ENBRIDGE

LINE INFORMATION

LINE 5 (20")

In-Line Inspection
Straits of Mackinac A & B
C Tool Geopig
MFL

2003

Volume 1

ENBRIDGE RECORDS MANAGEMENT
LAC00019936

LI.05.ili

From: Don L Engen on 01/22/2003 12:14 PM

To: Dave B McNeill/CNPL/Enbridge@IPL
cc: Pipeline Integrity DMS@IPL
Subject: Re: LINE # 5 PIGGING PROGRAM<PRG.LINE05.30".pe-ma.ml-03>

----- Forwarded by Don L Engen/CNPL/Enbridge on 01/22/2003 12:12 PM -----

Don Demich <pwicons@yahoo.com>

01/21/2003 06:13 PM

To: Don.Engen@enbridge.com
cc:
Subject: Re: LINE # 5 PIGGING PROGRAM<PRG.LINE05.30".pe-ma.ml-03>
Expire On:

The new time will be fine I will be home at 1330 MST.

Talk to you on Thursday.

Don D.
--- Don.Engen@enbridge.com wrote:
>
> Don,
>
> Due to a schedule conflict, could we hold a
> conference call with you on
> Thursday at 1330 instead. We will call you at (763)
> 381-0245.
>
> Thanks.
>
> Don Engen
>
>
>

> Thanks for the note, Thursday at 9:00 MST will work
> great for me. Just let me know which # to call or
> call
> me at 763 381-0245.
>
> Talk to you soon.
>
> Don Demich
> --- Don.Engen@enbridge.com wrote:
> >
> > Hi Don,
> >
> > Sorry neither Dave or I were available to speak
> with
> > you last week. We
> > would be able to have a conference call with you
> on
> > Thursday, January 23,
> > 2003 at 0900 MST to discuss Line 5 and other ILI
> > issues. Let me know if
> > that works for you.
> > Thanks.
> >
> > Don Engen
> > Pipeline Integrity
> > Office: (780) 420-8715
> > Cell: (780) 982-2032
> > Fax; (780) 420-5234
> >
> >
> >
> >
> >
> >   Don Demich
> >
> >
> >   <pwicons@yaho   To:
> > Dave McNeill <dave.mcneill@enbridge.com>
> >
> >   o.com>   cc:
> Don
> > Engen <don.engen@cnpl.enbridge.com>
> >
> >   Subject:
> > LINE # 5 PIGGING PROGRAM
> >
> >   01/17/2003   Expire On:
> >
> >
> >   07:18 AM
> >
> >
> >

> >
> >
> >
> >
> >
> >
> >
> >
> > Dear Dave
> >
> > Hope you had a great vacation, just a short note
> to
> > let you know my schedule. Don and I have talked a
> > couple of times and we discussed a conference call
> > either today or Monday of next week. I will be
> > available today till 2:00 PM your time or all day
> > Monday.
> >
> > Talk to you soon.
> >
> > =====
> > Don Demich
> > PWI Consultants Ltd.
> > 4325 Tyrol Crest
> > Golden Valley, MN 55416
> > Home: 763 381-0245
> > Fax: 763 381-0246
> > Cell: 612 940-1040
> >
> > _____
> > Do you Yahoo!?
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> > now.
> > http://mailplus.yahoo.com
> >
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> =====
> Don Demich
> PWI Consultants Ltd.
> 4325 Tyrol Crest
> Golden Valley, MN 55416
> Home: 763 381-0245
> Fax: 763 381-0246
> Cell: 612 940-1040
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> _____
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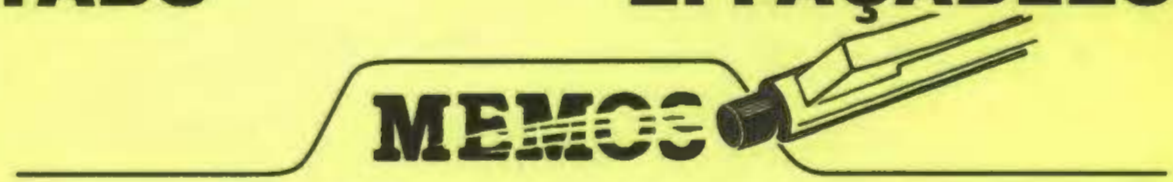
=====
Don Demich
PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Home: 763 381-0245
Fax: 763 381-0246
Cell: 612 940-1040

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ENBDNR0006798

NAME
NOM

No.

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ENBDNR0006799

No.	NAME NOM

Don L Engen
07/04/2003 01:54 PM

To: Leo M Zalaznik/LPL@LPL, John M Grotberg/LPL@LPL, Mike D Goman/LPL@LPL, Adam J Erickson/LPL@LPL, Al V Aleknavicius/LPL@LPL, Rick K Aunet/LPL@LPL, Dennis M Wedan/LPL@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Mike D Burnis/LPL@LPL, Peter T Olson/LPL@LPL, pwicons@earthlink.net, michel.hoyeck@og.ge.com, jordan@axiompipe.com, Donald Tennant/US/Enbridge@LPL, jfalk@bjservices.ca, dlatto@bjservices.ca, djungwirth@bjsevices.ca, bryan.pinkerton@og.ge.com, frank.buchanan@og.ge.com, brian@axiompipe.com
cc: Dave B McNeill/CNPL/Enbridge@IPL, Mark S Sitek/LPL@LPL, Pipeline Integrity DMS@IPL, Gary F Kosch/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, CCO Senior Operators, Doug A Barry/CNPL/Enbridge@IPL, Bryan J Walbauer/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Murray A Chudyk/CNPL/Enbridge@IPL, Doug R Newton/CNPL/Enbridge@IPL, Ashok Anand/CNPL/Enbridge@IPL, Paul W Wandzura/CNPL/Enbridge@IPL, Pipeline Integrity DMS@IPL
cc:
Subject: Line 5 (20 inch) West Straits In - Line Inspection Contact List<PRG.LINE05.20".straits.ml-03>
Expire On:

Attached is the contact list for the upcoming Line 5 (20") inspections on the West Leg of the Straits of Mackinac. Please advise of any additions or deletions required and feel free to distribute the list to any other interested parties.

Thank you.

Don Engen
Pipeline Integrity
Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234



Line 5 (20 inch) Straits of Mackinac, Contact List July 20(

Line 5 (20") Straits of Mackinac
In - Line Inspections - July 2003

Contact List

Enbridge

Edmonton Control Center - Line 5 Operator - (780) 420-8895
Christine Neff - Pipeline Control (780) 420-5204
Paul Wandzura - Pipeline Control - (780) 420-8285

Pipeline Integrity

Don Engen - ILI Coordinator (780) 420-8715 Office
(780) 982-2032 Cell

Don Demich - PWI Consultants Ltd - On Site ILI Coordinator - (763) 381-0245 Office
(612) 940-1040 Cell

Superior Terminal

Rick Aunet - Terminal Supervisor - (715) 398-8322 - Office
(218) 725-6939 - Pager

Dennis Wedan - Assisstant Terminal Supervisor - (715) 398-8323 - Office
(218) 725-21260 - Pager

Ironwood PLM

John Grotberg - Pipeline Maintenance Supervisor - (906) 932-3190 Office
(906) 630-5315 Cell
(906) 222-2086 Pager

Escanaba PLM

Don Tennant - Relief Supervisor (906) 789-1221 Ext 23 Office
(906) 630-9307 Cell

Escanaba Office

Blake Olson - Technical Supervisor - (906) 789-1221 EXT. 15 - Office
(906) 428-2656 - Home
(906) 222-1990 - Pager
(906) 630-2374 - Cell

