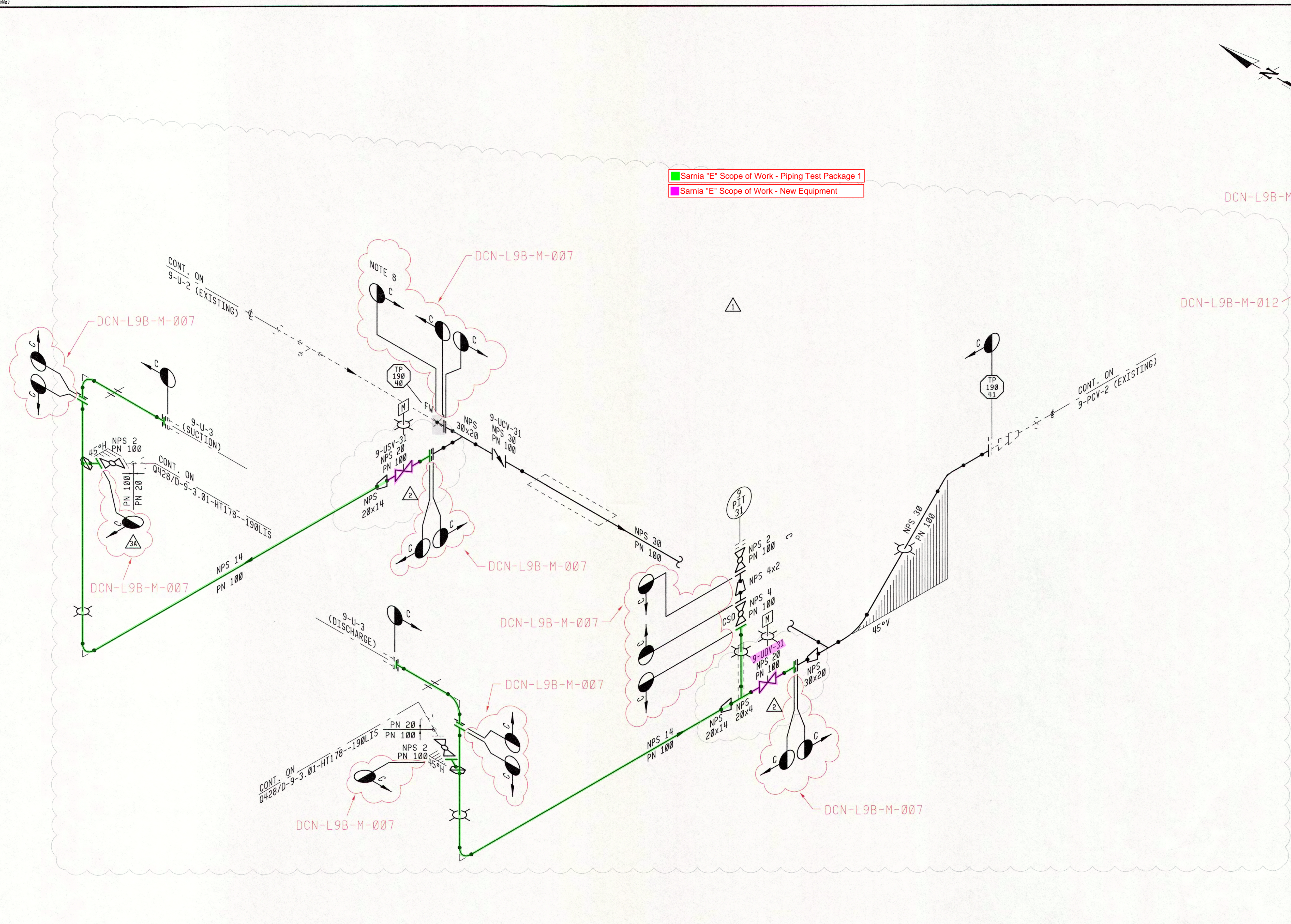
SARNIA (ON) TERMINAL
 LINE 9C
 RE-INJECTION LINE
 HYDROTEST ISOMETRIC

DRAWN	TDT	CHECK	KWB	APPROVE	BSHELDON
DATE	05 JUN 14	SCALE	NTS	APPROVE	ETAMAYO
D-9-3.01-HTM26-0-190LIS					Q453

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)
	B - B	1000 psi	1123 psi	720 psi	792 psi	----- m ³	ABOVE GRADE - 1.25 HR STRENGTH TEST FOLLOWED BY VISUAL LEAK INSPECTION AND DETECTION
		7440 kPa	7738 kPa	4964 kPa	5456 kPa		BELOW GRADE - 4.25 HRS STRENGTH TEST FOLLOWED BY 4.25 HRS LEAK TEST

NOTE 8 ADDITION: CLOSURE WELD PROCEDURE
 THE INTEGRITY OF THE WELD COULD BE BETTER REVEALED THROUGH A DRY MPI EXAMINATION, HALF WAY THROUGH THE FILL AND THEN THE FOLLOW UP CONTRAST MPI ON THE FINAL WELD. PROVIDE THE SERVICE TEST NITROGEN PRESSURE. THIS IS DUE TO VARIABLE MAIN LINE PRESSURES WITHIN THE PIPE. THE CONCERN IS THAT IF THE SERVICE TEST IS COMPLETED AT OPERATING PRESSURE OR DESIGN PRESSURE AND IF ENBRIDGE IS OPERATING AT A REDUCED PIPELINE PRESSURE WE MAY DEFORM THE MAINLINE PIPE, AT THE HOT TAP LOCATION A UT THICKNESS CHECK, CE AND LAMINATION CHECK WILL BE COMPLETED ON ALL HOT TAP LOCATIONS PRIOR TO WELDING.

ACAD2010...I:ca1 2013/2 ZENUS



- NOTES:**
- HYDROTEST PIPING IN ACCORDANCE WITH FCS014-(2012) AND CSA Z662 OIL AND PIPELINE SYSTEMS LATEST EDITION.
 - INDICATES LIMITS OF HYDROTEST.
 - DO NOT HYDROTEST THROUGH RELIEF VALVES, CONTROL VALVES, INSTRUMENTATION AND EQUIPMENT.
 - LIQUID FILL & PRESSURING FOR HYDROTESTING THROUGH CHECK VALVES MUST BE DONE FROM THE UPSTREAM SIDE OF THE CHECK VALVE.
 - ALL psi AND kPa VALUES TO BE CHECKED BY AN ENGINEER BASED ON PROJECT REQUIREMENTS.
 - APPROXIMATE FILL VOLUME TO BE CALCULATED BY CONTRACTOR.
 - ALL HYDROTEST MATERIALS TO BE SUPPLIED BY CONTRACTOR.
 - (TIE-IN PORTION)
100% X-RAY IF CARBER TOOL IS NOT PRACTICAL. THE CONNECTION WILL BE CONSIDERED AS A CLOSURE WELD. UPON APPROVAL FROM ENBRIDGE.

DCN-L9B-M-012

DCN-L9B-M-007

30 MAY 2014
2014-117
MIL

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

2014 CONSTRUCTION

REV: 1	LINE 9B REVERSAL PROJECT
AFE: 1241237A00 (LIS)	DATE: 29 NOV 13
BY: GC	APPR: BSHELDON
CHK: KWB	APPR: ETAMAYO
NO	SUBSEQUENT REVISION DATE/BY APPR
1	DIMENSIONAL REVISION DUE TO ADDITION OF FLANGES & BOM REVISED 28 FEB 14 RBG JWS

M75/D-9-3.01-38961--190LIS MATERIAL ID ISOMETRIC REFERENCE DRAWINGS

NO	REVISION	DATE/BY	APPROVE
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SARNIA (ON) TERMINAL
LINE 9 MAINLINE PUMP AREA
9-U-3
HYDROTEST ISOMETRIC

DRAWN N.FONT	CHECK R.WILLIAMS	APPROVE S.BURKE
DATE 13 SEP 12	SCALE NTS	APPROVE A.JABER
D-9-3.01-HT961-2-190LIS		Q445

NOTE 8 ADDITION: CLOSURE WELD PROCEDURE
THE INTEGRITY OF THE WELD COULD BE BETTER REVEALED THROUGH A DRY MPI EXAMINATION, HALF WAY THROUGH THE FILL AND THEN THE FOLLOW UP CONTRAST MPI ON THE FINAL WELD. PROVIDE THE SERVICE TEST NITROGEN PRESSURE. THIS IS DUE TO VARIABLE MAIN LINE PRESSURES WITHIN THE PIPE. THE CONCERN IS THAT IF THE SERVICE TEST IS COMPLETED AT OPERATING PRESSURE OR DESIGN PRESSURE AND IF ENBRIDGE IS OPERATING AT A REDUCED PIPELINE PRESSURE WE MAY DEFORM THE MAINLINE PIPE. AT THE HOT TAP LOCATION A UT THICKNESS CHECK, CE AND LAMINATION CHECK WILL BE COMPLETED ON ALL HOT TAP LOCATIONS PRIOR TO WELDING.

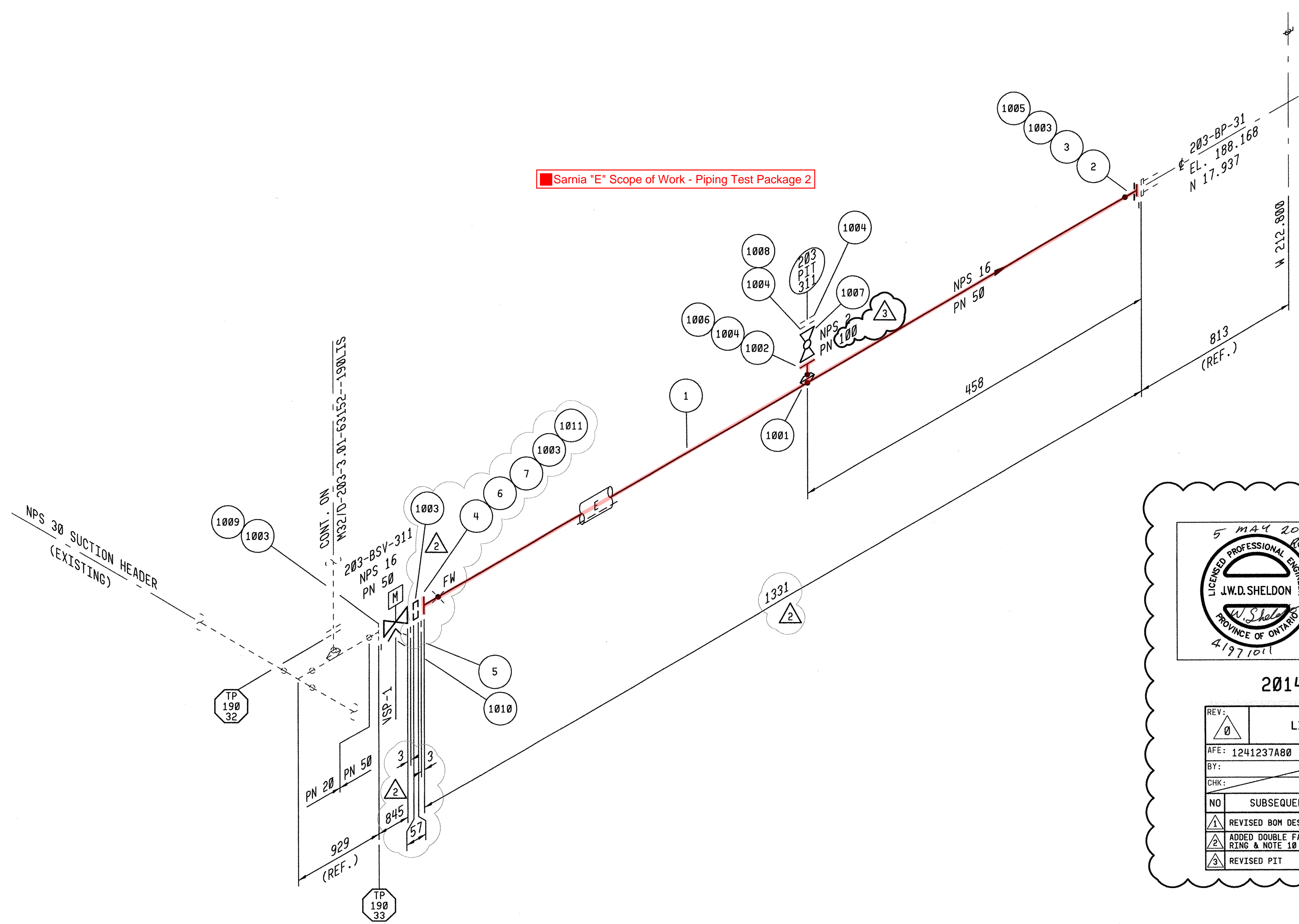
PRESSURE TEST DETAILS

TEST NUMBER	SECTION	MIN. TEST PRESSURE	MAX. TEST PRESSURE	MAX. OPER. PRESSURE	MIN. LEAK TEST PRESS.	APPROX. FILL VOL.	TEST DURATION (HRS)
	C - C	2160 psi	2246 psi	1440 psi	1584 psi	----- m 3	ABOVE GRADE - 1.25 HR STRENGTH TEST FOLLOWED BY VISUAL LEAK INSPECTION AND DETECTION
		14895 kPa	15491 kPa	9930 kPa	10923 kPa		BELOW GRADE - 4.25 HRS STRENGTH TEST FOLLOWED BY 4.25 HRS LEAK TEST

AC020108-11cal 2013v2 GALLIER

ENBRIDGE SUPPLIED MATERIAL					
ITEM NO.	QTY	SIZE (NPS)	RATING WT(mm)	DESCRIPTION	
1	0.9m	16	9.52	PIPE, CAT I Gr. 290, ERW	
2	1	16	9.52	STUB END, BW, 12" LG SMLS, CAT I, Gr. 290 c/w STRAINER (NOTE 9)	
3	1	16	PN 50	FLG., LAP JOINT, ASTM A105N	
4	1	16	PN 50	FLG., RFWN, ASTM A105N, 9.52mm WT	
5	1	16	PN 50	SLAB GATE VALVE, F x F, (RF), MOTOR OP., BOLTED BONNET, FULL OPENING THRU-CONDUIT RISING STEM, CAT II, API 6D (203-BSV-311)	
6	1	16	PN 50	SPACER RING, RF, ASTM A105N (NOTE 10)	
7	1	16	PN 50	DOUBLE FACE BLD. FLG., RF, ASTM A105N, TYPE A (NOTE 10)	

CONTRACTOR SUPPLIED MATERIAL					
ITEM NO.	QTY	SIZE (NPS)	RATING WT(mm)	DESCRIPTION	
1001	1	16x2		WELDOLET, BW, ASTM A105N	
1002	1	2	SCH 80	FLG., RFWN, ASTM A105N, SCH 80	
1003	4	16	PN 50	GASKET, 1/8" THK SP WND 304 SS FLEX GRAPH FILL, SS INNER & CS OUTER RING, FLEXITALLIC CGI	
1004	3	2	PN 100	GASKET, 1/8" THK SP WND 304 SS FLEX GRAPH FILL, SS INNER & CS OUTER RING, FLEXITALLIC CGI	
1005	20	-	-	1 1/4" x 8 1/2" LG STUDS A193 Gr. B7 c/w 2 HVY HEX NUTS A194 Gr. 2H	
1006	8	-	-	5/8" x 4 3/4" LG STUDS A193 Gr. B7 c/w 2 HVY HEX NUTS A194 Gr. 2H	
1007	1	2	PN 100	BALL VALVE, FLG., RF, FIRE SAFE, LEVER OP., ASTM A216 GR. WCB, TRUNION MOUNTED, API 6D, DB&B (NOTE 6)	
1008	8	-	-	5/8" x 6 1/4" LG STUDS A193 Gr. B7 c/w 2 HVY HEX NUTS A194 Gr. 2H	
1009	20	-	-	1 1/4" x 8" LG STUDS A193 Gr. B7 c/w 2 HVY HEX NUTS A194 Gr. 2H	
1010	1	16	-	PIPE SUPPORT, VSP-1	
1011	20	-	-	1 1/4" x 10" LG STUDS A193 Gr. B7 c/w 2 HVY HEX NUTS A194 Gr. 2H	