ENBDNR0006802

Stations

North Straits - (906) 643-8212

Larry Schnurer - Electrical Technician in Charge
(906) 446-3426 - Home
(906) 222-2075 - Pager

Mechanical Coverage

Gary Kayser - Mech.
(906)341-3331 - Home
(906) 222-1979 - Pager

Mackinaw - (231) 436-5760

Peter Olson - Electrical Technician in Charge
(231) 625-9537 - Home
(906) 222-5996 - Pager

Mechanical Coverage

Gary Kayser - Mech.
(906)341-3331 - Home
(906) 222-1979 - Pager

BJ Pipeline Inspection Services - Geopig Tool

Joel Falk - Project Leader - (403) 531-5469 Office
(403) 813-4361 Cell

Mathew Russell - Data Analyst

Dan Jungwirth - (403) 531-5409 Office
(403) 852-1061 Cell

Dave Latto - Technical Sales Rep - (403) 531-7625 Office
(403) 815-4463 Cell

PII (Canada) Limited - MFL Tool

Frank Buchanan - Tech (713) 805 - 2618 Cell
Dave Bolton - Tech

Bryan Pinkerton - Project Manager - (403) 298-0241 Office
(403) 650-3129 Cell

Axiom Pipeline Solutions Inc. - C Tool, Tracking CTool, MFL Tool

Brian Powlousky - (780) 975-1323 Cell

ENBDNR0006803



Don L Engen
07/10/2003 11:02 AM

To: pwicons@earthlink.net, jfalk@bjservices.ca, frank.buchanan@og.ge.com, dlatto@bjservices.ca, djungwirth@bjservices.ca, bryan.pinkerton@og.ge.com, brian@axiompipe.com
cc: Pipeline Integrity DMS
cc:
Subject: Line 5 (20")Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg * Rev. 3<PRG.LINE05.20".straits.ml-03>
Expire On:

Revised message to clarify isolation of piping. No changes to launch or receive times.

Don
----- Forwarded by Don L Engen/CNPL/Enbridge on 07/10/2003 11:02 AM -----

Christine L Neff
07/10/2003 10:33 AM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL, Grant P Henningsen/LPL@LPL, Donald Tennant/US/Enbridge@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Peter T Olson/LPL@LPL, MBS Support
cc:
Subject: Line 5 (20")Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg <5>* Rev. 3
Expire On:

*Revision 3 - issued to clarify isolation
*Revision 2 - issued to update procedure and times
*Revision 1 - issued to change date

ed CCO Coordinator
Line 5 Operator

Line 5 (20") Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - **West** leg
{0600 MST July 11 to 0800 MST July 11}
~~~~~~~~~~~~~~~~~~~~~~~~~~

Proceed with plans to run a caliper tool in the 20" Line 5 **West** leg of the straits crossing to MA. The run is in preparation for the upcoming MFL/geopig tool run. The caliper run does require continuous flow. In order to maintain a consistent, predictable flow rate on the tools, the east leg will be isolated immediately prior to the tool launch and will be returned to service following the landing of the tool. In order to avoid contamination or degradation, this run is batch dependent. The tool will be launched in SLE-962-0. The tool must be launched at least 2000m3 from the head of the batch to ensure that there is SLE through the straits prior to the east leg isolation. The tool must be launched no closer than 2500m3 upstream of the tail of to batch to ensure that the de-isolation can occur prior to the SLE clearing the straits. The run will be completed while SLE is across both straits.

The Line 5 Operator is requested to shutdown the line to isolate the east strait, when batches are in position. The line can be re-started with the strait isolated and then the tool launched. Line 5 Operator is requested to page MBS Support prior to start up. CMT changes should not be required.

The caliper tool (5MA1) will be launched from MP 1475 at 0500/11. The tools cannot be launched in an NGL or buffer batch. As of 1400MST July 9, SLE-962-0 is scheduled across the straits from 0500/11 to 1000/11.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction
~~~~~~~~~~~~~~~~~~~~~~~~~~

transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

The East leg of the Straits will be isolated during this run, so the flow will be completely in the west leg.

Field personnel shall report to the Edmonton Control Center the location of the pig upon launching and prior to the pig landing.

Provided below is the estimated schedule for the run.

			5MA1 - Caliper Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time
	1475		0600/11	
MA	1479	1650 m3	0730/11	

*All times are listed in MST.

Please contact me with any questions.

Christine Neff (780)420-5204.



Don L Engen
07/09/2003 04:27 PM

To: pwicons@earthlink.net, jfalk@bjservices.ca, frank.buchanan@og.ge.com, dlatto@bjservices.ca, djungwirth@bjservices.ca, bryan.pinkerton@og.ge.com, brian@axiompipe.com
cc: Pipeline Integrity DMS
cc:
Subject: Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinac - MP 1075 to MA - West leg <5>*Rev. 3
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/09/2003 04:27 PM -----

Christine L Neff
07/09/2003 03:31 PM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL, Grant P Henningsen/LPL@LPL, Donald Tennant/US/Enbridge@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Peter T Olson/LPL@LPL, MBS Support
cc:
Subject: Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinac - MP 1075 to MA - West leg <5>*Rev. 3
Expire On:

*Revision 3 - issued to update times and method
*Revision 2 - issued to update times and method

ed CCO Coordinator
Line 5 Operator

Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinac - MP 1075 to MA - **West** leg
{0500 MST July 12 to 1000 MST July 12}

Proceed with plans to run a Geopig tool and an MFL tool in the 20" Line 5 **West** leg of the straits crossing to MA. This run does require continuous flow. In order to maintain a consistent, predictable flow rate on the tools, the east leg will be isolated immediately prior to the first tool launch and will be returned to service following the landing of the second tool. In order to avoid contamination or degradation, this run is batch dependent. Both tools will be launched in HSB, batches HSB-854-0 and HSB-855-0. The first tool must be launched at least 2000m3 from the head of HSB-854-0 to ensure that there is HSB through the straits prior to the east leg isolation. The second tool must be launched no closer than 2500m3 upstream of the tail of HSB-855-0. The run will be completed while HSB is across both straits.

The Line 5 Operator is requested to shutdown the line to isolate the east strait, when batches are in position. The line can be re-started with the strait isolated and then the tool launched. Line 5 Operator is requested to page MBS Support prior to start up. CMT changes should not be required.

The MFL tool (5MA2) will be launched from MP 1475 at 0500/12. The Geopig tool (5MA3) will be launched as soon at the MFL tool has landed. The tools cannot be launched in an NGL or buffer batch.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

These tools are highly sensitive to line rate. In order to preserve data quality, the line 5 operator is requested to slow the line to minimum rate (1200m3/hr) prior to the tool launch and return to scheduled

rate when the tool lands.

Field personnel shall report to the Edmonton Control Center the location of the pigs upon launching and prior to the pig landing.

Provided below is the estimated schedule for the run.

			5MA2 - Geopig Tool		5MA3 - MFL Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time	Estimated Time	Actual Time
	1475		0500/12		0800/12	
MA	1479	1650 m3	0630/12		0930/12	

*All times are listed in MST.

Please contact me with any questions.

Christine Neff (780)420-5204.



Don L Engen
07/09/2003 04:25 PM

To: pwicons@earthlink.net, jfalk@bjservices.ca, frank.buchanan@og.ge.com, dlatto@bjservices.ca, djungwirth@bjservices.ca, bryan.pinkerton@og.ge.com, brian@axiompipe.com
cc: Pipeline Integrity DMS
cc:
Subject: Line 5 (20")Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg * Rev. 2<PRG.LINE05.20".straits.ml-03>
Expire On:

Latest update for launch \ receive times for the CTool.