- NOTES:**
- ALL DIMENSIONS ARE IN MILLIMETRES, COORDINATES AND ELEVATIONS ARE IN METRES UNLESS NOTED OTHERWISE.
 - ALL PIPE TO CONFORM TO CSA Z245.1
ALL VALVES TO CONFORM TO CSA Z245.15
ALL FITTINGS TO CONFORM TO CSA Z245.11
ALL FLANGES TO CONFORM TO CSA Z245.12
UNLESS NOTED OTHERWISE.
 - CONTRACTOR TO PLACE FIELD WELDS AS NEEDED AND SUPPLY ANY ADDITIONAL MATERIAL.
 - CONTRACTOR TO VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
 - FOR PIPE SUPPORT DETAILS, SEE DWG. M29B/D-3.2-63468--190LIS.
 - VALVE, NPS 6 AND SMALLER SHALL BE IN ACCORDANCE WITH EES129 (2012).
 - THE PIPES, FITTINGS AND FLANGES SUPPLIED BY ENBRIDGE WILL BE SENT TO THE CONTRACTOR BARE. THE CONTRACTOR IS RESPONSIBLE FOR PAINTING FOR A/G AND COATING FOR U/G INSTALLATION.
 - THE FOLLOWING ENBRIDGE STANDARDS AS REQUIRED:
A/G EXTERNAL PAINT (P-210)
U/G EXTERNAL COATING (C-110)
TRANSITION SECTION FROM A/G TO U/G (C-610)
DRAIN LINES INTERNAL COATING (SCOTCHKOTE 134)
BURIED FLANGES EXTERNAL COATING (C-420).
 - FOR LAP JOINT FLG., STRAINER DETAIL, SEE DWG. M28A/D-3.2-63147--190LIS.
 - FOR DOUBLE FACED BLIND FLANGE AND SPACER RING, SEE TYP. DESIGN DETAIL DWG. M29C/D-3.8-24831--190LIS.

5 MAY 2014
KAL 3
LICENSED PROFESSIONAL ENGINEER
J.W.D. SHELTON
PROVINCE OF ONTARIO
4.197.1011

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	REVISED BOM DESCRIPTION	28 FEB 14 RRG	JWS
2	ADDED DOUBLE FACED BLIND, SPACER RING & NOTE 10	11 APR 14 TDT	JWS
3	REVISED PIT	09 MAY 14 JAD	JWS

M29D/D-3.2-63470--190LIS SECTIONS 5 AND 6
M13/D-203-3.5-4284--190LIS PIPING PLAN

REFERENCE DRAWINGS

NO	REVISION	DATE/BY	APPROVE
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**SARNIA (ON) TERMINAL
BOOSTER PUMP 203-BP-31
SUCTION LINE
MATERIAL IDENTIFICATION ISOMETRIC**

DRAWN GC	CHECK KMB/KLB	APPROVE BSHELDON
DATE 07 JUL 13	SCALE NTS	APPROVE ETAMAYO

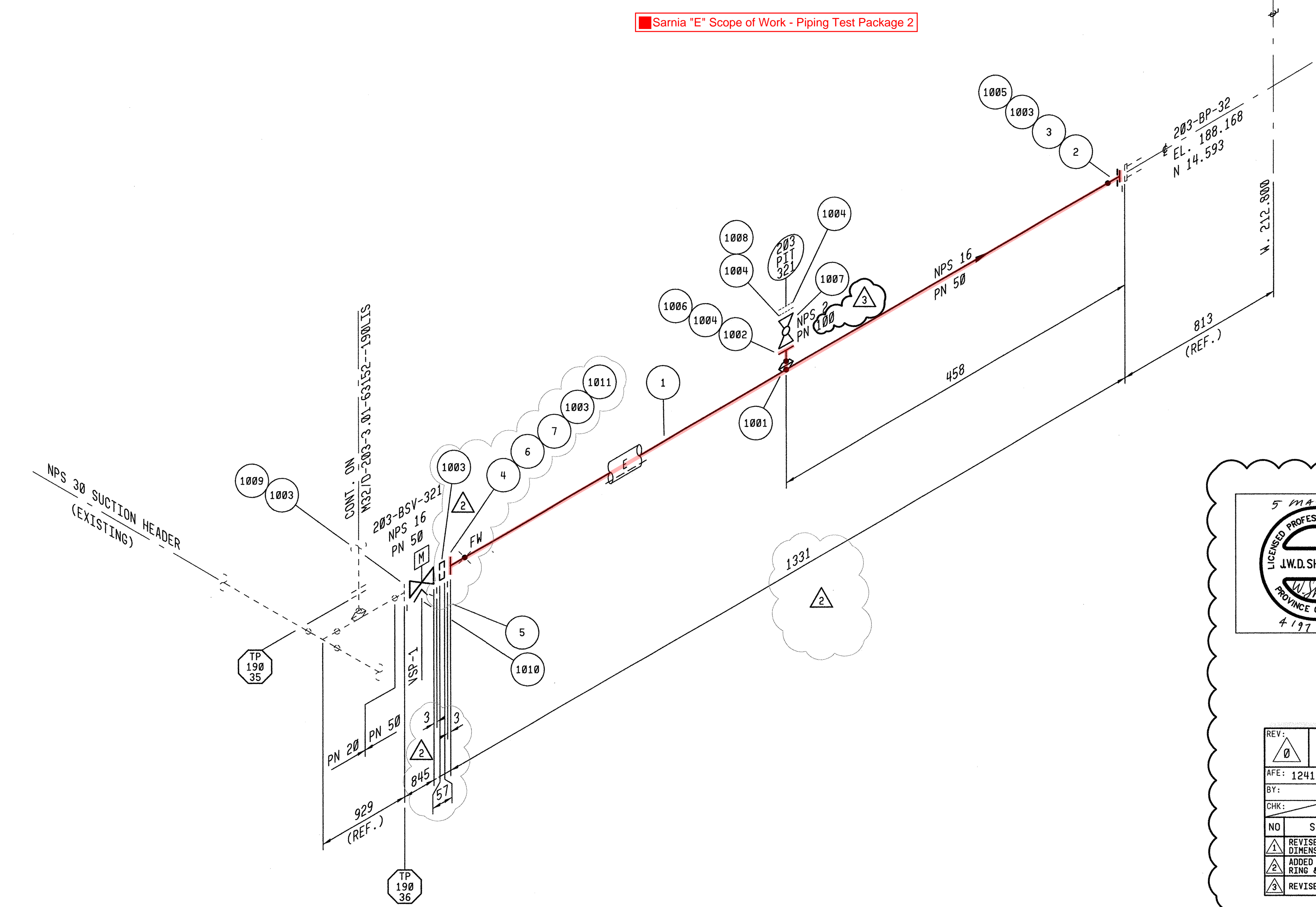
D-203-3.01-63153-3-190LIS M33

ACAD0010: Ical 2013v2 BEREKJ

ENBRIDGE SUPPLIED MATERIAL				
ITEM NO.	QTY	SIZE (NPS)	RATING WT(mm)	DESCRIPTION
1	0.9m	16	9.52	PIPE, CAT I Gr.290, ERW
2	1	16	9.52	STUB END, BW, 12" LG SMLS, CAT I, Gr. 290 c/w STRAINER (NOTE 9)
3	1	16	PN 50	FLG., LAP JOINT, ASTM A105N
4	1	16	PN 50	FLG., RFWN, ASTM A105N, 9.52mm WT
5	1	16	PN 50	SLAB GATE VALVE, F x F, RF, MOTOR OP., BOLTED BONNET, FULL OPENING THRU-CONDUIT RISING STEM, CAT II, API 6D (203-BSV-321)
6	1	16	PN 50	SPACER RING, RF, ASTM A105N (NOTE 10)
7	1	16	PN 50	DOUBLE FACE BLD. FLG., RF, ASTM A105N, TYPE A (NOTE 10)

CONTRACTOR SUPPLIED MATERIAL				
ITEM NO.	QTY	SIZE (NPS)	RATING WT(mm)	DESCRIPTION
1001	1	16x2	SCH 80	WELDOLET, BW, ASTM A105N
1002	1	2	PN 100	FLG., RFWN, ASTM A105N, SCH 80
1003	4	16	PN 50	GASKET, 1/8" THK SP WND 304 SS FLEX GRAPH FILL, SS INNER & CS OUTER RING, FLEXITALLIC CGI
1004	3	2	PN 100	GASKET, 1/8" THK SP WND 304 SS FLEX GRAPH FILL, SS INNER & CS OUTER RING, FLEXITALLIC CGI
1005	20	-	-	1 1/4" x 8 1/2" LG STUDS A193 Gr.87 c/w 2 HVY HEX NUTS A194 Gr.2H
1006	8	-	-	5/8" x 6 1/4" LG STUDS A193 Gr.87 c/w 2 HVY HEX NUTS A194 Gr.2H
1007	1	2	PN 100	BALL VALVE, FLG., RF, FIRE SAFE, LEVER OP., ASTM A216 GR.WCB, TRUNION MOUNTED, API 6D, DB&B (NOTE 6)
1008	8	-	-	5/8" x 6 1/4" LG STUDS A193 Gr.87 c/w 2 HVY HEX NUTS A194 Gr.2H
1009	20	-	-	1 1/4" x 8" LG STUDS A193 Gr.87 c/w 2 HVY HEX NUTS A194 Gr.2H
1010	1	16	-	PIPE SUPPORT, VSP-1
1011	20	-	-	1 1/4" x 18" LG STUDS A193 Gr.87 c/w 2 HVY HEX NUTS A194 Gr.2H

Sarnia "E" Scope of Work - Piping Test Package 2



- NOTES:
- ALL DIMENSIONS ARE IN MILLIMETRES, COORDINATES AND ELEVATIONS ARE IN METRES UNLESS NOTED OTHERWISE.
 - ALL PIPE TO CONFORM TO CSA Z245.1
ALL VALVES TO CONFORM TO CSA Z245.15
ALL FITTINGS TO CONFORM TO CSA Z245.11
ALL FLANGES TO CONFORM TO CSA Z245.12 UNLESS NOTED OTHERWISE.
 - CONTRACTOR TO PLACE FIELD WELDS AS NEEDED AND SUPPLY ANY ADDITIONAL MATERIAL.
 - CONTRACTOR TO VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
 - FOR PIPE SUPPORT DETAILS, SEE DWG. M29B/D-3.2-63468--190LIS.
 - VALVE, NPS 6 AND SMALLER SHALL BE IN ACCORDANCE WITH EES129 (2012).
 - THE PIPES, FITTINGS AND FLANGES SUPPLIED BY ENBRIDGE WILL BE SENT TO THE CONTRACTOR BARE. THE CONTRACTOR IS RESPONSIBLE FOR PAINTING FOR A/G AND COATING FOR U/G INSTALLATION.
 - THE FOLLOWING ENBRIDGE STANDARDS AS REQUIRED:
A/G EXTERNAL PAINT (P-210)
U/G EXTERNAL COATING (C-110)
TRANSITION SECTION FROM A/G TO U/G (C-610)
DRAIN LINES INTERNAL COATING (SCOTCHKOTE 134)
BURIED FLANGES EXTERNAL COATING (C-420).
 - FOR LAP JOINT FLG., STRAINER DETAIL, SEE DWG. M28A/D-3.2-63147--190LIS.
 - FOR DOUBLE FACED BLIND FLANGE AND SPACER RING, SEE TYP. DESIGN DETAIL DWG. M29C/D-3.8-24831--190LIS.

5 MAY 2014

4 197 10 11

Professional Engineers of Ontario
CERTIFICATE OF AUTHORIZATION
Jacobs Canada Inc.
Number 1252378

2014 CONSTRUCTION

REV: 0	LINE 9B REVERSAL PROJECT		
BY: 1241237A80 (LIS)	DATE: 29 NOV 13		
CHK: _____	APPR: _____		
NO	SUBSEQUENT REVISION	DATE/BY	APPR
1	REVISED BON DESCRIPTION & DIMENSION	28 FEB 14 RBB	JWS
2	ADDED DOUBLE FACED BLIND, SPACER RING & NOTE 10	11 APR 14 TDT	JWS
3	REVISED PIT	09 MAY 14 JAD	JWS

M29D/D-3.2-63470--190LIS SECTIONS 5 AND 6
M13/D-203-4284--190LIS PIPING PLAN
REFERENCE DRAWINGS

NO	REVISION	DATE/BY	APPROVE
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SARNIA (ON) TERMINAL
BOOSTER PUMP 203-BP-32
SUCTION LINE
MATERIAL IDENTIFICATION ISOMETRIC

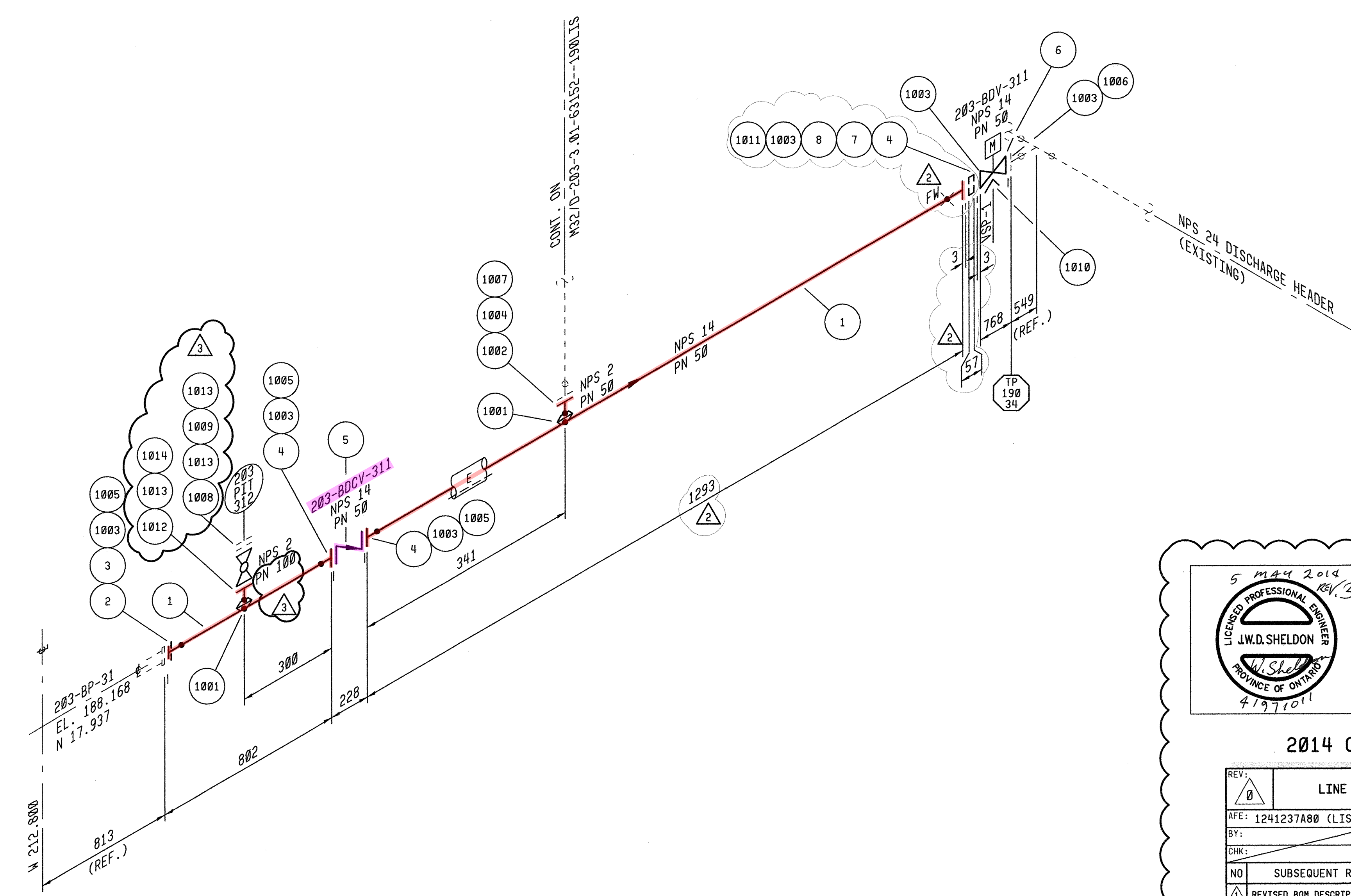
DRAWN GC	CHECK KWB	APPROVE BSHELDON
DATE 11 JUL 13	SCALE NTS	APPROVE ETAMAYO

D-203-3.01-63154-3-190LIS M34

ACAD0010:1ca1 2813v2 DEHEKJ

ENBRIDGE SUPPLIED MATERIAL					CONTRACTOR SUPPLIED MATERIAL				
ITEM NO.	QTY	SIZE (NPS)	RATING WT(mm)	DESCRIPTION	ITEM NO.	QTY	SIZE (NPS)	RATING WT(mm)	DESCRIPTION
1	1.5m	14	9.52	PIPE, CAT I, Gr.290, ERM	1001	2	14x2	-	WELDLET, BW, ASTM A105N
2	1	14	9.52	STUB END, 12" LG, BW, CAT I, Gr.290	1002	1	2	SCH 80	FLG., RFWN, ASTM A105N, SCH 80
3	1	14	PN 50	FLG., LAP JOINT, ASTM A105N	1003	6	14	PN 50	GASKET, 1/8" THK SP WND 304 SS FLEX GRAPH FILL, SS INNER & CS OUTER RING, FLEXITALLIC CGI
4	3	14	PN 50	FLG., RFWN, ASTM A105N, 9.52mm WT	1004	1	2	PN 50	GASKET, 1/8" THK SP WND 304 SS FLEX GRAPH FILL, SS INNER & CS OUTER RING, FLEXITALLIC CGI
5	1	14	PN 50	CHECK VALVE, DUAL-PLATE, FLG., RF, CS, CAT II, API 594 (203-BDCV-311)	1005	60	-	-	1 1/8" x 8" LG STUDS A193 Gr.B7 c/w 2 HVY HEX NUTS A194 Gr.2H
6	1	14	PN 50	SLAB GATE VALVE, F x F, RF, MOTOR OP., BOLTED BONNET, FULL OPENING THRU-CONDUIT RISING STEM, CAT II, API 6D (203-BDV-311)	1006	20	-	-	1 1/8" x 7 1/2" LG STUDS A193 Gr.B7 c/w 2 HVY HEX NUTS A194 Gr.2H
7	1	14	PN 50	SPACER RING, RF, ASTM A105N (NOTE 9)	1007	8	-	-	5/8" x 4" LG STUDS A193 Gr.B7 C/W 2 HVY HEX NUTS A194 Gr.2H
8	1	14	PN 50	DOUBLE FACE BLD. FLG., RF, ASTM A105N, TYPE A (NOTE 9)	1008	1	2	PN 100	BALL VALVE, FLG., RF, FIRE SAFE, LEVER OP., ASTM A216 GR.WCB, TRUNION MOUNTED, API 6D, DB&B (NOTE 6)
					1009	8	-	-	5/8" x 6 3/4" LG STUDS A193 Gr.B7 c/w 2 HVY HEX NUTS A194 Gr.2H
					1010	1	14	-	PIPE SUPPORT, VSP-1
					1011	20	-	-	1 1/8" x 9 1/2" LG STUDS A193 Gr.B7 c/w 2 HVY HEX NUTS A194 Gr.2H
					1012	1	2	PN100	FLG., RFWN, ASTM A105N, SCH.80.
					1013	3	2	PN100	1/8" THK SP WND 304SS FLEX GRAPH FILL, SS INNER & CS OUTER RING, FLEXITALLIC CGI.
					1014	8	-	-	5/8" x 4 3/4" LG STUDS A193 Gr.B7 c/w 2 HVY HEX NUTS A194 Gr.2H

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



- NOTES:**
- ALL DIMENSIONS ARE IN MILLIMETRES, COORDINATES AND ELEVATIONS ARE IN METRES UNLESS NOTED OTHERWISE.
 - ALL PIPE TO CONFORM TO CSA Z245.1
ALL VALVES TO CONFORM TO CSA Z245.15
ALL FITTINGS TO CONFORM TO CSA Z245.11
ALL FLANGES TO CONFORM TO CSA Z245.12 UNLESS NOTED OTHERWISE.
 - CONTRACTOR TO PLACE FIELD WELDS AS NEEDED AND SUPPLY ANY ADDITIONAL MATERIAL.
 - CONTRACTOR TO VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
 - FOR PIPE SUPPORT DETAILS, SEE DWG. M29B/D-3.2-63468--190LIS.
 - VALVE, NPS 6 AND SMALLER SHALL BE IN ACCORDANCE WITH EES129 (2012).
 - THE PIPES, FITTINGS AND FLANGES SUPPLIED BY ENBRIDGE WILL BE SENT TO THE CONTRACTOR BARE. THE CONTRACTOR IS RESPONSIBLE FOR PAINTING FOR A/G AND COATING FOR U/G INSTALLATION.
 - THE FOLLOWING ENBRIDGE STANDARDS AS REQUIRED:
A/G EXTERNAL PAINT (P-210)
U/G EXTERNAL COATING (C-110)
TRANSITION SECTION FROM A/G TO U/G (C-610)
DRAIN LINES INTERNAL COATING (SCOTCHKOTE 134)
BURIED FLANGES EXTERNAL COATING (C-420).
 - FOR DOUBLE FACED BLIND FLANGE AND SPACER RING, SEE TYP. DESIGN DETAIL DWG. M29C/D-3.8-24831--190LIS.

5 MAY 2014
REV 3

LICENSED PROFESSIONAL ENGINEER
J.W.D. SHELDON
PROVINCE OF ONTARIO
41971011

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

2014 CONSTRUCTION

REV	DESCRIPTION	DATE	BY	APPR
0	LINE 9B REVERSAL PROJECT	29 NOV 13		
	AFE: 1241237A00 (LIS)			
	CHK:			
	BY:			
	APPR:			
NO	SUBSEQUENT REVISION	DATE/BY	APPR	
1	REVISED BOM DESCRIPTION	28 FEB 14 RBG	JWS	
2	ADDED DOUBLE FACED BLIND, SPACER RING & NOTE 9	11 APR 14 TDT	JWS	
3	REVISED 203-PIT-312	09 MAY 14 NKA	JWS	

M29D/D-3.2-63470--190LIS SECTIONS 5 AND 6
M13/D-203-3.5-4284--190LIS PIPING PLAN
REFERENCE DRAWINGS

NO	REVISION	DATE/BY	APPROVE

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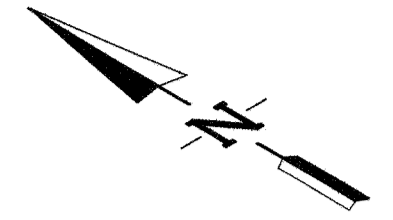
SARNIA (ON) TERMINAL
BOOSTER PUMP 203-BP-31
DISCHARGE LINE
MATERIAL IDENTIFICATION ISOMETRIC

DRAWN	GC	CHECK	KMB	APPROVE	BSHELDON
DATE	05 JUL 13	SCALE	NTS	APPROVE	ETAMAYO

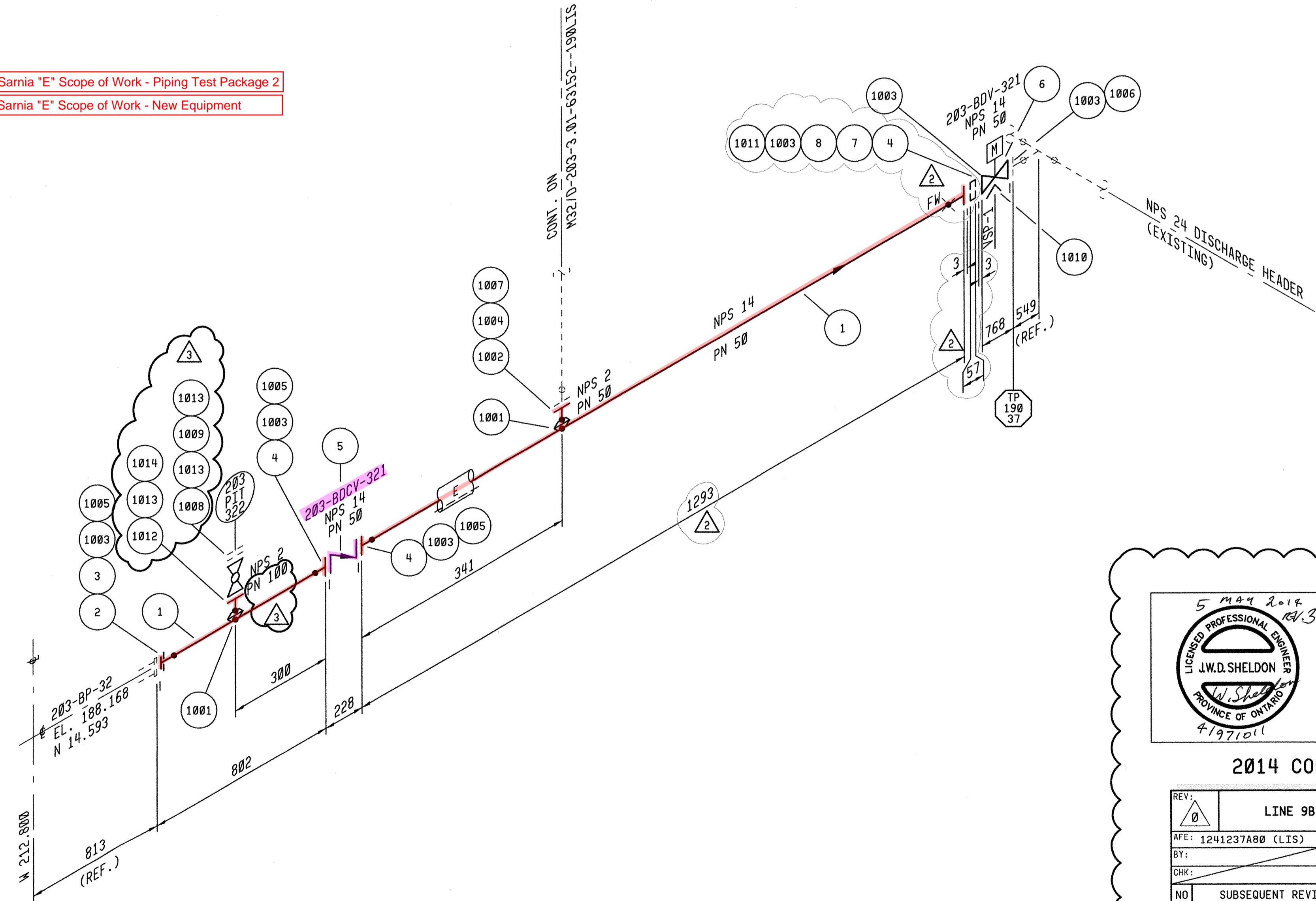
D-203-3.01-63155-3-190LIS M35

ENBRIDGE SUPPLIED MATERIAL				
ITEM NO.	QTY	SIZE (NPS)	RATING WT.(mm)	DESCRIPTION
1	1.5m	14	9.52	PIPE, CAT I, Gr.290, ERW
2	1	14	9.52	STUB END, 12" LG, BW, CAT I, Gr.290
3	1	14	PN 50	FLG., LAP JOINT, ASTM A105N
4	3	14	PN 50	FLG., RFWN, ASTM A105N, 9.52mm WT
5	1	14	PN 50	CHECK VALVE, DUAL-PLATE, FLG., RF, CS, CAT II, API 594 (203-BDCV-321)
6	1	14	PN 50	SLAB GATE VALVE, F x F, RF, MOTOR OP., BOLTED BONNET, FULL OPENING THRU-CONDUIT RISING STEM, CAT II, API 6D (203-BDV-321)
7	1	14	PN 50	SPACER RING, RF, ASTM A105N (NOTE 9)
8	1	14	PN 50	DOUBLE FACE BLD. FLG., RF, ASTM A105N TYPE A (NOTE 9)

CONTRACTOR SUPPLIED MATERIAL				
ITEM NO.	QTY	SIZE (NPS)	RATING WT.(mm)	DESCRIPTION
1001	2	14x2	-	WELDOLET, BW, ASTM A105N
1002	1	2	PN 50	FLG., RFWN, ASTM A105N, SCH 80
1003	6	14	PN 50	GASKET, 1/8" THK SP WND 304 SS FLEX GRAPH FILL, SS INNER & CS OUTER RING, FLEXITALLIC CGI
1004	1	2	PN 50	GASKET, 1/8" THK SP WND 304 SS FLEX GRAPH FILL, SS INNER & CS OUTER RING, FLEXITALLIC CGI
1005	60	-	-	1 1/8" x 8" LG STUDS A193 Gr.B7 c/w 2 HVY HEX NUTS A194 Gr.2H
1006	20	-	-	1 1/8" x 7 1/2" LG STUDS A193 Gr.B7 c/w 2 HVY HEX NUTS A194 Gr.2H
1007	8	-	-	5/8" x 4" LG STUDS A193 Gr.B7 c/w 2 HVY HEX NUTS A194 Gr.2H
1008	1	2	PN 100	BALL VALVE, FLG., RF, FIRE SAFE, LEVER OP., ASTM A216 GR.WCB, TRUNION MOUNTED, API 6D, DB&B (NOTE 6)
1009	8	-	-	5/8" x 6 3/4" LG STUDS A193 Gr.B7 c/w 2 HVY HEX NUTS A194 Gr.2H
1010	1	14	-	PIPE SUPPORT, VSP-1
1011	20	-	-	1 1/8" x 9 1/2" LG STUDS A193 Gr.B7 c/w 2 HVY HEX NUTS A194 Gr.2H
1012	1	2	PN 100	FLG., RFWN, ASTM A105N, SCH 80
1013	3	2	PN 100	GASKET, 1/8" THK SP WND 304 SS FLEX GRAPH FILL, SS INNER & CS OUTER RING, FLEXITALLIC CGI
1014	8	-	-	5/8" x 4 3/4" LG STUDS A193 Gr.B7 c/w 2 HVY HEX NUTS A194 Gr.2H



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



- NOTES:**
- ALL DIMENSIONS ARE IN MILLIMETRES, COORDINATES AND ELEVATIONS ARE IN METRES UNLESS NOTED OTHERWISE.
 - ALL PIPE TO CONFORM TO CSA Z245.1
ALL VALVES TO CONFORM TO CSA Z245.15
ALL FITTINGS TO CONFORM TO CSA Z245.11
ALL FLANGES TO CONFORM TO CSA Z245.12
UNLESS NOTED OTHERWISE.
 - CONTRACTOR TO PLACE FIELD WELDS AS NEEDED AND SUPPLY ANY ADDITIONAL MATERIAL.
 - CONTRACTOR TO VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
 - FOR PIPE SUPPORT DETAILS, SEE DWG. M29B/D-3.2-63468--190LIS.
 - VALVE, NPS 6 AND SMALLER SHALL BE IN ACCORDANCE WITH EES129 (2012).
 - THE PIPES, FITTINGS AND FLANGES SUPPLIED BY ENBRIDGE WILL BE SENT TO THE CONTRACTOR BARE. THE CONTRACTOR IS RESPONSIBLE FOR PAINTING FOR A/G AND COATING FOR U/G INSTALLATION.
 - THE FOLLOWING ENBRIDGE STANDARDS AS REQUIRED:
A/G EXTERNAL PAINT (P-210)
U/G EXTERNAL COATING (C-110)
TRANSITION SECTION FROM A/G TO U/G (C-610)
DRAIN LINES INTERNAL COATING (SCOTCHKOTE 134)
BURIED FLANGES EXTERNAL COATING (C-420).
 - FOR DOUBLE FACED BLIND FLANGE AND SPACER RING, SEE TYP. DESIGN DETAIL DWG. M29C/D-3.8-24831--190LIS.