Don
----- Forwarded by Don L Engen/CNPL/Enbridge on 07/09/2003 04:25 PM -----

Christine L Neff
07/09/2003 03:31 PM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL, Grant P Henningsen/LPL@LPL, Donald Tennant/US/Enbridge@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Peter T Olson/LPL@LPL, MBS Support
cc:
Subject: Line 5 (20")Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg <5>* Rev. 2
Expire On:

*Revision 2 - issued to update procedure and times
*Revision 1 - issued to change date

ed CCO Coordinator
Line 5 Operator

Line 5 (20") Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - **West** leg
{0600 MST July 11 to 0800 MST July 11}
~~~~~~~~~~~~~~~~~~~~~~~~~~

Proceed with plans to run a caliper tool in the 20" Line 5 **West** leg of the straits crossing to MA. The run is in preparation for the upcoming MFL/geopig tool run. The caliper run does require continuous flow. In order to maintain a consistent, predictable flow rate on the tools, the east leg will be isolated immediately prior to the tool launch and will be returned to service following the landing of the tool. In order to avoid contamination or degradation, this run is batch dependent. The tool will be launched in SLE-962-0. The tool must be launched at least 2000m3 from the head of the batch to ensure that there is SLE through the straits prior to the east leg isolation. The tool must be launched no closer than 2500m3 upstream of the tail of to batch to ensure that the de-isolation can occur prior to the SLE clearing the straits. The run will be completed while SLE is across both straits.

The Line 5 Operator is requested to shutdown the line to isolate the east strait, when batches are in position. The line can be re-started with the strait isolated and then the tool launched. Line 5 Operator is requested to page MBS Support prior to start up. CMT changes should not be required.

The caliper tool (5MA1) will be launched from MP 1475 at 0500/11. The tools cannot be launched in an NGL or buffer batch. As of 1400MST July 9, SLE-962-0 is scheduled across the straits from 0500/11 to 1000/11.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting
~~~~~~~~~~~~~~~~~~~~~~~~~~

valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

The East leg of the Straits will be ~~in service~~ isolated during this run, so the flow will be ~~split through both legs and the speed~~ completely in the west leg ~~may be slower.~~

Field personnel shall report to the Edmonton Control Center the location of the pig upon launching and prior to the pig landing.

Provided below is the estimated schedule for the run.

			5MA1 - Caliper Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time
	1475		0600/11	
MA	1479	1650 m3	0730/11	

*All times are listed in MST.

Please contact me with any questions.

Christine Neff (780)420-5204.



Don L Engen
07/07/2003 03:53 PM

To: jfalk@bjservices.ca, frank.buchanan@og.ge.com, dlatto@bjservices.ca, djungwirth@bjservices.ca, bryan.pinkerton@og.ge.com, brian@axiompipe.com
cc: Pipeline Integrity DMS
cc:
Subject: Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinac - MP 1075 to MA - West leg *Rev. 2<PRG.LINE05.20".straits.ml-03>
Expire On:

Updated Geopig and MFL launch \ receive schedule.

Don
----- Forwarded by Don L Engen/CNPL/Enbridge on 07/07/2003 03:53 PM -----

Christine L Neff
07/07/2003 03:07 PM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL, Grant P Henningsen/LPL@LPL, Donald Tennant/US/Enbridge@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Peter T Olson/LPL@LPL
cc:
Subject: Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinac - MP 1075 to MA - West leg <5>*Rev. 2
Expire On:

*Revision 2 - issued to update times and method

ed CCO Coordinator
Line 5 Operator

Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinac - MP 1075 to MA - **West** leg
{0400 MST July 12 to 1000 MST July 12}
~~~~~~~~~~~~~~~~~~~~~~~~~~

Proceed with plans to run a Geopig tool and an MFL tool in the 20" Line 5 **West** leg of the straits crossing to MA. This run does require continuous flow. In order to maintain a consistent, predictable flow rate on the tools, the east leg will be isolated immediately prior to the first tool launch and will be returned to service following the landing of the second tool. In order to avoid contamination or degradation, this run is batch dependent. Both tools will be launched in HSB, batches HSB-854-0 and HSB-855-0. The first tool must be launched at least 2000m3 from the head of HSB-854-0 to ensure that there is HSB through the straits prior to the east leg isolation. The second tool must be launched no closer than 2500m3 upstream of the tail of HSB-855-0. The run will be completed while HSB is across both straits.

The MFL tool (5MA2) will be launched from MP 1475 at 0400/12. The Geopig tool (5MA3) will be launched as soon at the MFL tool has landed. The tools cannot be launched in an NGL or buffer batch.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

These tools are highly sensitive to line rate. In order to preserve data quality, the line 5 operator is requested to slow the line to minimum rate (1200m3/hr) prior to the tool launch and return to scheduled rate when the tool lands.

Field personnel shall report to the Edmonton Control Center the location of the pigs upon launching and prior to the pig landing.
~~~~~~~~~~~~~~~~~~~~~~~~~~

Provided below is the estimated schedule for the run.

			5MA2 - Geopig Tool		5MA3 - MFL Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time	Estimated Time	Actual Time
	1475		0400/12		0600/12	
MA	1479	1650 m3	0530/12		0730/12	

*All times are listed in MST.

Please contact me with any questions.

Christine Neff (780)420-5204.



Don L Engen
07/07/2003 04:05 PM

To: jfalk@bjservices.ca, frank.buchanan@og.ge.com, dlatto@bjservices.ca, djungwirth@bjservices.ca, bryan.pinkerton@og.ge.com, brian@axiompipe.com
cc: Pipeline Integrity DMS
cc:
Subject: Line 5 (20")Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg * Rev. 1<PRG.LINE05.20".straits.ml-03>
Expire On:

Updated CTool launch and receive schedule.

Don
----- Forwarded by Don L Engen/CNPL/Enbridge on 07/07/2003 04:05 PM -----

Christine L Neff
07/07/2003 03:13 PM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL, Grant P Henningsen/LPL@LPL, Donald Tennant/US/Enbridge@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Peter T Olson/LPL@LPL
cc:
Subject: Line 5 (20")Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg <5>* Rev. 1
Expire On:

Revision1 - issued to change date

ed CCO Coordinator
Line 5 Operator

Line 5 (20") Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - **West** leg
{0500 MST July 11 to 0700 MST July 11}
~~~~~~~~~~~~~~~~~~~~~~~~~~

Proceed with plans to run a caliper tool in the 20" Line 5 **West** leg of the straits crossing to MA. The run is in preparation for the upcoming MFL/geopig tool run. The caliper run does require continuous flow.

The caliper tool (5MA1) will be launched from MP 1475 at 0500/11. The tools cannot be launched in an NGL or buffer batch. As of 1400MST July7, there is crude scheduled accross the straits from 1930/10 to 0730/11.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

The East leg of the Straits will be in service during this run, so the flow will be split through both legs and the speed in the west leg may be slower.

Field personnel shall report to the Edmonton Control Center the location of the pig upon launching and prior to the pig landing.

Provided below is the estimated schedule for the run.

			5MA1 - Caliper Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time
~~~~~~~~~~~~~~~~~~~~~~~~~~

	1475		0500/11	
MA	1479	1650 m3	0700/11	

*All times are listed in MST.

Please contact me with any questions.

Christine Neff (780)420-5204.

Don L Engen
07/03/2003 04:08 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg *Rev. 1<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/03/2003 04:08 PM -----

Christine L Neff
07/03/2003 03:57 PM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL, Grant P Henningsen/LPL@LPL, Donald Tennant/US/Enbridge@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Peter T Olson/LPL@LPL
cc:
Subject: Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg <5>*Rev. 1
Expire On:

ed CCO Coordinator
Line 5 Operator

Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinaw - MP 1075 to MA - **West** leg
{0700 MST July 8 to 1400 MST July 8}

Proceed with plans to run a Geopig tool and an MFL tool in the 20" Line 5 **West** leg of the straits crossing to MA. This run does require continuous flow.

The Geopig tool (5MA2) will be launched from MP 1475 at 1400/19. The MFL tool (5MA3) will be launched 2 hours later. The tools cannot be launched in an NGL or buffer batch.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

The East leg of the Straits will be isolated prior to this tool run, so all of the flow will be through the west leg.

These tools are highly sensitive to line rate. In order to preserve data quality, the line 5 operator is requested to slow the line to minimum rate (1200m3/hr) prior to the tool launch and return to scheduled rate when the tool lands.

Field personnel shall report to the Edmonton Control Center the location of the pigs upon launching and prior to the pig landing.

Provided below is the estimated schedule for the run.

			5MA2 - Geopig Tool		5MA3 - MFL Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time	Estimated Time	Actual Time
	1475		0700/8		1300/8	

MA	1479	1650 m3	0800/8		1400/8	

*All times are listed in MST.

Please contact me with any questions.

Christine Neff (780)420-5204.

From: Don L Engen on 07/03/2003 04:02 PM

To: Pipeline Integrity DMS@IPL
cc:
Subject: Line 5 (20")Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg <PRG.LINE05.20".straits.geo-03>

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/03/2003 04:00 PM -----

Christine L Neff
07/03/2003 03:43 PM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL, Grant P Henningsen/LPL@LPL, Donald Tennant/US/Enbridge@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Peter T Olson/LPL@LPL
cc:
Subject: Line 5 (20")Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg <5>
Expire On:

ed CCO Coordinator
Line 5 Operator

Line 5 (20") Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - **West** leg
{1300 MST July 7 to 1600 MST July 7}
~~~~~~~~~~~~~~~~~~~~~~~~

Proceed with plans to run a caliper tool in the 20" Line 5 **West** leg of the straits crossing to MA. The run is in preparation for the upcoming MFL/geopig tool run. The caliper run does require continuous flow.

The cleaning tool (5MA1) will be launched from MP 1475 at 1300/7. The caliper tool (5MA2) will be launched 2 hours later. The tools cannot be launched in an NGL or buffer batch.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

The East leg of the Straits will be isolated prior to this tool run, so all of the flow will be through the west leg.

Field personnel shall report to the Edmonton Control Center the location of the pig upon launching and prior to the pig landing.

Provided below is the estimated schedule for the run.

			5MA1 - Caliper Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time
	1475		1300/7	
MA	1479	1650 m3	1400/7	

*All times are listed in MST.

Please contact me with any questions.
~~~~~~~~~~~~~~~~~~~~~~~~

Christine Neff (780)420-5204.

Don L Engen
04/14/2003 08:53 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Line 5 (30") MFL Tool Run - IR to MP 1475 - Run #2 <PRG.LINE05.30".pe-ma.ml-03> >
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 04/14/2003 08:53 AM -----

ENBRIDGE

4865541

Gary F Kosch
04/13/2003 11:14 AM

To: CCO Field Work, Don L Engen/CNPL/Enbridge@IPL, Superior PLM Crew@LPL, Greg C Schelin/LPL@LPL, Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Bob D Granquist/LPL@LPL, Bruce A Hasforth/LPL@LPL, Todd D Vinopal/LPL@LPL, Gary L Mattson/LPL@LPL, Scott A Ostern/LPL@LPL, Neil R Igo/LPL@LPL, Dale F Nelson/LPL@LPL, Dave P Friborg/LPL@LPL, Todd R Hendricks/LPL@LPL, Bill E Clark/LPL@LPL, Ricky E Saari/LPL@LPL, Rick K Aunet/LPL@LPL, Dennis M Wedan/LPL@LPL, Joe M Shafer/LPL@LPL, Mike J Skaggs/LPL@LPL, Blake C Olson/LPL@LPL, Fred W Klumpp/LPL@LPL, Ironwood PLM Crew@LPL, PWICONS@earthlink.net, Leo M Zalaznik/LPL@LPL, Peter T Olson/LPL@LPL, Mike D Burnis/LPL@LPL
cc:
Subject: Line 5 (30") MFL Tool Run - IR to MP 1475 - Run #2 <5>
Expire On:

ed CCO Coordinator
Line 5 Operator

Line 5 (30") MFL Tool Run - IR to MP 1475
{0800 MST April 14 to 0845 MST April 17}

Proceed with plans to run an MFL in the 30" Line 5 pipe from IR to MP 1475 to capture data missed on the last tool run. This tool cannot be launched within a batch of NGL. **Continuous flow is required. The four hour shutdown on April 14 from 2300 MST to 0300 MST April 15 has been taken into account.**

Stations are to be bypassed 0.5 hours prior to the arrival of a tool, and taken off bypass once it has been confirmed that the tool has passed the station. When bypassing stations that do not have mainline suction transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting a valid readback to LPM. Station discharge valves must be completely closed during the bypass. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

Responsibilities
~ ~ ~ ~ ~ ~ ~ ~ ~ ~

Tool trackers shall report to the Line operator when a tool is launched and received, when a tool is 1/2 hour upstream of a station or landing location, when a tool has passed a station, and every two hours in between. The information to be provided to the operator shall include the position of a particular tool (MP) and the associated time and date. Tool trackers shall also provide the line operator with appropriate contact names and numbers (including off hours contact numbers in case of an emergency) prior to the start of the

tool run.

Tool Tracker 1:
Cel:
Pager:
Other:

Tool Tracker 2:
Cel:
Pager:
Other:

Field personnel responsible for bypassing stations or landing tools are requested to provide the Line operator with appropriate contact information. This can be provided anytime after the beginning of the run, but no later than 1 day prior to the estimated time of the responsible person's activity (for runs less than 1 day, the notification should no less than 4 hours). Field personnel are encouraged to contact the line operator during the run for tool positions and estimated arrival times/dates (line operators will not be issuing tool position messages during the run). Where applicable, field personnel are requested to contact the line operator to confirm launch times after 1700 MST of the day preceding the run (to ensure that the next day's pump orders have been received). Field personnel are responsible for operating valves to launch and receive each tool. Station bypasses shall be initiated by field personnel in coordinator with the Line operator and tool trackers.

The line operator is responsible for issuing a message (to the recipients of this message) indicating the launch and arrival times of each tool. This message shall be issued twice: immediately after launch time of a tool train, and immediately after arrival time of a tool train. The line operator is responsible for contacting the appropriate field personnel for bypassing stations and landing the tools 2 hours prior to the arrival of the tool at the particular site. If estimated arrival times change significantly during a run, the line operator is responsible for contacting the appropriate field person. The line operator is also requested to contact tool trackers in the event that line rates and schedules change (eg. durations of shut down times).
~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~

Below is a tentative schedule of launch and arrival times. Field personnel are requested to contact the Line operator for updated arrival times.

			MFL Tool 5NO1	
Station	**MP**	**Responsible Person and Contact Information**	**Estimated Time**	**Actual Time**
IR	1272	Name: Cel: Pager Other:	0800 / 14	
RA	1357	Name: Cel: Pager: Other:	1700 / 15	
MQ	1392	Name: Cel:	0500 / 16	

		Pager: Other:		
GC	1423	Name: Cel: Pager: Other:	1530 / 16	
NA	1441	Name: Cel: Pager: Other:	2145 / 16	
MP 1475	1475	Name: Cel: Pager: Other:	0845 / 17	

Please contact me with any questions.