5 May 2014
REV 3
LICENSED PROFESSIONAL ENGINEER
J.W.D. SHELDON
PROVINCE OF ONTARIO
41971011

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

2014 CONSTRUCTION

REV	DESCRIPTION	DATE/DATE	BY
0	LINE 9B REVERSAL PROJECT	29 NOV 13	
1	REVISED BOM DESCRIPTION	28 FEB 14	JWS
2	ADDED DOUBLE FACED BLIND, SPACER RING & NOTE 9	11 APR 14	JWS
3	REVISED 203 PIT 322	09 MAY 14	JWS

M29D/D-3.2-63470--190LIS SECTIONS 5 AND 6
M13/D-203-3.5-4284--190LIS PIPING PLAN
REFERENCE DRAWINGS

NO	REVISION	DATE/DATE	APPROVE

COPYRIGHT © This drawing is the property of Enbridge and shall not be reproduced either in whole or in part without prior written consent of Enbridge



SARNIA (ON) TERMINAL
BOOSTER PUMP 203-BP-32
DISCHARGE LINE
MATERIAL IDENTIFICATION ISOMETRIC

DATE	SCALE	APPROVE
11 JUL 13	NTS	ETAMAYO

D-203-3.01-63156-3-190LIS M36

Dual Plate Check Valve

203-BDCV-311



ISO 9001
 BSI Registered
 Cert No: FM00343

**BS EN 10204 3.1 + NACE MR-01-75 /
 ISO 15156 CERTIFICATE
 API 594 DUAL PLATE CHECK VALVE**

The materials used in manufacture of valves on this certificate comply with Nace MR-01-75 / ISO 15156 Latest Edition.

CLIENT: ENBRIDGE PIPELINES INC
ORDER N°: P4000-11760
PART CODE: BFR14-030-OSUPRLYS
DESCRIPTION: 14 IN ANSI 300 RF CHECK VALVE

QUANTITY: 1
CUSTOMER ITEM N°: 10
CUSTOMER TAG N°: 203-BDCV-311
SA-LIS-M-00029
1241237A80

GOODWIN JOB N°
AM28289/10

VALVE NO	BODY	PLATE	BODY SEAT	PLATE SEAT	SPRING	CARRIER	HINGE & STOP PIN	KEEPER PLATES	OTHER
	ASTM A352 LCC	ASTM A351 CF8M	Stellite 6	As Plates	Inconel X750	ASTM A351 CF8M	ASTM A276 / A479 316ss	ASTM A276 / A479 316ss	
1	13484	B9AF B89Y				D3 D4	S616 S616	S507 S507	

Test Pressures		TEST RESULTS TEST IN ACCORDANCE WITH API 594 / API 598 / ANSI B16.34
HYDRO SHELL TEST PRESSURE	SHELL TEST EXTENDED TESTS	
1125 psi	60 mins	
HYDRO SEAT TEST PRESSURE	SEAT TEST EXTENDED TESTS	
825 psi	5 mins	
AIR SEAT TEST PRESSURE	AIR SEAT TEST EXTENDED TESTS	
N/A	N/A	
OTHER TEST	OTHER TEST	
N/A	N/A	

CERTIFIED BY	AUTHORISED SIGNATORY
Karen Holdforth	
DATE	16-Dec-2013

DOCS ATTACHED :
 MATERIAL CERTS (BODY & PLATE)
 INSPECTION AND NDT REPORTS

GOODWIN INTERNATIONAL LTD
STOKE-ON-TRENT, ENGLAND

GI Page No :-
 28289/10

Q.A.F. 075 NACE.B REV 7

Additional Information:

Statement of Conformity:

We hereby certify that the valves and materials detailed above have been manufactured, inspected and tested in accordance with the requirements of the Purchase Order and unless otherwise noted, conform in all respects to the relevant National and International Standards.

CERTIFICATE OF CALIBRATION

Issued By Proserv UK Limited
Date of Issue 05 November 2013

Certificate Number
CU00076



0725

Proserv UK Limited
Unit 1 Instrumentation & Calibration Facility
Birchmoss Depot, Echt
Westhill, Aberdeenshire
AB32 6XL

Page 1 of 2

Approved Signatory

E. Elis

K. Neri

Customer : TER Calibration Ltd
Unit 1, Armstrong Point
Swan Lane, Hindley Green

Wigan
WN2 4 AV

Date Received: 05/11/2013

TER Instruments
01942 552275 www.ter.co.uk
Ref: 624102/266152
Ser:
Date: 05/11/2013 Submitted
Due: 04/05/2014
Cert: CU00076

Instrument -	System ID :	ID17501	Job Number :	04-001806
	Description :	Pressure Gauge		
	Manufacturer :	Stewart Buchanan		
	Model Number :	25000 Psi		
	Serial Number :	10906566-2		
	Procedure Version :	2926		

Environmental Conditions

Temperature : 20°C ± 2°C
Relative Humidity : < 70%

Mains Voltage : 240V ± 10V
Mains Frequency 50Hz ± 1Hz

Comments

Instrument was allowed to acclimatise for over four hours.
No Adjustments were made.

Calibration Information

The instrument was calibrated against laboratory standards whose values are traceable to recognised National Standards. The uncertainty limits quoted refer to the measured values only, with no account being taken of the instruments ability to maintain its calibration.

Calibrated By : Mike Beattie

Date of Calibration : 05 November 2013

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

CERTIFICATE OF CALIBRATION

Certificate Number
 CU00076

Page 2 of 2

Test Title	Tolerance	Applied Value	Reading	Error
Readings Rising				
0 Psi	250Psi	0Psi	0.0Psi	0.00
5000 Psi	250Psi	5000Psi	5092.0Psi	-92.00
10000 Psi	250Psi	10000Psi	10233.0Psi	-233.00
15000 Psi	250Psi	15000Psi	15219.0Psi	-219.00
20000 Psi	250Psi	20000Psi	20106.0Psi	-106.00
25000 Psi	250Psi	25000Psi	24953.0Psi	47.00
Readings Falling				
20000 Psi	250Psi	20000Psi	19956.0Psi	44.00
15000 Psi	250Psi	15000Psi	15050.0Psi	-50.00
10000 Psi	250Psi	10000Psi	10094.0Psi	-94.00
5000 Psi	250Psi	5000Psi	5011.0Psi	-11.00
0 Psi	250Psi	0Psi	0.0Psi	0.00
End of Test Data				

The uncertainty of measurement is +/- 0.024% +14.8 PSI +1/5 UUT scale division.
 Where 1 PSI = 6,894.76 Pa

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

CERTIFICATE OF CALIBRATION

Date Of Issue 09 January 2013
Issue Number 1
Certificate Number TERUKAS31190
Issue By TER Calibration
Page 1 of 2



UKAS ACCREDITED CALIBRATION LABORATORY NO. 0149

0149



TER CALIBRATION LTD
Peel Lane, Astley, Manchester M29 7QX
Tel:-01942 882275 Fax:-01942 897958
E:-me@ter.co.uk Web:-www.ter.co.uk

Approved Signatory
Les Finnen

Submitted By Goodwin International Ltd
Newstead Industrial
Trading Est.
Trentham
Stoke On Trent
ST4 8HU
Engineer STEVEH
Procedure Number 010002657
Order Number 00173732
Date Received 13 December 2012
Callbration Date 09 January 2013
Request Recalibration 08 July 2013
Equipment DRUCK DPI283 Digital Pressure Indicator
Serial Number 28301587 & 3233214
Owners Identification
TERID 301101
JobNumber 615129
Conditions of Test
Temperature 20°C ±1°C
Humidity 42% ±10%

Method Of Test

Druck DPI283 Digital Indicator Serial Number 28301587 was calibrated in conjunction with Druck PTX7511-1 Pressure Transmitter Serial Number 3233214

The unit under test was calibrated against a reference pressure balance.

Prior to calibration the unit under test was exercised up to its maximum working range.

Pressure Medium: Oil

Pressure Reference: Pressure was referenced to the sealing face of the pressure connector.

Orientation: The unit under test was calibrated in the vertical position, with the pressure connection down most.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

CERTIFICATE OF CALIBRATION

Date Of Issue 09 January 2013
 Issue Number 1
 Certificate Number TERUKAS31190
 Issue By TER Calibration
 Page 2 of 2

UKAS ACCREDITED CALIBRATION LABORATORY NO. 0149

Test 1 Pressure

Range	Operation	Unit Under Test	Applied Pressure	Specification	Uncertainty
0 - 10 000psi	Increasing	0 000 psi	0.000 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Increasing	1 014 psi	1 016.029 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Increasing	2 029 psi	2 032.048 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Increasing	4 060 psi	4 064.177 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Increasing	6 093 psi	6 096.189 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Increasing	7 968 psi	7 982.960 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Increasing	9 998 psi	10 014.890 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Decreasing	7 971 psi	7 982.960 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Decreasing	6 062 psi	6 096.189 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Decreasing	4 061 psi	4 064.177 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Decreasing	2 029 psi	2 032.048 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Decreasing	1 012 psi	1 016.029 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Decreasing	0 000 psi	0.000 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)

The uncertainty of measurement includes an allowance for short term stability, repeatability and resolution.

Stability, repeatability and resolution achieved during test 0.01bar.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Dual Plate Check Valve

203-BDCV-321



ISO 9001
 BSI Registered
 Cert No: FM00343

**BS EN 10204 3.1 + NACE MR-01-75 /
 ISO 15156 CERTIFICATE
 API 594 DUAL PLATE CHECK VALVE**

Attachment 5 - Equipment Test Package - Hydrostatic Test Summary

The materials used in manufacture of valves on this certificate comply with Nace MR-01-75 / ISO 15156 Latest Edition.

CLIENT: ENBRIDGE PIPELINES INC
ORDER N°: P4000-11760
PART CODE: BFR14-030-OSUPRLYS
DESCRIPTION: 14 IN ANSI 300 RF CHECK VALVE

QUANTITY: 1
CUSTOMER ITEM N°: 11
CUSTOMER TAG N°: 203-BDCV-321
SA-LIS-M-00030
1241237A80

GOODWIN JOB N°
AM28289/11

VALVE NO	BODY	PLATE	BODY SEAT	PLATE SEAT	SPRING	CARRIER	HINGE & STOP PIN	KEEPER PLATES	OTHER
	ASTM A352 LCC	ASTM A351 CF8M	Stellite 6	As Plates	Inconel X750	ASTM A351 CF8M	ASTM A276 / A479 316ss	ASTM A276 / A479 316ss	
1	13482	B9AG B9AI				D2 D4	S616 S616	S507 S507	

Test Pressures		TEST RESULTS TEST IN ACCORDANCE WITH API 594 / API 598 / ANSI B16.34
HYDRO SHELL TEST PRESSURE	SHELL TEST EXTENDED TESTS	
1125 psi	60 mins	
HYDRO SEAT TEST PRESSURE	SEAT TEST EXTENDED TESTS	
825 psi	5 mins	
AIR SEAT TEST PRESSURE	AIR SEAT TEST EXTENDED TESTS	
N/A	N/A	
OTHER TEST	OTHER TEST	
N/A	N/A	

CERTIFIED BY	AUTHORISED SIGNATORY
Karen Holdforth	
DATE	16-Dec-2013

DOCS ATTACHED :
 MATERIAL CERTS (BODY & PLATE)
 INSPECTION AND NDT REPORTS

GOODWIN INTERNATIONAL LTD
STOKE-ON-TRENT, ENGLAND

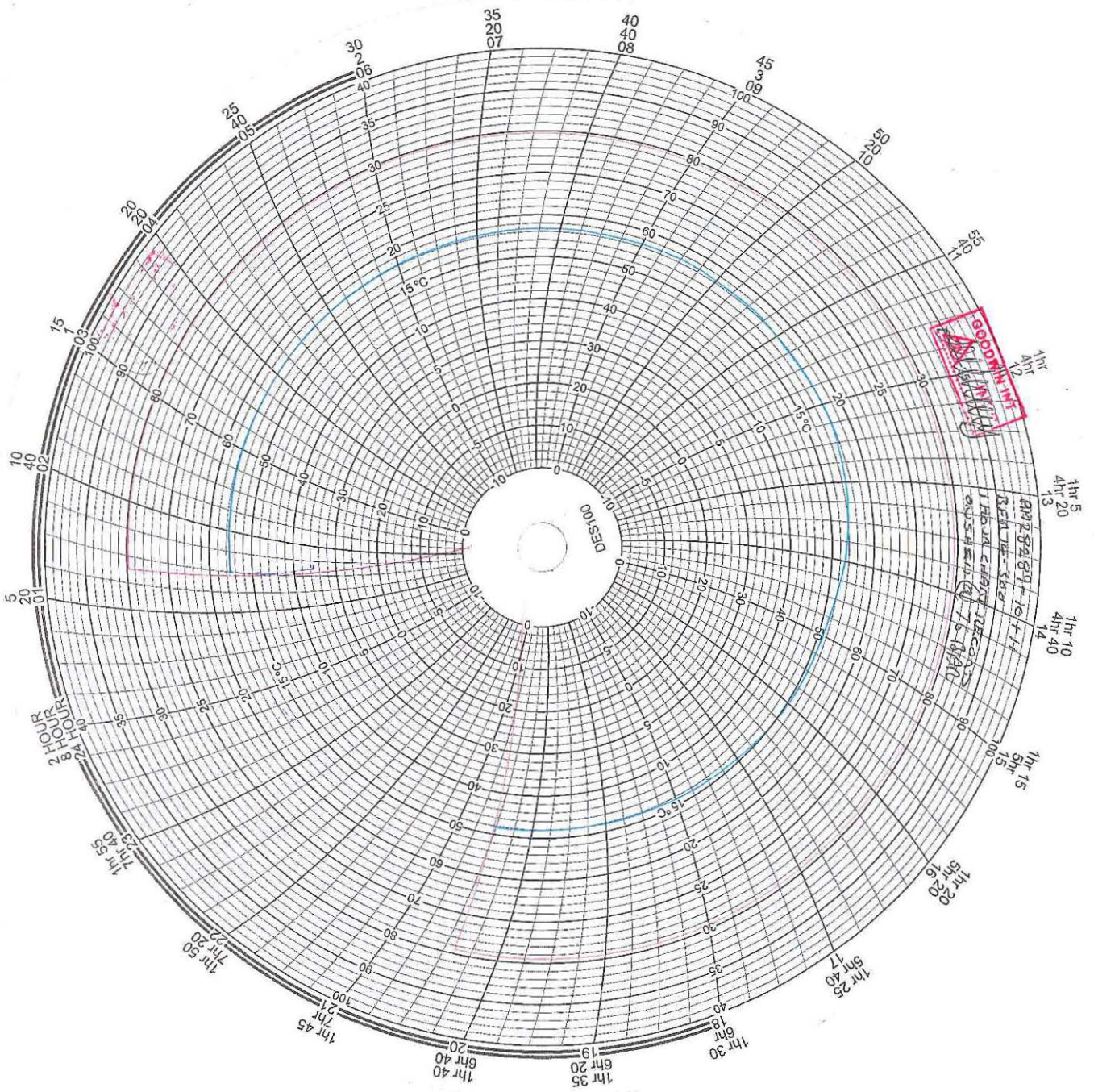
GI Page No :-
 28289/11

Q.A.F. 075 NACE.B REV 7

Additional Information:

Statement of Conformity:

We hereby certify that the valves and materials detailed above have been manufactured, inspected and tested in accordance with the requirements of the Purchase Order and unless otherwise noted, conform in all respects to the relevant National and International Standards.