Gary Kosch (780) 420 - 8598

Don L Engen
03/21/2003 08:33 AM

To: Jim M McKone/LPL@LPL, Leo M Zalaznik/LPL@LPL, John M Grotberg/LPL@LPL, Mike D Goman/LPL@LPL, Adam J Erickson/LPL@LPL, Al V Aleknavicius/LPL@LPL, Rick K Aunet/LPL@LPL, Dennis M Wedan/LPL@LPL, Joe M Shafer/LPL@LPL, Fred W Klumpp/LPL@LPL, Mike J Skaggs/LPL@LPL, Larry G Schnurer/LPL@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Mike D Burnis/LPL@LPL, Peter T Olson/LPL@LPL, pwicons@yahoo.com, michel.hoyeck@og.ge.com, james1.simmons@og.ge.com, aaron.roberie@corrpro.ca, landals@attglobal.net, jordan@axiompipe.com

cc: Dave B McNeill/CNPL/Enbridge@IPL, Mark S Sitek/LPL@LPL, Pipeline Integrity DMS@IPL, Dean G Rawson/CNPL/Enbridge@IPL, Gary F Kosch/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, CCO Senior Operators, Doug A Barry/CNPL/Enbridge@IPL, Bryan J Waibauer/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Murray A Chudyk/CNPL/Enbridge@IPL, Doug R Newton/CNPL/Enbridge@IPL, Ashok Anand/CNPL/Enbridge@IPL

cc:

Subject: Line 5 (20"/30") Superior to Iron River, Iron River to North Straits, Straits of Mackinac In - Line Inspections - March \ April, 2003 - Contact List-Revision 1 <PRG.LINE05.20".straits.ml-03>

Expire On:

Revision to correct phone number for Mike Skaggs.

Attached is a revised contact list for the Line 5 (20" and 30") in - line inspections. Please advise of any additions or deletions required and feel free to forward this to any other interested parties.

Thank you.

Don Engen
Pipeline Integrity
Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234

Line 5 (20 Inch) Straits of Mackinac, Line 5 (30 inch) PE to IR, IR to Straits Contact List Mar-April 2003

Line 5 (20") Straits of Mackinac
Line 5 (30") Superior to Iron River, Iron River to Straits of Mackinac
In - Line Inspections - March/April 2003

Contact List

Enbridge

Edmonton Control Center - Line 5 Operator - (780) 420 - 8895
Christine Neff - Pipeline Control (780) 420-5204
Dean Rawson - Pipeline Control - (780) 420 - 8285

Pipeline Integrity

Don Engen - ILI Coordinator (780) 420 - 8715 Office
(780) 982 - 2032 Cell

Don Demich - PWI Consultants Ltd - On Site ILI Coordinator - (763) 381-0245 Office
(612) 940-1040 Cell

Superior Terminal

Rick Aunet - Terminal Supervisor - (715) 398-8322 - Office
(218) 725-6939 - Pager

Dennis Wedan - Assisstant Terminal Supervisor - (715) 398-8323 - Office
(218) 725-21260 - Pager

Superior PLM

Jim McKone - Pipeline Maintenance Supervisor - (715) 398-8347 Office
(218) 391-0096 Cell
(218) 725-6928 Pager

Ironwood PLM

John Grotberg - Pipeline Maintenance Supervisor - (906) 932-3190 Office
(906) 630-5315 Cell
(906) 222-2086 Pager

Escanaba PLM

Leo Zalaznik - Pipeline Maintenance Supervisor - (906) 789 - 1221 Ext 23 Office
(906) 630-5314 Cell
(906) 222-2091 Pager

ENBDNR0006822

Escanaba Office

Blake Olson - Technical Supervisor - (906) 789-1221 EXT. 15 - Office
(906) 428-2656 - Home
(906) 222-1990 - Pager
(906) 630-2374 - Cell

Stations

Ino - (715) 372-4776

Joe Schafer - Electrical Technician in Charge
(715) 561-3587 - Home
(906) 222 - 2056 - Pager

Mechanical Coverage

Fred Klumpp - Mech
(906) 932-2374 - Home
(906) 222-2024 - Pager

Saxon - (715) 893-2475

Joe Schafer - Electrical Technician in Charge
(715) 561-3587 - Home
(906) 222 - 2056 - Pager

Mechanical Coverage

Fred Klumpp - Mech
(906) 932-2374 - Home
(906) 222-2024 - Pager

Gogebic - (906) 787-2414

Mike Skaggs - Electrical Technician in Charge
(906) 265-5086 - Home
(906) 222 - 2057 - Pager

Mechanical Coverage

Fred Klumpp - Mech
(906) 932-2374 - Home
(906) 222-2024 - Pager

ENBDNR0006823

Iron River - (906) 265-3722

Mike Skaggs - Electrical Technician in Charge
(906) 265-5086 - Home
(906) 222 - 2057 - Pager

Mechanical Coverage

Fred Klumpp - Mech
(906) 932-2374 - Home
(906) 222-2024 - Pager

Rapid River - (906) 474-6614

Larry Schnurer - Electrical Technician in Charge
(906) 446-3426 - Home
(906) 222-2075 - Pager
Mechanical Coverage

Gary Kayser - Mech.
(906)341-3331 - Home
(906) 222-1979 - Pager

Manistique - (906) 341-2730

Larry Schnurer - Electrical Technician in Charge
(906) 446-3426 - Home
(906) 222-2075 - Pager
Mechanical Coverage

Gary Kayser - Mech.
(906)341-3331 - Home
(906) 222-1979 - Pager

Gould City - (906) 477-6722

Mike Burnis - Electrical Technician in Charge
(906) 341-8516 - Home
(906) 222-2079 - Pager
Mechanical Coverage

Gary Kayser - Mech.
(906)341-3331 - Home
(906) 222-1979 - Pager

ENBDNR0006824

Naubinway - (906) 477-6031

Mike Burnis - Electrical Technician in Charge
(906) 341-8516 - Home
(906) 222-2079 - Pager
Mechanical Coverage

Gary Kayser - Mech.
(906)341-3331 - Home
(906) 222-1979 - Pager

North Straits - (906) 643-8212

Mike Burnis - Electrical Technician in Charge
(906) 341-8516 - Home
(906) 222-2079 - Pager

Mechanical Coverage

Gary Kayser - Mech.
(906)341-3331 - Home
(906) 222-1979 - Pager

Mackinaw - (231) 436-5760

Pete Olson - Electrical Technician in Charge
(231) 625-9537 - Home
(906) 222-5996 - Pager

Mechanical Coverage

Gary Kayser - Mech.
(906)341-3331 - Home
(906) 222-1979 - Pager

BJ Pipeline Inspection Services - Geopig Tool

Richard Fawcett - Project Leader - (403) 531-5046 Office
(403) 813-4361 Cell

Geoff Hurd - Data Analyst - (403) 531-5332 Office

Dan Jungwirth - (403) 531-5409 Office

Dave Latto - Technical Sales Rep - (403) 531-7625 Office

ENBDNR0006825

PII (Canada) Limited - MFL Tool

James Simmons - Tech - (403) 510-3650 Cell
Leonard Garcia - Tech - (281) 543-9126 Cell
Michel Hoyeck - Project Manager - (403) 806-0265 Office
(403) 650-4300 Cell