[Handwritten signature]
16/12/13
FOR ENBRIDGE

CERTIFICATE OF CALIBRATION

Issued By Proserv UK Limited **Certificate Number** CU00076
Date of Issue 05 November 2013



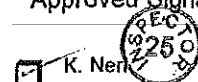
0725

Proserv UK Limited
Unit 1 Instrumentation & Calibration Facility
Birchmoss Depot, Echt
Westhill, Aberdeenshire
AB32 6XL

Page 1 of 2


Approved Signatory

E. Elis



Customer : TER Calibration Ltd
Unit 1, Armstrong Point
Swan Lane, Hindley Green

Wigan
WN2 4 AV

Date Received: 05/11/2013

TER Instruments
01942 552275 www.ter.co.uk
Ref: 624102/266152
Ser:
Date: 05/11/2013 Submitted
Due: 04/05/2014
Cert: CU00076

Instrument -	System ID : ID17501	Job Number : 04-001806
	Description : Pressure Gauge	
	Manufacturer : Stewart Buchanan	
	Model Number : 25000 Psi	
	Serial Number : 10906566-2	
	Procedure Version : 2926	

Environmental Conditions

Temperature : 20°C ± 2°C
Relative Humidity : < 70%

Mains Voltage : 240V ± 10V
Mains Frequency 50Hz ± 1Hz

Comments

Instrument was allowed to acclimatise for over four hours.
No Adjustments were made.

Calibration Information

The instrument was calibrated against laboratory standards whose values are traceable to recognised National Standards. The uncertainty limits quoted refer to the measured values only, with no account being taken of the instruments ability to maintain its calibration.

Calibrated By : Mike Beattie

Date of Calibration : 05 November 2013

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

CN 013 REV 01

CERTIFICATE OF CALIBRATION

Certificate Number
CU00076

Page 2 of 2

Test Title	Tolerance	Applied Value	Reading	Error
Readings Rising				
0 Psi	250Psi	0Psi	0.0Psi	0.00
5000 Psi	250Psi	5000Psi	5092.0Psi	-92.00
10000 Psi	250Psi	10000Psi	10233.0Psi	-233.00
15000 Psi	250Psi	15000Psi	15219.0Psi	-219.00
20000 Psi	250Psi	20000Psi	20106.0Psi	-106.00
25000 Psi	250Psi	25000Psi	24953.0Psi	47.00
Readings Falling				
20000 Psi	250Psi	20000Psi	19956.0Psi	44.00
15000 Psi	250Psi	15000Psi	15050.0Psi	-50.00
10000 Psi	250Psi	10000Psi	10094.0Psi	-94.00
5000 Psi	250Psi	5000Psi	5011.0Psi	-11.00
0 Psi	250Psi	0Psi	0.0Psi	0.00

End of Test Data

The uncertainty of measurement is +/- 0.024% +14.8 PSI +1/5 UUT scale division.
 Where 1 PSI = 6,894.76 Pa

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

CERTIFICATE OF CALIBRATION

Date Of Issue 09 January 2013
Issue Number 1
Certificate Number TERUKAS31190
Issue By TER Calibration
Page 1 of 2



UKAS ACCREDITED CALIBRATION LABORATORY NO. 0149

0149



TER CALIBRATION LTD
Peel Lane, Astley, Manchester M29 7QX
Tel:-01942 882275 Fax:-01942 897958
E:-me@ter.co.uk Web:-www.ter.co.uk

Approved Signatory
Les Finnen

Submitted By Goodwin International Ltd
Newstead Industrial
Trading Est.
Trentham
Stoke On Trent
ST4 8HU
Engineer STEVEH
Procedure Number 010002657
Order Number 00173732
Date Received 13 December 2012
Calibration Date 09 January 2013
Request Recalibration 08 July 2013
Equipment DRUCK DPI283 Digital Pressure Indicator
Serial Number 28301587 & 3233214
Owners Identification
TERID 301101
JobNumber 615129
Conditions of Test
Temperature 20°C ±1°C
Humidity 42% ±10%

Method Of Test

Druck DPI283 Digital Indicator Serial Number 28301587 was calibrated in conjunction with Druck PTX7511-1 Pressure Transmitter Serial Number 3233214

The unit under test was calibrated against a reference pressure balance.

Prior to calibration the unit under test was exercised up to its maximum working range.

Pressure Medium: Oil

Pressure Reference: Pressure was referenced to the sealing face of the pressure connector.

Orientation: The unit under test was calibrated in the vertical position, with the pressure connection down most.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

CERTIFICATE OF CALIBRATION

Date Of Issue 09 January 2013
 Issue Number 1
 Certificate Number TERUKAS31190
 Issue By TER Calibration
 Page 2 of 2

UKAS ACCREDITED CALIBRATION LABORATORY NO. 0149

Test 1 Pressure

Range	Operation	Unit Under Test	Applied Pressure	Specification	Uncertainty
0 - 10 000psi	Increasing	0 000 psi	0.000 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Increasing	1 014 psi	1 016.029 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Increasing	2 029 psi	2 032.048 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Increasing	4 060 psi	4 064.177 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Increasing	6 093 psi	6 096.189 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Increasing	7 968 psi	7 982.960 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Increasing	9 998 psi	10 014.890 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Decreasing	7 971 psi	7 982.960 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Decreasing	6 062 psi	6 096.189 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Decreasing	4 061 psi	4 064.177 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Decreasing	2 029 psi	2 032.048 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Decreasing	1 012 psi	1 016.029 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)
0 - 10 000psi	Decreasing	0 000 psi	0.000 psi	± 0.12 % of FS DPM and	± (0.01 % + 1psi)

The uncertainty of measurement includes an allowance for short term stability, repeatability and resolution.

Stability, repeatability and resolution achieved during test 0.01bar.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Slab Gate Valves:

9-USV-31 - SN: 1000002924427

9-UDV-31 - SN: 1000002924428

SPX
Flow Technology
HOUSTON, TEXAS

CERTIFICATE OF COMPLIANCE

Date MAY 21 2014

Customer: ENBRIDGE PIPELINES INC

Purchase Order Number: P4000-11768-2W

Sales Order Number: 1734052

<u>Item</u>	<u>Quantity</u>	<u>Description</u>	<u>Serial Number</u>
55	2	20" CL 600, MODEL M303 GATE VALVE.	1000002924427 1000002924428

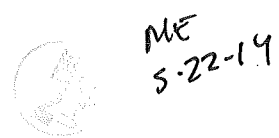
SPX Flow Technology certifies that the above were manufactured in accordance with API-6D Specifications.



Douglas Hinze

Quality Control Supervisor

DH/mt



SPX
Flow Technology
HOUSTON, TEXAS

CERTIFICATE OF COMPLIANCE

Date MAY 19 2014

Customer: ENBRIDGE PIPELINES INC

Purchase Order Number: P4000-11768-2W

Sales Order Number: 1734052

<u>Item</u>	<u>Quantity</u>	<u>Description</u>	<u>Serial Number</u>
55	2	20" CL 600, MODEL M303 GATE VALVE.	1000002924427 1000002924428

Attached are the hydrostatic test reports for the above.



Douglas Hinze

Quality Control Supervisor

DH/mt



ME
5.22-14

PRODUCT: <input checked="" type="checkbox"/> GATE <input type="checkbox"/> DAN-FLO <input type="checkbox"/> EX-GATE <input type="checkbox"/> BALLTROL <input type="checkbox"/> CEG <input type="checkbox"/> CHECK <input type="checkbox"/> OTHER _____	SIZE: <u>20"</u> MODEL: <u>m303</u>	CLASS: <input type="checkbox"/> 150 <input type="checkbox"/> 900 <input type="checkbox"/> 300 <input type="checkbox"/> 1500 <input type="checkbox"/> 400 <input type="checkbox"/> 2500 <input type="checkbox"/> 600 <input type="checkbox"/> OTHER _____	ENDS: <input type="checkbox"/> FXF <input checked="" type="checkbox"/> WXW <input type="checkbox"/> WXF <input type="checkbox"/> _____	SERIAL NO. <u>10000002924427</u> S.O. NO. <u>1734052-55</u> CUSTOMER <u>Enbridge</u>
---	--	---	--	---

PRESSURE/FUNCTIONAL TESTING PER: API 6D ANSI B16.34 M&J/CUST. SPEC: HT-1340

VALVE OPERATED BY: TEMPORARY OPERATOR BGO ELECTRIC HYDRAULIC

PRESSURE TESTING	HYDROSTATIC SHELL TEST	@ <u>2350</u> PSIG. FOR <u>1</u>	<input checked="" type="checkbox"/> HR <input type="checkbox"/> MIN	<input checked="" type="checkbox"/> TEST OK	GAGE NO. <u>CR-0014</u>
	HYDROSTATIC SEAT TEST	SEAT #1 @ <u>1700</u> PSIG. FOR <u>5</u>	<input type="checkbox"/> HR <input checked="" type="checkbox"/> MIN	<input checked="" type="checkbox"/> TEST OK	GAGE NO. <u>CR-0014</u>
		SEAT #2 @ <u>1700</u> PSIG. FOR <u>5</u>	<input type="checkbox"/> HR <input checked="" type="checkbox"/> MIN	<input checked="" type="checkbox"/> TEST OK	GAGE NO. <u>CR-0014</u>
	BLOCK & BLEED	BOTH SEATS @ <u>1700</u> PSIG. FOR <u>5</u>	<input type="checkbox"/> HR <input checked="" type="checkbox"/> MIN	<input checked="" type="checkbox"/> TEST OK	GAGE NO. <u>CR-0014</u>
	AIR/GAS SHELL TEST	@ _____ PSIG. FOR _____	<input type="checkbox"/> HR <input type="checkbox"/> MIN	<input type="checkbox"/> TEST OK	GAGE NO. _____
	AIR/GAS SEAT TEST	SEAT #1 @ _____ PSIG. FOR _____	<input type="checkbox"/> HR <input type="checkbox"/> MIN	<input type="checkbox"/> TEST OK	GAGE NO. _____
SEAT #2 @ _____ PSIG. FOR _____		<input type="checkbox"/> HR <input type="checkbox"/> MIN	<input type="checkbox"/> TEST OK	GAGE NO. _____	

FUNCTIONAL TESTING	PULL TEST	VALVE OPENED WITH SEAT #1 @ _____ PSIG. <input type="checkbox"/> SEAT RETEST OK
		VALVE OPENED WITH SEAT #2 @ _____ PSIG. <input type="checkbox"/> SEAT RETEST OK
	TORQUE TEST	_____ FT.-LBS TO OPEN VALVE WITH SEAT #1 @ _____ PSIG. <input type="checkbox"/> OK
		_____ FT.-LBS TO OPEN VALVE WITH SEAT #2 @ _____ PSIG. <input type="checkbox"/> OK
_____ FT.-LBS TO OPEN @ 0 PSIG.		_____ FT.-LBS TO CLOSE @ 0 PSIG.

VALVE STROKE FULL OPEN / FULL CLOSE YES BOLTING TIGHTNESS AFTER TEST ? OK

VERIFICATION

SET PRESSURE _____ PSIG. @ _____ PSIG. N2 LD. PILOT SN _____

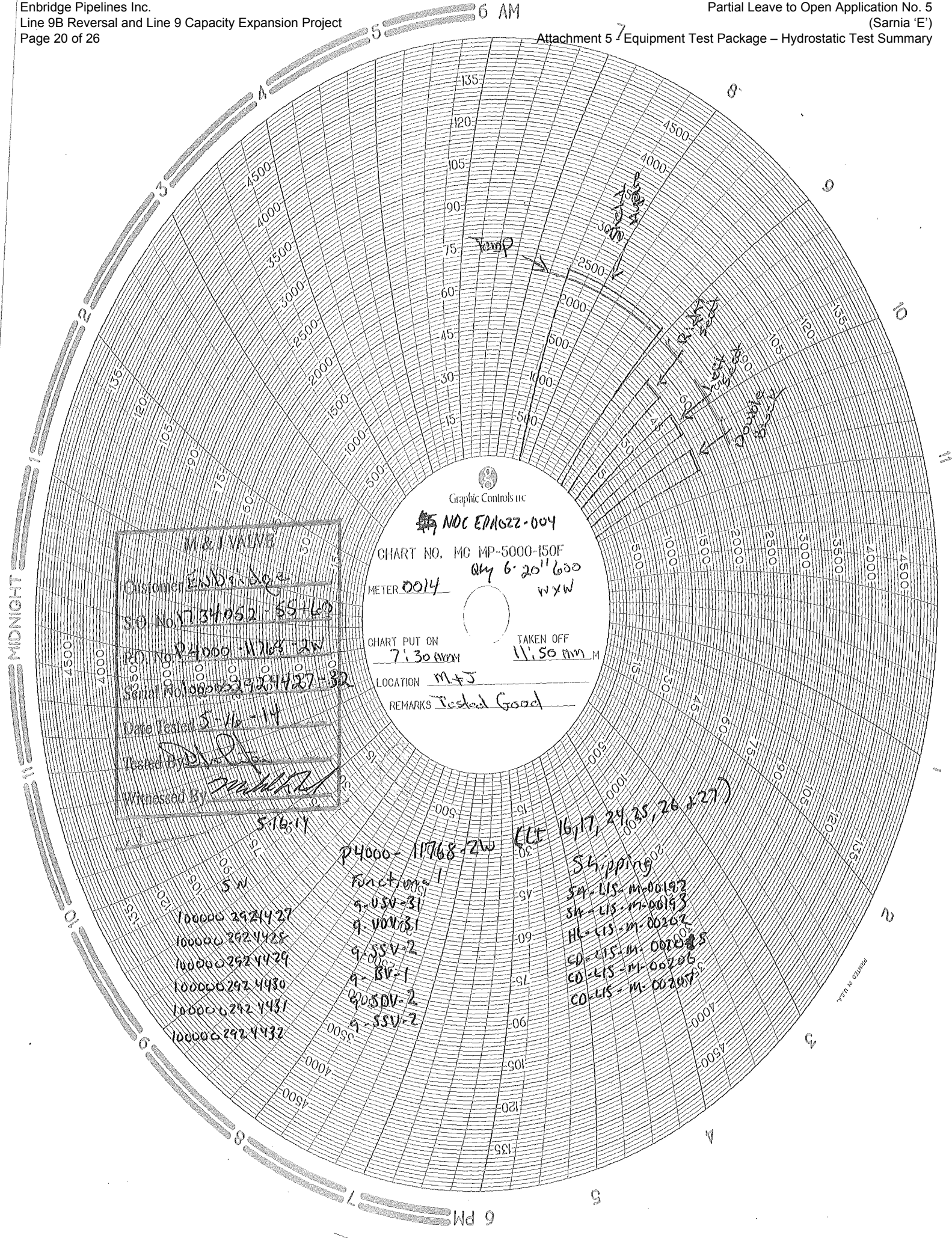
VALVE ASSEMBLED BY: 1st + 2nd shift DATE: 5-15-14

VALVE TESTED BY: [Signature] DATE: 5-16-14

TEST WITNESSED BY: [Signature] DATE: 5-16-14

COMMENTS:
Runtime - open + close - 163 sec

PG - 0357



M & J VALVE
Customer: Endsley
SO No: 1734052-55+60
ID No: R4000-11768-2W
Serial No: 100002924432-32
Date Tested: 5-16-14
Tested By: [Signature]
Witnessed By: [Signature]

Graphic Controls Inc
~~NO~~ NOC ED1622-004
CHART NO. MC MP-5000-150F
Qty 6 20" 600
WxW
METER 0014
CHART PUT ON 7:30 AM TAKEN OFF 11:50 AM
LOCATION M+J
REMARKS Tested Good

- 100000 2924427
- 100000 2924428
- 100000 2924429
- 100000 2924430
- 100000 2924431
- 100000 2924432

- R4000-11768-2W
- Function 1
- q-UV-31
- q-VN-31
- q-SSV-2
- q-BV-1
- q-SDV-2
- q-SSV-2

- (LI 16, 17, 24, 25, 26 & 27)
- Shipping
- SA-LIS-M-00192
- SA-LIS-M-00193
- HL-LIS-M-00202
- CD-LIS-M-00205
- CD-LIS-M-00206
- CD-LIS-M-00207

MDNIGHT

6 PM

Company: SPX Flow Technology	Doc #: 39800 OEM #: cd4-6963	Print #: 000-000 Serial #: PG-0357
Address: 19191 Hempstead Hwy. Houston, Tx	Contact: Dept: Cal.Date: 02/20/2014	Location: M&J Assy & Test Mfg: Ashcroft Model: 0 - 5000 PSI
Zip: 77065	PO#:	Gage: Pressure Gauge
Page: 1 of 1		

As Found

Master	Actual	Deviation	Serial	Tol +50.000000 / -50.000000
+1250.000000	+1270.000000	+20.000000		
+2500.000000	+2504.000000	+4.000000		
+3750.000000	+3753.000000	+3.000000		
+5000.000000	+5000.000000	+0.000000		

As Left

Master	Actual	Deviation	Serial	Tol +50.000000 / -50.000000
+1250.000000	N/A	N/A		
+2500.000000	N/A	N/A		
+3750.000000	N/A	N/A		
+5000.000000	N/A	N/A		

Comments:

Calibration Procedure CAL - 0020 Latest Rev.

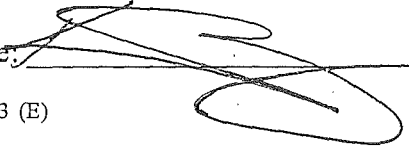
We certify the equipment used for this calibration is traceable to NIST through one or more of the following numbers:

Reference Standard Serial #: DWT-0003 Deadweight Tester 15 - 10,000 psig Traceable to NIST via NAMAS certification no:	Last / Next Cal Dates: 08/21/2013 --> 08/21/2016
Reference Standard Serial #: calpg-0001 Digital Test Comparator Gauge 0-500 Traceable to NIST via NAMAS certification no:	Last / Next Cal Dates: 06/25/2013 --> 06/25/2014
Reference Standard Serial #: calpg-0002 Digital Test Comparator Gauge 0-2000 Traceable to NIST via NAMAS certification no:	Last / Next Cal Dates: 06/25/2013 --> 06/25/2014
Reference Standard Serial #: calpg-0003 Digital Test Comparator Gauge 0-10000 Traceable to NIST via NAMAS certification no:	Last / Next Cal Dates: 06/25/2014 --> 06/25/2014

Gage Status: PASS


Next Calibration Due: 05/20/2014

Certified By: Kevin Priesmeyer

Signature: 

This certificate is not valid unless all 1 page(s) are present:

We certify that the aforementioned gage has been calibrated according to the requirements of ISO 10012-1 : 2003 (E)


SPX >M&J Valve ISO 14313 

HOUSTON, TEXAS
 PATENTED: 5,163,655 AND 6,164,622

SIZE	CLASS	MODEL	API	F/F
20"	600	M-303	6D	7L 50"
BODY	GATE	SEAT	STEM	SEAL
X-52	A-516	A-350	4140	LT/BUNA
TEMP	-50F	+150F		
MOP	1480 PSI	1415 PSI		
DATE MFG	LICENSE NO	SERIAL NUMBER		
05/14	6D-0079	1000002924427		

DBB SHELL TEST@2275 PSI FOR 1HR.

PO# P4000-11768-2W
 FUNC. TAG# 9-USV-31
 SHIPPING TAG#
 SA-LIS-M-00192
 SHELL TEST@2350PSIFOR1HR

SPX >M&J Valve ISO 14313 

HOUSTON, TEXAS
 PATENTED: 5,163,655 AND 6,164,622

SIZE	CLASS	MODEL	API	F/F
20"	600	M-303	6D	7L 50"
BODY	GATE	SEAT	STEM	SEAL
X-52	A-516	A-350	4140	LT/BUNA
TEMP	-50F	+150F		
MOP	1480 PSI	1415 PSI		
DATE MFG	LICENSE NO	SERIAL NUMBER		
05/14	6D-0079	1000002924428		

DBB SHELL TEST@2275 PSI FOR 1HR.

PO# P4000-11768-2W
 FUNC. TAG# 9-UDV-31
 SHIPPING TAG#
 SA-LIS-M-00193
 SHELL TEST@2350PSIFOR1HR.

4" Flex Hose



Senior Operations (Canada) Limited
134 Nelson Street West
Brampton, ON L6X 1C9
Tel: 905-451-1250
800-267-1975
Fax: 905-451-1315
www.flexonics.ca

P.O. 4450-0154


Certificate of Compliance / Conformance

Customer:	Industratech Inc.	Date:	September 16, 2014
P.O. Number:	Visa	Customer Order No.	77071

We hereby certify that all material used in the manufacture of the above designated order conforms to material and / or specification listed above and are in accordance with the manufacturing provisions of this order.

Equipment listed herein has been inspected by the company and are in conformance with the contract requirements and are now approved for shipment.

C.R.N.	0D2524.5C	Unit accepted
---------------	-----------	---------------



Stuart Bailey
Quality Manager



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

Request for Hydrotest

Canadian Facilities Construction Services



Contractor LamSar Inc. **Test No.:** 4450-38
Location Sarnia Terminal **Test Date:** Sep. 13/2014
AFE/Project: 1241237A80 (LIS) **Job Description:** SA Line 9B Reversal/Expansion

Hydrotest Drawing Number D-9-3.01-HT961-2-190LIS, Q445

Test Media **WATER** Yes **AIR** _____ **OTHER** _____


Volume (m³) 2.258 m3

Pipe Sizes 14", 20", 4"

Pipe Grade CAT. I, Gr. 290, SMLS

Test Media Source Treated water from frack tank

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

Authorization/Permission	
Treatment prior to test	<u>N/A</u>
Treatment after test	<u>N/A</u>
Disposal of test media	<u>Pump back to frack tank for testing, treating and disposal</u>
Notes	

Requested by:

Name (Print): Natalya Davydenko

Signature: 

Date: Sep.11/2014

MPFCS-CKL-HTQC-025-r00.docx

December 2010

Hydrostatic Test QA Checklist

Canadian Facility Construction Services



Contractor: LamSar Inc. **Date:** Sep.13/2014
Project: SA Line 9B Reversal/ Expansion **Test No.:** 4450-38
Location: 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	13/09/2014	
Test Section Drawing	Y	13/09/2014	
Review Materials Documentation	Y	13/09/2014	
Establishing intended maximum operating pressure (MOP), and for deviations to existing MOP approval by Engineering	Y	13/09/2014	
All NDE Reviewed	Y	13/09/2014	
Equipment List	Y	13/09/2014	
Pre Hydro-Package Approvals	Y	13/09/2014	
Environmental Concerns / Issues	N.A.	N/A	
Safety precautions specific to the circumstances, including setback distances for workers and the public	Y	13/09/2014	
Pre-job Meeting with Workers	Y	13/09/2014	
Calibration of Test Instruments	Y	13/09/2014	
Pressure Recorder Set	Y	13/09/2014	
Test Acceptance Criteria	Y	13/09/2014	

Contractor Representative:

Company Representative:

Name (Print): Natalya Davydenko
 Signature:
 Date: 13/09/2014

Name (Print): Andre Begin
 Signature:
 Date: 13/09/2014

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

Pressure Test Equipment Report

Canadian Facilities Construction Services



MPCFCS-PTR-065-R2

Page 1 of 1

CONTRACTOR	LamSar Inc.	TEST DATE	Sep.13/2014
PROJECT	SA Line 9B Reversal/ Expansion	TEST No.	4450-38
LOCATION	Sarnia Terminal	AFE	1241237A80 (LIS)
DRAWING #.	D-9-3.01-HT961-2-190LIS, Q445	CWP #	N/A

PIPE DATA

NPS/OD	WT	Grade	Length	Manufacturer	Type
14"	12.7mm	CAT. I, Gr. 290	63'-6" (19350mm)	V&M	SMLS
20"	12.7mm	CAT. I, Gr. 359	10'-6"(3200mm)	ScAH Steel	SAW
4"	8.56mm	A106-B	6'-3"(1920mm)	Tenaris	SMLS
THE NPS 4 PIPE IS NOT PART OF THIS LTO PACKAGE					

TEST DATA

Test Medium	Fill Volume
Potable Water	2,258 Cubic Meter

	REFERENCE INSTRUMENTS		TEST EQUIPMENT		
	Deadweight Pressure	Liquid in Glass Thermometer	Pressure Recorder	Pressure Gauge	Temperature Recorder
Make	Fluke	Fluke	Dri Flo II	Wika	Dri Flo II
Range	0-5000 psi	- 238 to 1832 F	0-3000 psi	0-5000 psi	0 to 150 F
Serial No.	2395137	26470619WS	25122659	LN-5000-52 LN-5000-65	2512-002675

	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	555.9 psi	1120.3 psi	1660.1 psi	2220.6 psi	2215.9 psi	1725.3 psi	1100.4 psi	555.1 psi
Pressure Recorder	555 psi	1120 psi	1660 psi	2220 psi	2215 psi	1725 psi	1103 psi	556 psi
Pressure Gauge	555 psi	1120 psi	1660 psi	2220 psi	2215 psi	1725 psi	1103 psi	556 psi

Test	Aim Test Pressure	Minimum	Maximum	Duration
Strength	2200 psig	2160 psig	2246 psig	1.25 hr
Leak	1800 psig	1584 psig	N/A	10 min.

See Accompanying Pages for Pressure and Temperature Records

Contractor Representative:

(Print) Natalya Davydenko

(Sign)

Date: Sep.13/2014

Enbridge Representative:

(Print) Andre Begin

(Sign)

Date: Sep.13/2014

Pressure Test Data Report

Canadian Facilities Construction Services




F-INSP-066-FPTDR-R1.DOT

CONTRACTOR NAME:	<u>LamSar Inc.</u>		
LOCATION:	<u>Sarnia Terminal</u>		
PROJECT / AFE:	<u>SA Line 9B Reversal/ Expansion 1241237A80 (LIS)</u>	Page 1 of 2	
TEST NO.:	<u>4450-38</u>	TEST DATE:	<u>Sep.13/2014</u>
DRAWING NO.:	<u>D-9-3.01-HT961-2-190LIS, Q445</u>	CWP NO.:	<u>N/A</u>

TIME	DEADWEIGHT PRESSURE psi	TEMPERATURE °F			REMARKS (Weather, Volumes Added/Bled Off)
		AMBIENT (Thermometer)	PIPE MEDIUM (Recorder)	GROUND Thermocouple)	
12:20	0.0	61.7	56	N/A	Begin Test, Run in Charts
12:30	0.0	61.5	55	N/A	Stabilize
12:35	7.5	61.3	55	N/A	Pump up to 25% Press Up
12:50	30.8	61.6	56	N/A	Pump up to 25% Press Up
1:05	48.2	61.9	58	N/A	Pump up to 25% Press Up
1:20	140.4	61.7	59	N/A	Pump up to 25% Press Up
1:35	555.9	61.2	61	N/A	Begin 25% Press. Up
1:40	556.1	60.9	61	N/A	Stabilize
1:50	1120.3	60.5	62	N/A	Begin 50% Press. Up
1:55	1120.1	60.4	62	N/A	Stabilize
2:05	1660.1	60.6	63	N/A	Begin 75% Press. Up
2:10	1660.2	60.7	63	N/A	Stabilize
2:20	2220.6	60.9	62	N/A	Begin Strength Test, 100% Press. Up
2:30	2219.5	60.7	62	N/A	Hold 1hr. 15 min.
2:40	2218.3	60.4	61	N/A	Hold
2:50	2218.0	60.0	61	N/A	Hold
3:00	2217.5	59.8	62	N/A	Hold
3:10	2217.3	59.9	63	N/A	Hold

Contractor Representative Natalya Davydenko
 Print

 Sign
Sep.13/2014
 Date

Company Representative Andre Begin
 Print

 Sign
Sep.13/2014
 Date

Pressure Test Data Report

Canadian Facilities Construction Services



F-INSP-066-FPTDR-R1.DOT

CONTRACTOR NAME: LamSar Inc.