Axiom Pipeline Solutions Inc. - C Tool, Tracking CTool

Jordan Dyck - (780) 984-8198 Cell
Greg Phillips - (780) 722-2209 Cell

Corrpro Canada Inc. - Tracking (30")MFL Tool - GPS Surveying

Aaron Roberie - Manager Operations - (780) 447-4565 Ext 298 Office
(780) 993-1938 Cell

Jesse Landals- (780) 993-1927
Martin Racicot - (514) 346-3006

* Base Station

Station P.L.M.P.#	Phone	Mailing Address	Technician in Charge Home Phone No. Pager No.	Mechanical Coverage Home Phone No. Pager No.
Ino 1136	715-372-4776 Fax. No. 715-372-5370	See Saxon	Joe Shafer - Elec. 715-561-3587 906-222-2056	Fred Klumpp-Mech. 906-932-2374 906-222-2024
Saxon* 1183	715-893-2475 Fax. No. 715-893-2401	Enbridge Pipelines 14482 N Lakehead Rd Saxon,Wi 54559-9406	*Joe Shafer - Elec.	*Fred Klumpp-Mech.
Gogebic 1226	906-787-2414 Fax. No. 906-787-2450	See Iron R.	Mike Skaggs-Elec. 906-265-5806 906-222-2057	Fred Klumpp-Mech.
Iron River* 1272	906-265-3722 Fax No. 906-265-4411	Enbridge Pipelines 1781 Homer Rd. Iron River, MI 49938	*Mike Skaggs-Elec.	Fred Klumpp-Mech.
Rapid River* 1356	906-474-6614 Fax. No. 906-474-6174	Enbridge Pipelines P.O. Box 158 Rapid River, MI 49878	*Larry Schnurer-Elec. 906-446-3426 906-222-2075	Gary Kayser-Mech.
Escanaba Office	906-789-1221 x.15 Fax. No. 906-789-9009	Enbridge Pipelines 2811 27th Ave N Escanaba, MI 49829	Blake Olson - Tech. Supv. 906-428-2656 906-222-1990 Cell - 906-630-2374	
Manistique* 1392	906-341-2730 Fax. No. 906-341-3341	Enbridge Pipelines Rt. 1, Box 1418-C Manistique,MI 49854	Larry Schnurer-Elec.	*Gary Kayser-Mech. 906-341-3331 906-222-1979
Gould City* 1423	906-477-6722 Fax. No. 906-477-1177	Enbridge Pipelines P.O. Box 127 Gould City, MI 49838	*Mike Burnis-Elec. 906-341-8516 906-222-2079	Gary Kayser-Mech.
Naubinway 1441	906-477-6031 Fax. No. 906-477-1104	See Gould City	Mike Burnis-Elec.	Gary Kayser-Mech.
North Straits 1476	906-643-8212	See Gould City	Mike Burnis-Elec.	Gary Kayser-Mech.
Mackinaw 1480	231-436-5760 Fax. No. 231-436-4169	See Indian River	Pete Olson-Elec.	Gary Kayser-Mech.
Indian River* 1515	231-525-8861 Fax. No. 231-525-6644	Enbridge Pipelines 9671 Afton Rd. Wolverine, MI 49799	*Pete Olson-Elec. 231-625-9537 906-222-5996	Gary Kayser-Mech.

Don L Engen
03/20/2003 10:24 AM

To: Robert A Wilke/LPL, Jim M McKone/LPL@LPL, Leo M Zalaznik/LPL@LPL, John M Grotberg/LPL@LPL, Mike D Goman/LPL@LPL, Adam J Erickson/LPL@LPL, Al V Aleknavicius/LPL@LPL, Rick K Aunet/LPL@LPL, Dennis M Wedan/LPL@LPL, Joe M Shafer/LPL, Fred W Klumpp/LPL, Mike J Skaggs/LPL, Larry G Schnurer/LPL, Blake C Olson/LPL, Gary F Kayser/LPL, Mike D Burnis/LPL, Peter T Olson/LPL
cc: Dave B McNeill/CNPL/Enbridge@IPL, Mark S Sitek/LPL@LPL, Pipeline Integrity DMS@IPL, Dean G Rawson/CNPL/Enbridge@IPL, Gary F Kosch/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL
cc: Dave B McNeill/CNPL/Enbridge@IPL, Mark S Sitek/LPL@LPL, Pipeline Integrity DMS@IPL, Dean G Rawson/CNPL/Enbridge@IPL, Gary F Kosch/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL
Subject: Cost Code for Line 5 (20") and (30") In - Line Inspections
Expire On:

The cost codes for the Line 5 (20") - Straits of Mackinac and (30") Superior to Iron River and Iron River to Straits of Mackinac are as follows:

Line 5 (20") Straits of Mackinac - East and West Legs

Time Sheet

Project # - 91204SC0093
Task # - 05

3rd Party Expense

Project # - 91204SC0093
Task # - 04
Expenditure Type - 62010-10

Line 5 (30") PE to MA

Time Sheet

Project # - 91204SC0092
Task # - 05

3rd Party Expense

Project # - 91204SC0092
Task # - 04
Expenditure Type - 62010-10

Please forward this to any others I may have missed. Thanks.

Don Engen
Pipeline Integrity DMS
Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234

These will need to be requested through Rick Johnson's group. I have copied them on my reply.

Leanne M Thomson@IPL



Leanne M Thomson@IPL
02/19/2003 06:35 PM

To: Greg Montgomery/US/Enbridge@LPL
cc: Don L Engen/CNPL/Enbridge@IPL, Tanis J Elm/CNPL/Enbridge@IPL
Subject: Pipeline Integrity - Request for SCN<AF.BUD.op>

Hi Greg,

The following Pipeline Integrity programs will need Special Cost Numbers. I am not too sure of the process involved to request the SCNs or all the information you may need so please contact me at (780)420 8459 or via e-mial if I have missed any information or to let me know of the proper process to go through.

Thanks,
Leanne.

91204SC0099
Line 2 (26") Inhibitor Program (* *Note that in Canada this is Terrace budget work, but has been included here as operating and would apply to Terrace costs for the year anyways.)*

Task	Discription	Exp. Type	Amount
01	Chemical	62007-01	$310,000
02	O/S	62008-01	$ 58,000
03	Foil Placements (New)	62008-01	$84,000
04	Foil Replacements	62008-01	$121,000

91204SC0098
Line 4 (48") Inhibitor Program

Task	Discription	Exp. Type	Amount
01	Chemical	62007-01	$160,000
02	O/S	62008-01	$100,000
03	Foil Placements (New)	62008-01	$10,500

91204SC0097
Line 6B (30") Inhibitor Program

Task	Discription	Exp. Type	Amount
01	Chemical	62007-01	$230,000
02	O/S	62008-01	$82,000
03	Foil Placements (New)	62008-01	$155,000

91204SC0096
Consultant Foil Review

Task	Discription	Exp. Type	Amount
01	Consultant Foil Review	62008-01	$20,000

91204SC0095
Monitoring Fees

Task	Discription	Exp. Type	Amount
01	All locations	62008-01	$3,100

91204SC0094
Line 2 (26") CR to PW

Task	Discription	Exp. Type	Amount
01	ILI Vendor	62010-01	$435,000
02	Caliper	62010-01	$30,000
03	Tool Tracking	62010-01	$45,000
04	3rd Party Expense	62010-01	$10,000

91204SC0093
Line 5 (20") Straits of Mackinac A and B

Task	Discription	Exp. Type	Amount
01	ILI Vendor	62010-01	$250,000
02	Caliper	62010-01	$219,000
03	Tool Tracking	62010-01	$2,000
04	3rd Party Expense	62010-01	$10,000