LOCATION: Sarnia Terminal

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

TEST NO.: 4450-38

DRAWING NO.: D-9-3.01-HT961-2-190LIS, Q445

Page 2 of 2

TEST DATE: Sep.13/2014

CWP NO.: N/A

TIME	DEADWEIGHT PRESSURE psi	TEMPERATURE °F			REMARKS (Weather, Volumes Added/Bled Off)
		AMBIENT (Thermometer)	PIPE MEDIUM (Recorder)	GROUND Thermocouple)	
3:20	2216.8	59.6	63	N/A	Hold
3:30	2216.4	59.4	62	N/A	Hold
3:40	2215.9	59.0	63	N/A	End Strength Test, 100% Press. Down
3:45	1725.3	58.8	63	N/A	Begin Leak Test, 75% Press. Down
3:50	1725.8	59.0	62	N/A	Hold 10 Min.
3:55	1726.4	59.1	62	N/A	End Leak Test, 75% Press. Down
4:00	1100.4	59.2	62	N/A	Begin 50% Press. Down
4:05	1101.0	59.0	62	N/A	Stabilize
4:10	555.1	58.7	61	N/A	Begin 25% Press. Down
4:15	555.4	58.6	61	N/A	Stabilize
4:25	0.0	58.3	61	N/A	0% Test Press.
4:30	0.0	58.2	62	N/A	Run Out Charts
4:35	0.0	58.2	62	N/A	End Test

Contractor Representative Natalya Davydenko

Print

Sign Sep.13/2014

Date

Company Representative Andre Begin

Print

Sign Sep.13/2014

Date



Volume of Pipe Calculation

Pipe Size	Pipe Sch.	Ft Lg	Gallons [UK]	Gallons [US]	Litres
14	XS	63.5	364.6	437.8	1657.4

PIPE O.D.	Pipe Wall	PIPE I.D.	Ft Lg	Gallons [UK]	Gallons [US]	Litres
20	0.5	19	10.5	128.8	154.7	585.4

Pipe Size	Pipe Sch.	Ft Lg	Gallons [UK]	Gallons [US]	Litres
4	XS	6.5	3.2	3.9	14.7

Sept
SEPT 13/2014



1107 Moore Line, R.R. #1
Mooretown, Ontario N0N 1M0
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

<u>Calibrator</u>	<u>Pressure Calibrator</u>
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





1107 Moore Line, R.R. #1
Mooretown, Ontario N0N 1M0
Bus./Res. Phone: (519) 867-5361
Fax: (519) 867-2496

June 23, 2014

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

Att: Max Lessard

CALIBRATION REPORT

Type: Dri-Flo II Pressure Recorder
Serial #25122659
Range: 0 – 3000 PSI

Calibration Date – June 23, 2014

<u>Calibrator</u>	<u>Recorder</u>
0	0
500	500
1000	1000
1500	1500
2000	2000
2500	2500
3000	3000

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





1107 Moore Line, R.R. #1
Mooretown, Ontario N0N 1M0
Bus./Res. Phone: (519) 867-5361
Fax: (519) 867-2496

June 23, 2014

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

Att: Max Lessard

CALIBRATION REPORT

Type: Dri-Flo II Temperature Recorder
Serial: #2512-002675
Range: 0 – 150°F

Calibration Date – June 23, 2014

<u>Calibrator</u>	<u>Recorder</u>
32	32
86	86
126	126

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



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

MONTREAL
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 intrinsic 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: 



Certificate: 17706-00-1
Asset: 26470619WS.5111

Calibration Certificate
Data Type: As Found-As Left

Page 1 of 2



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

MONTREAL
 20800 Boul. Industriel
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 H9X 0A1
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CALGARY
 10505 48th St SE, Suite #101
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 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

Test Results

<u>Test Description</u>	<u>True Value</u>	<u>Reading</u>	<u>Lower limit</u>	<u>Upper limit</u>	<u>Units</u>	<u>Test Status</u>	<u>Exp Uncert</u>
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	

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-00981

Provincial Reference:	PC-17088-CAL
------------------------------	--------------

Manufacturer	Model	Gauge Number	Calibration Date	Expiration Date
WIKA	0-5000 PSI Wika	LN-5000-52	4/10/2013	4/10/2014

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

Customer:	Lamsar
Purchase Order:	42261

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				5000 PSI	
Reference Reading	Gauge Reading	Allowable Tolerance	Difference	Difference (% of reading)	Condition
0	0	25	0		Pass
1652	1650	25	-2	-0.001212121	Pass
3352	3350	25	-2	-0.000597015	Pass
5001	5000	25	-1	-0.0002	Pass
3344	3350	25	6	0.001791045	Pass
1647	1650	25	3	0.001818182	Pass
0	0	25	0		Pass

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
33461	Crystal Engineering	259899	0-20% of FS: ±(0.02% of FS); 20%-100% of FS: ±(0.1% of Rdg)

Calibrated By: Adam Allen

Inspected By: [Signature] AP

Certificate of Calibration

Report Number CTR-D5477

Provincial Reference:	PC-17633
------------------------------	----------

Manufacturer	Model	Gauge Number	Calibration Date	Expiration Date
Wika	0-5000PSI	LN-5000-65	7/15/2014	7/15/2015

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

Customer:	Lamsar Mechanical
Purchase Order:	4450

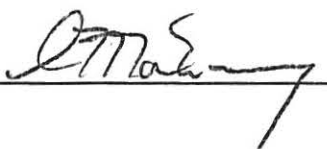
All calibrations are performed in a controlled environment by qualified personnel using instrumentation and methods which guarantee that specifications claimed are reliable. The above item has been inspected and tested to comply with the relevant specifications, in accordance with the above purchase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

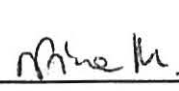

As Left Results			5000 PSI		
Reference Reading	Gauge Reading	Allowable Tolerance	Difference	Difference (% of reading)	Condition
0	0.0	25.0	0.0	0	Pass
2501	2500.0	25.0	1.0	3.333333333	Pass
4994	5000.0	25.0	-6.0	-20	Pass
2499	2500.0	25.0	-1.0	-3.333333333	Pass
0	0.0	25.0	0.0	0	Pass

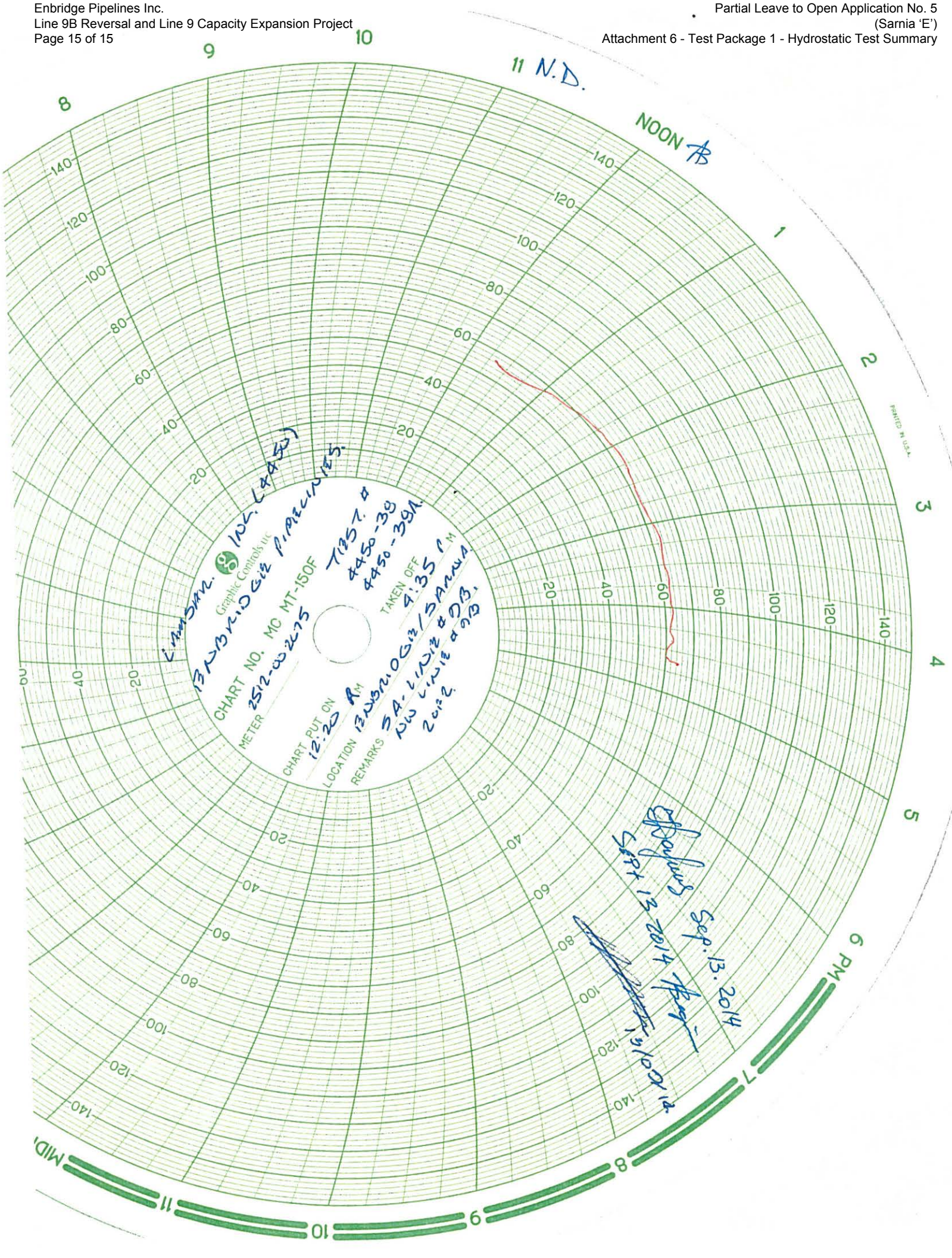
Deadweight S/N 66937.0

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
0191-259899	Crystal Engineering	259899	0.25% of Full Scale

Calibrated By: 

Inspected By:  



CAMDAN. 106. (745)
Graphic Controls Inc.
CHART NO. MC MT-150F
METER 2512-002675

CHART PUT ON 12:20 AM
LOCATION 13203700613/5ARNIA
REMARKS SA-LINER & DB, 2012
TAKEN OFF 9:35 PM
7257 & 4450-39 4450-39A

Sep. 13. 2014
Sep. 13. 2014

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

Request for Hydrotest

Canadian Facilities Construction Services



Contractor LamSar Inc. Test No.: 4450-40
Location LamSar Shop Test Date: Sept.12/2014
AFE/Project: 1241237A80 (LIS) Job Description: SA Line 9B Reversal/Expansion

Hydrotest Drawing Number D-203-3.01-HT153-3-190LIS (Q403), D-203-3.01-HT154-3-210LIS (Q404),
D-203-3.01-HT155-2-190LIS (Q405), D-203-3.01-HT156-2-190LIS (Q406),
D-203-3.01-HT152-1-190LIS (Q402 Valves Only)

Test Media WATER Yes AIR _____ OTHER _____

Volume (m³) <1.0 m3

Pipe Sizes 16",14 "

Pipe Grade CSA 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	<i>Begin</i>
Treatment prior to test	<u>N/A</u>
Treatment after test	<u>N/A</u>
Disposal of test media	<u>To shop drains</u>
Notes	

Requested by:

Name (Print): Dave Fletcher

Signature: *[Signature]*

Date: Sept.11/2014

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

Hydrostatic Test QA Checklist

Canadian Facility Construction Services



Contractor: LamSar Inc. **Date:** Sept.12/2014
Project: SA Line 9B Reversal/ Expansion **Test No.:** 4450-40
Location: LamSar Shop **AFE#:** 1241237A80 (LIS)
CWP #: N/A

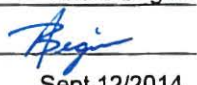
This checklist must be completed and attached to the hydrostatic test records prior to turnover. The following information must be completed prior to the hydrostatic tests as per Operations and Maintenance Manual Book 3: Pipeline Facilities, Section 07-02-01:

Task	Yes / No	Date	NOTES
Notifications	yes	12/09/2014	
Test Section Drawing	yes	12/09/2014	
Review Materials Documentation	yes	12/09/2014	
Establishing intended maximum operating pressure (MOP), and for deviations to existing MOP approval by Engineering	yes	12/09/2014	
All NDE Reviewed	yes	12/09/2014	
Equipment List	yes	12/09/2014	
Pre Hydro-Package Approvals	yes	12/09/2014	
Environmental Concerns / Issues	N/A	N/A	
Safety precautions specific to the circumstances, including setback distances for workers and the public	yes	12/09/2014	
Pre-job Meeting with Workers	yes	12/09/2014	
Calibration of Test Instruments	yes	12/09/2014	
Pressure Recorder Set	yes	12/09/2014	
Test Acceptance Criteria	yes	12/09/2014	

Contractor Representative:

Company Representative:

Name (Print): Dave Fletcher
Signature: 
Date: Sept.12/2014

Name (Print): Andre Begin
Signature: 
Date: Sept.12/2014

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

Pressure Test Equipment Report

Canadian Facilities Construction Services



MPCFCS-PTR-065-R2

Page 1 of 1

CONTRACTOR	LamSar Inc.	TEST DATE	Sept.12/2014
PROJECT	SA Line 9B Reversal/ Expansion	TEST No.	4450-40
LOCATION	LamSar Shop	AFE	1241237A80 (LIS)
DRAWING #.	Q403/Q404/Q405/Q406 (Q402 Valve Only)	CWP #	N/A

PIPE DATA

NPS/OD	WT	Grade	Length	Manufacturer	Type
14	0.375"(9.53mm)	CSA Gr.290 Cat I	2578mm	SeAH Steel	ERW
16	0.375"(9.53mm)	CSA Gr.290 Cat I	2214mm	SeAH Steel	ERW

TEST DATA

Test Medium	Fill Volume
Potable Water	<1.0 Cubic Meter

	REFERENCE INSTRUMENTS		TEST EQUIPMENT		
	Deadweight Pressure	Liquid in Glass Thermometer	Pressure Recorder	Pressure Gauge	Temperature Recorder
Make	Fluke	Fluke	Dri Flo II	Winters	Dri Flo
Range	0-5000 psi	- 238 to 1832 F	0-3000 psi	0-2000 psi	0 to 150 F
Serial No.	2395137	26470619WS	25122659	LN-2000-13 LN-2000-41	2512-002675

	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	280.6 psi	555.7 psi	832.9 psi	1105.1 psi	1106.6 psi	835.3 psi	555.6 psi	275.1 psi
Pressure Recorder	280 psi	555 psi	833 psi	1105 psi	1107 psi	835 psi	555 psi	275 psi
Pressure Gauge	280 psi	555 psi	833 psi	1105 psi	1107 psi	835 psi	555 psi	275 psi

Test	Aim Test Pressure	Minimum	Maximum	Duration
Strength	1110 psig	1080 psig	1123 psig	1.25 hr
Leak	850 psig	792 psig	N/A	10 min.

See Accompanying Pages for Pressure and Temperature Records

Contractor Representative:

(Print) **Dave Fletcher**

(Sign)

Date: **Sept.12/2014**

Enbridge Representative:

(Print) **Andre Begin**

(Sign)

Date: **Sept.12/2014**

Pressure Test Data Report

Canadian Facilities Construction Services



F-INSP-066-FPTDR-R1.DOT

CONTRACTOR NAME: LamSar Inc.

LOCATION: LamSar Shop

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

TEST NO.: 4450-40

DRAWING NO.: Q403/Q404/Q405/Q406
(Q402 Valves Only)

Page 1 of 2

TEST DATE: Sept.12/2014

CWP NO.: N/A

TIME	DEADWEIGHT PRESSURE psi	TEMPERATURE °F			REMARKS (Weather, Volumes Added/Bled Off)
		AMBIENT (Thermometer)	PIPE MEDIUM (Recorder)	GROUND Thermocouple)	
11:20	0.0	58.4	59	N/A	Begin Test, Run in Charts
11:30	0.0	58.6	59	N/A	Stabilize
11:35	280.6	58.8	59	N/A	Begin 25% Press. Up
11:40	280.3	59.0	59	N/A	Stabilize
11:40	555.7	59.1	59	N/A	Begin 50% Press. Up
11:45	555.6	59.3	59	N/A	Stabilize
11:50	832.9	59.4	59	N/A	Begin 75% Press. Up
11:55	833.0	59.5	59	N/A	Stabilize
12:00	1105.1	59.7	59	N/A	Begin Strength Test, 100% Press. Up
12:10	1105.3	59.9	59	N/A	Hold 1 hr. 15 min.
12:20	1105.4	60.0	59	N/A	Hold
12:30	1105.6	60.2	59	N/A	Hold
12:40	1105.8	60.4	59	N/A	Hold
12:50	1105.9	60.6	59	N/A	Hold
1:00	1106.1	60.7	59	N/A	Hold
1:10	1106.3	61.0	59	N/A	Hold
1:20	1106.6	61.2	59	N/A	End Strength Test, 100% Press. Down
1:25	835.3	61.3	59	N/A	Begin Leak Test, 75% Press. Down

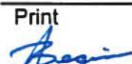
Contractor Representative Dave Fletcher


Print 

Sign 

Date Sept.12/2014

Company Representative Andre Begin

Print 

Sign 

Date Sept.12/2014

Pressure Test Data Report

Canadian Facilities Construction Services



F-INSP-066-FPTDR-R1.DOT

CONTRACTOR NAME: LamSar Inc.

LOCATION: LamSar Shop

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

TEST NO.: 4450-40

DRAWING NO.: Q403/Q404/Q405/Q406
(Q402 Valves Only)

Page 2 of 2

TEST DATE: Sept.12/2014

CWP NO.: N/A

TIME	DEADWEIGHT PRESSURE psi	TEMPERATURE °F			REMARKS (Weather, Volumes Added/Bled Off)
		AMBIENT (Thermometer)	PIPE MEDIUM (Recorder)	GROUND Thermocouple)	
1:30	835.6	61.4	59	N/A	Hold 10 min.
1:35	835.8	61.5	59	N/A	End Leak Test, 75% Press. Down
1:35	555.6	61.5	59	N/A	Begin 50% Press. Down
1:40	555.9	61.6	60	N/A	Stabilize
1:45	275.1	61.7	60	N/A	Begin 25% Press. Down
1:50	275.3	61.8	60	N/A	Stabilize
1:55	0.0	61.8	60	N/A	0% Press. Down
2:00	0.0	62.0	60	N/A	Run out Charts
2:05	0.0	62.0	60	N/A	End Test

Contractor Representative Dave Fletcher

Print _____

Sign

Sept.12/2014

Date _____

Company Representative Andre Begin

Print _____

Sign

Sept.12/2014

Date _____



STEWART INSTRUMENTS
A Division of Donald A. Stewart Limited

1107 Moore Line, R.R.#1
Mooretown, Ontario N0N 1M0
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

<u>Calibrator</u>	<u>Pressure Calibrator</u>
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





1107 Moore Line, R.R.#1
Mooretown, Ontario NON 1M0
Bus./Res. Phone: (519) 867-5361
Fax: (519) 867-2496

June 23, 2014

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

Att: Max Lessard

CALIBRATION REPORT

Type: Dri-Flo II Pressure Recorder
Serial #25122659
Range: 0 – 3000 PSI

Calibration Date – June 23, 2014

<u>Calibrator</u>	<u>Recorder</u>
0	0
500	500
1000	1000
1500	1500
2000	2000
2500	2500
3000	3000

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

AS



1107 Moore Line, R.R. #1
Mooretown, Ontario N0N 1M0
Bus./Res. Phone: (519) 867-5361
Fax: (519) 867-2496

June 23, 2014

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

Att: Max Lessard

CALIBRATION REPORT

Type: Dri-Flo II Temperature Recorder
Serial: #2512-002675
Range: 0 – 150°F

Calibration Date -- June 23, 2014

<u>Calibrator</u>	<u>Recorder</u>
32	32
86	86
126	126

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



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

MONTREAL
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 intrinsic 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:

Certificate: 17706-00-1
Asset: 26470619WS.5111

Calibration Certificate
Data Type: As Found-As Left

Page 1 of 2



TORONTO 16975 Leslie Street Newmarket, ON L3Y 9A1 Tel: (905) 952-3750 Fax: (905) 952-3751	MONTREAL 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
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www.itm.com - information@itm.com

Test Results

<u>Test Description</u>	<u>True Value</u>	<u>Reading</u>	<u>Lower limit</u>	<u>Upper limit</u>	<u>Units</u>	<u>Test Status</u>	<u>Exp Uncert</u>
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	

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-D5262

Provincial Reference: PC-17461

Manufacturer	Model	Gauge Number	Calibration Date	Expiration Date
Wika	0-2000PSI	LN-2000-41	2/19/2014	2/19/2015

Model Uncertainty
+/- ASME 2A of span (.5%)

Customer:	Lamsar
Purchase Order:	43175

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				2000 PSI		
Reference Reading	Gauge Reading	Allowable Tolerance	Difference	Difference (% of reading)	Condition	
0	0.0	10.0	0.0	0	Pass	
1000	1000.0	10.0	0.2	0.666666667	Pass	
2002	2000.0	10.0	1.9	6.333333333	Pass	
993.7	1000.0	10.0	-6.3	-21	Pass	
0	0.0	10.0	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: *A. Mahajan*

Inspected By: *[Signature]* B

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-D5480

Provincial Reference:	PC-17633
------------------------------	----------

Manufacturer	Model	Gauge Number	Calibration Date	Expiration Date
Wika	0-2000PSI	LN-2000-13	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				2000 PSI		
Reference Reading	Gauge Reading	Allowable Tolerance	Difference	Difference (% of reading)	Condition	
0	0.0	10.0	0.0	0	Pass	
1001	1000.0	10.0	1.4	4.666666667	Pass	
1998	2000.0	10.0	-1.6	-5.333333333	Pass	
998.2	1000.0	10.0	-1.8	-6	Pass	
0	0.0	10.0	0.0	0	Pass	

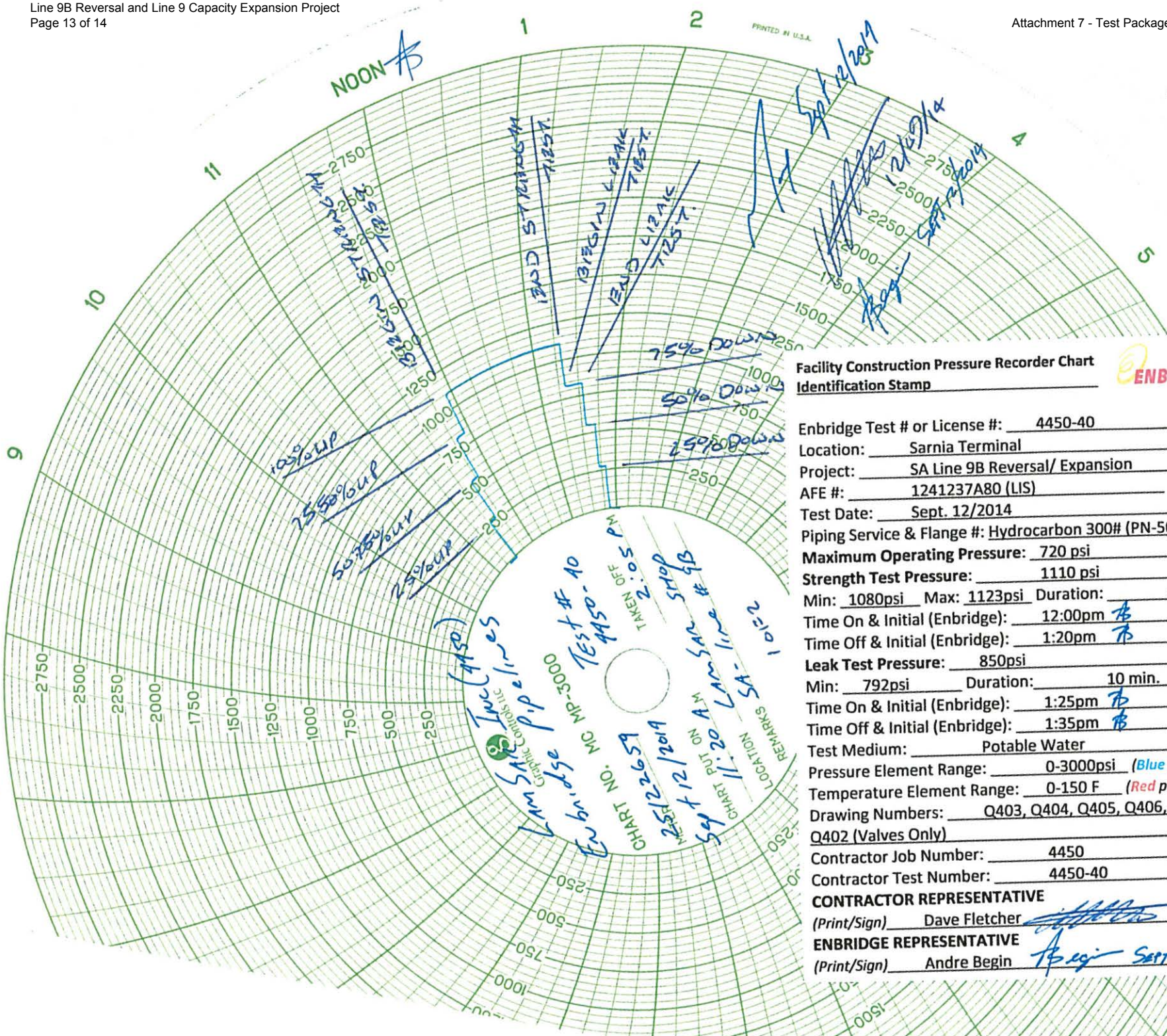
Deadweight S/N 66937.0

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: *ETM*

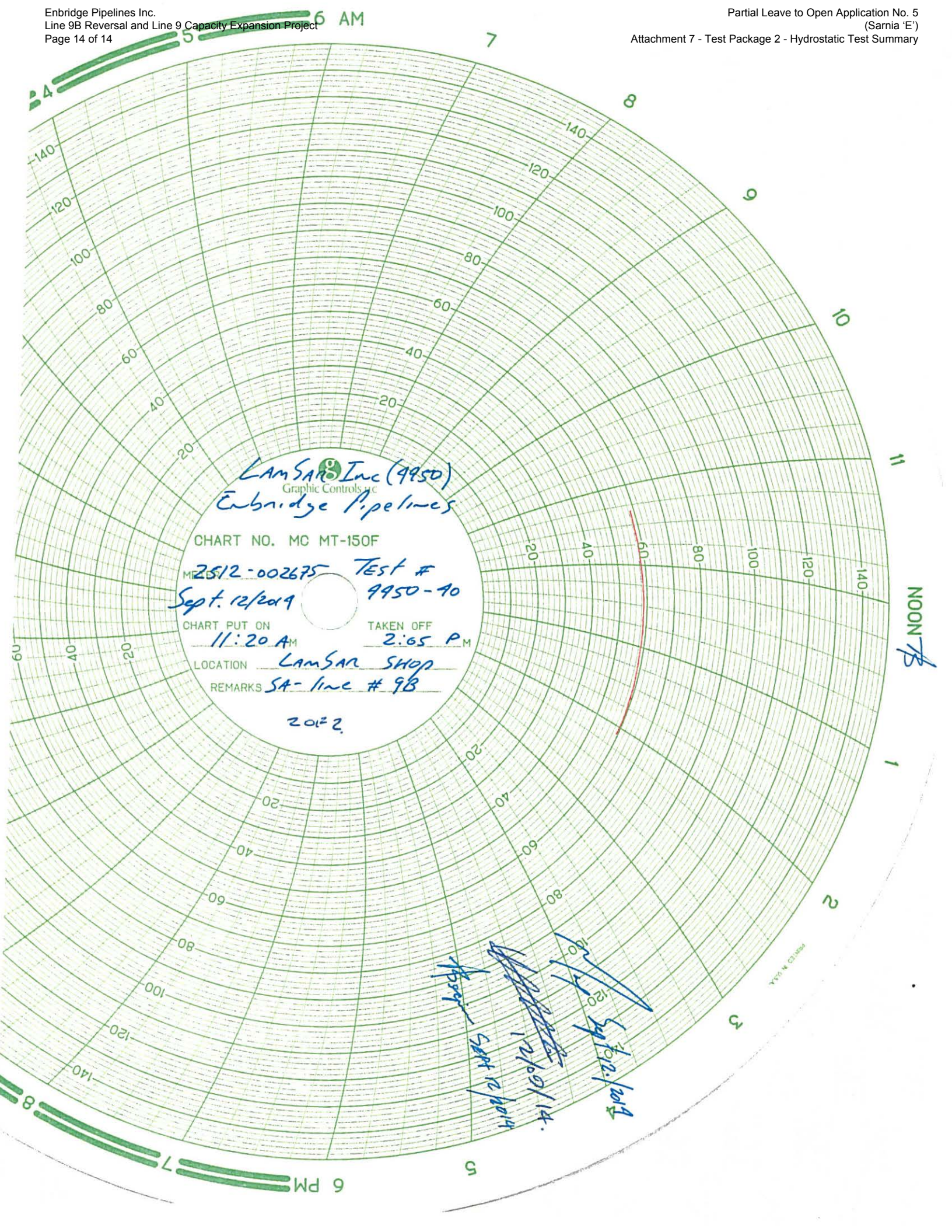
Inspected By: *M. M.* *B*



**Facility Construction Pressure Recorder Chart
 Identification Stamp**



Enbridge Test # or License #: 4450-40
 Location: Sarnia Terminal
 Project: SA Line 9B Reversal/ Expansion
 AFE #: 1241237A80 (LIS)
 Test Date: Sept. 12/2014
 Piping Service & Flange #: Hydrocarbon 300# (PN-50)
 Maximum Operating Pressure: 720 psi
 Strength Test Pressure: 1110 psi
 Min: 1080psi Max: 1123psi Duration: 1.25 hr.
 Time On & Initial (Enbridge): 12:00pm AB
 Time Off & Initial (Enbridge): 1:20pm AB
 Leak Test Pressure: 850psi
 Min: 792psi Duration: 10 min.
 Time On & Initial (Enbridge): 1:25pm AB
 Time Off & Initial (Enbridge): 1:35pm AB
 Test Medium: Potable Water
 Pressure Element Range: 0-3000psi (Blue pen color)
 Temperature Element Range: 0-150 F (Red pen color)
 Drawing Numbers: Q403, Q404, Q405, Q406,
Q402 (Valves Only)
 Contractor Job Number: 4450
 Contractor Test Number: 4450-40
CONTRACTOR REPRESENTATIVE
 (Print/Sign) Dave Fletcher [Signature] 12/12/14
ENBRIDGE REPRESENTATIVE
 (Print/Sign) Andre Begin [Signature] Sept. 12/2014



LAM SAR Inc (9950)
Graphic Controls Inc
Enbridge Pipelines

CHART NO. MC MT-150F

MI 2512-002675 Test # 9950-40
Sept. 12/2014

CHART PUT ON 11:20 AM TAKEN OFF 2:05 PM

LOCATION LAM SAR SHOP

REMARKS SA-line # 9B

2012

12/01/14
Sept 12/2014
12/01/14

NOON