91204SC0092
Line 5 (30") PE to MA

Task	Discription	Exp. Type	Amount
01	ILI Vendor	62010-01	$861,000
02	Caliper	62010-01	$40,000
03	Tool Tracking	62010-01	$58,000
04	3rd Party Expense	62010-01	$10,000

Meeting Minutes - In - Line Inspections

Line 5 - (20" and 30") Straits of Makinac, Superior to Iron River and Iron River to North Straits

March 11, 2003 - Superior Terminal

Introductions

- **Introductions of the meeting attendees** – Don Demich PWI, Jim McKone, Leo Zalagnik, John Grotberg, Al Abmanians, Gordon Ogle, Rick Annet, Michael Hayeck.
- **Identify Enbridge Station and PLM Authority for the inspection programs**
  - Leo - Escanaba -
  - PE - IR - Mar. 24th. Clean, CTod.
  - 20" - Escanaba. Leo.
  - 30" - Superior, Dan Ward, Escanaba Jim McKone, John Grotberg, Leo Zalagnik

Safety\Security

- **Enbridge will provide the safety orientation for the contractors and review safety concerns specific to these inspections** OK,
- **Contact list**
  - from Vendors.
  - PLM
- **Discuss PLM shop where tools will be stored**
  - Escanaba - 20"
  - Superior - 30", Iron River, Escanaba.
- **Review use of Safe Work Permit for trackers and contractors**
  - OK
  - OK - Don Demicks to look after.
- **Review any security issues between vendors if required**
  - No issues -
  - Keys required for shop.

- **Discuss requirements for vendors working on Enbridge property and using Enbridge equipment after hours** - Vendors to check with PLM

Inspection Schedule

- **Review the inspection schedule for Straits of Mackinac, PE to IR, IR to MA**
  - Looking at Mar. 18/19th - 20"
  - 30" March. 24th. PE - IL. Clean, Tool
  - 30" MFL - April 1st. - need 3 days to download and relaunch. Use Ironwood PLM Shop.
- **Discuss nitrogen purge and electrical bonding for launch and receipt of tools**
  N2 don't need it. Tools not laundried like.

Enbridge and Vendor Responsibilities

- **Discuss transportation of Internal Inspection Equipment during the program**
  Enbridge - in field, Vendor mobs/demobs. tools, need to be warmed up. MFL,
- **Discuss loading and receiving of cleaning, caliper, and MFL tools, equipment required and responsibilities** Pull in assemblies, Escanaba PLM, cranes etc.
  30" tool, cranes available
- **Discuss cleaning of inspection tools**
  Clean @ Escanaba, 20", 30"
  Ironwood PLM clean 30", Escanaba - 30"

Tool Tracking

- **Discuss tracking responsibilities for contractors and PLM** – 20" Aquanav, GPS ok Mike Paradise - Superior.
  - 30" - PLM - Clean tools, CTool Assess MFL - Compo - GPS too, PLM.
- **Discuss tracking procedures and equipment being used** – 20" was real tracking involved. No transmitters,

- **Discuss AGM reporting procedures** – AGM report to PI ASAP after run.

- **Discuss GPS Surveying** – Aaron 20" Compro 30"
- **Review safety issues for tracking** – Notify Bridge Authority; Magnetic Signs, PLM too be with trackers.

Inhibitor Injections

- **Discuss injection of corrosion inhibitor if require** – 20" No. 30" – No

Tool Demobilization

- **Discuss tool demobilization location** – Escanaba. 20" and 30" tools.

- **Discuss demobilization procedures, paperwork and responsibilities** – Vendors to look after.

Other Business

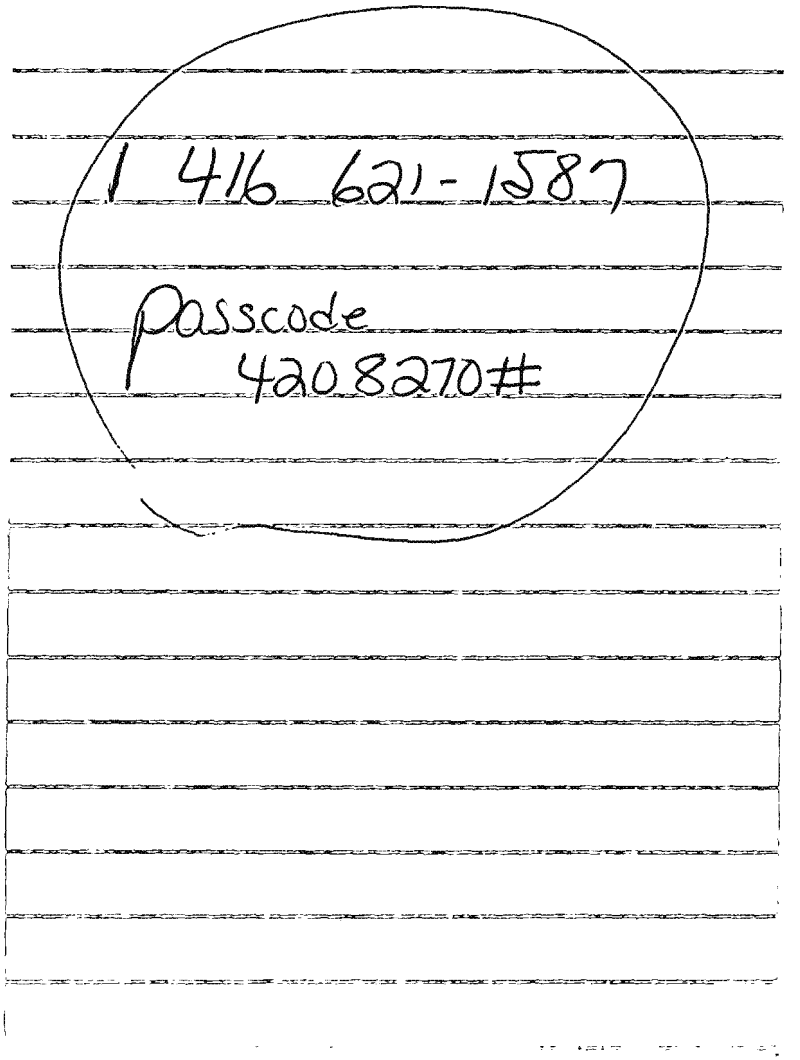
Have Aaron – bring set to an GPS equipment.

Jim M McKone@LPL

03/05/2003 07:14 AM

To: Don L Engen/CNPL/Enbridge@IPL
cc:
Subject: Shipping Address
Expire On:

Don, Our shipping address is : 10 Bardon Ave., Superior Wi 54880 Jim


1 416 621-1587
passcode
4208270#

Global Crossing

Walter

READY ACCESS SUBSCRIBER PROCEDURES

Welcome to Global Crossing Conferencing's Ready Access service.

1. Everyone including the subscriber must dial the assigned access phone number: 1-416-621-1587
2. Everyone including the subscriber must dial the 7 digit access code: 4208270 followed by the # key.
3. At this point participants will stand by. They will then be placed on Music hold until the Subscriber activates the conference.
4. The Subscriber will be asked to press the * key.
5. The Subscriber must enter his/her Subscriber password 8270, followed by # key.
6. The Subscriber must then press 1 followed by * key to activate conference without a security code*.
7. It is recommended that once the subscriber has activated the conference they press * 8 to allow conference continuation**. This allows participants to continue conferencing should the subscriber disconnect.

---

*Should the Subscriber wish to ADD a security code they must press 1, then enter the pre-determined 4-9 digit security code. The security code must be issued to participants along with the 7 digit access code prior to the beginning of the conference.

**Should the subscriber disconnect without having activated the conference continuation feature (*8), all participants will be disconnected.

Meeting Agenda - In - Line Inspections

Line 5 - (20" and 30") Straits of Makinac, Superior to Iron River and Iron River to North Straits

March 11, 2003 - Superior Terminal

Introductions

- Introductions of the meeting attendees
- Identify Enbridge Station and PLM Authority for the inspection programs

Safety\Security

- Enbridge will provide the safety orientation for the contractors and review safety concerns specific to these inspections
- Contact list
- Discuss PLM shop where tools will be stored
- Review use of Safe Work Permit for trackers and contractors
- Review any security issues between vendors if required
- Discuss requirements for vendors working on Enbridge property and using Enbridge equipment after hours

Inspection Schedule

- Review the inspection schedule for Straits of Mackinac, PE to IR, IR to MA
- Discuss nitrogen purge and electrical bonding for launch and receipt of tools

Enbridge and Vendor Responsibilities

- Discuss transportation of Internal Inspection Equipment during the program
- Discuss loading and receiving of cleaning, caliper, and MFL tools, equipment required and responsibilities
- Discuss cleaning of inspection tools

Tool Tracking

- Discuss tracking responsibilities for contractors and PLM
- Discuss tracking procedures and equipment being used
- Discuss AGM reporting procedures
- Discuss GPS Surveying
- Review safety issues for tracking

Inhibitor Injections

- Discuss injection of corrosion inhibitor if required

Tool Demobilization

- Discuss tool demobilization location
- Discuss demobilization procedures, paperwork and responsibilities

Other Business

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- **Discuss injection of corrosion inhibitor if required**

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- **Discuss demobilization procedures, paperwork and responsibilities**

Other Business

Anna M Warawa
11/12/2003 08:14 AM

To: Pipeline Integrity
cc: Pipeline Integrity DMS@IPL
Subject: Line 5 (20 inch) Straits of Mackinaw West Leg Donsa Ctool, Axiom Tracking July 2003 <PRG.LINE05.20".straits.ml-03>
Expire On:

The above mentioned report was received on October 24, 2003.

Below the quality assurance requiring further input and analysis by Martha.



Line 5 (20 inch) Straits of Mackinac West Leg Donsa Ctool Axiom Tracking July

The hard copy report will be available with Martha.

Geometry In-Line Inspection
Data Assessment and QA Checklist

Line Number 5 Diameter 20"

Segments Inspected Straits of Mackinac West Leg

Inspection Tool Ctool

Vendor Axiom

Part 1 ILI Report / Contract Terms

ILI Coordinator or designate to review the incoming report and complete basic checks to ensure report format and contract terms have been met.

Run Date July 10, 2003

Report Due Date Unknown Report Received Date October 24, 2003

Comments (if report not received by due date)

Check List for Deliverables

Basic check to determine if requested or required items as outlined in the contract (and/or formally requested) were provided and are in the correct format (indicate NA if not applicable).

	Required / Requested	Received Hardcopy	Received Electronic	Format Good
Pipe Tally (hard copy, CD)	☒	☐	☐	N/A
Features List (hardcopy, CD)	☒	☐	☐	N/A
Fully Documented Defects (incl. type, length, depth, circumferential location, relative distance, absolute distance, and GW # of defect)	☒	☒	☒	Yes
Discussion of Results	☒	☒	☒	Yes
Assessment of Results	☒	☒	☒	Yes
On network	☒	☐	☐	Yes
	☐	☐	☐	
	☐	☐	☐	

Comments and / or Actions Required To Complete Reporting Requirements

Complete and confirmed by Anna Warawa Date: November 12, 2003

Part 2 Data Assessment

Excavation Coordinator or designate to complete a QA assessment of the ILI data to confirm the data is acceptable and consistent with historical and / or other documented information about the pipeline segment. The analysis consists of expert based judgement of data validity.

QA Data Check

- ξ Is format acceptable for analysis (y/n)
- ξ Are all CD files acceptable for analysis (y/n)
  (i.e. files can all be opened & data is formatted)

Comments and / or Actions Required To Fix Data

QA data check completed by Date

Data Validation

Compare ILI data to historical information to determine if data is consistent with past results and expectations. Note – the items outlined below are intended to represent some of the ways that can be used to evaluate the data and is not intended as a comprehensive list (nor as a requirement) for evaluating ILI data. Methods used should be checked (y/n). Comments can be provided below.

Validation Method(s) Used Valid

- ☐ Girth weld numbers okay (y/n)
- ☐ Marker list and tracking report match (y/n)
  (AGM numbers, locations, etc).
- ☐ Data consistent with historical ILI information
- ☐ Trend plots consistent w/ historical results
- ☐ Sentenced plots consistent w/ historical results
- ☐ Exploratory dig results consistent w/ ILI data
- ☐ Comparison of data to previously excavated data
- ☐
- ☐
- ☐

Comments and / or Actions Required To Validate Data

Additional Comments (any missing information should be documented with new deliverable dates – Note; if data can be assessed in the present format then assessment should begin on data as is)

Due:	Rec'd:
Due:	Rec'd:
Due:	Rec'd:
Due:	Rec'd:

Recommended Date of Acceptance:

Reviewed/Approved by: Date:
Excavation Coordinator: Date:
Supervisor of Integrity Programs: Date:

Part 3 Analysis / Generation of Excavation Packages

Excavation Coordinator or designate shall analyze the ILI information, develop a master dig list, determine whether pressure restrictions are required and outline any phased dig programs that may be required to meet operating requirements, resource requirements and / or HCA regulations.

Add Features to Master Dig List **Date Complete**

Add all features that meet Enbridge dig criteria to master dig list.

Identify and document (on master list) all features that have been previously excavated And recoated or repaired.

Evaluation of remaining features **Required** **Action By**

Is a temporary restriction being requested?

If yes, is there a Capacity Impact?

Is a phased excavation program required?

Note: For HCA's in the US phased programs may not be allowed

No. of phases

Phase criteria Phase 1 -

Phase 2 -

Phase 3 -

Reson for Phased Program:

Due to Capacity Impacts?

Other

Preparation of Dig Packages

Action By **Date Complete**

Prepare Dig List / Status Table

(including HCA or other requirements)

Request Environmental Assessments

Complete Dig Packages and Submit to Operations

Comments

NOTE: This document should be kept electronically in the network neighbourhood along with the Master Dig Lists, Excavation Program Status Tables and any supporting documentation re: decision making processes that were used. Hard copy of this form, the Master Dig List, Excavation Status Sheets and documents describing decision making processes should be inserted and retained at the front of the hard copy ILI report received from the Vendor.

Anna M Warawa
11/12/2003 08:36 AM

To: Pipeline Integrity
cc: Pipeline Integrity DMS@IPL
Subject: Line 5 (20 inch) Straits of Mackinaw West Leg Axiom Tracking PII Metal Loss Tool July 2003 <PRG.LINE05.20".straits.ml-03>
Expire On:

The above mentioned report was received on October 24, 2003.

Below the quality assurance form, requiring further input by Martha.



Line 5 (20 inch) Straits of Mackinac West Leg Axiom Tracking PII Metal Loss July

Hard copy report will be available with Martha.

AGM Report
Data Assessment

Line Number 5 Diameter 20" Segments Inspected: Straits of Mackinac - West Leg

Inspection Tool PII Metal Loss Run Date: July 12, 2003

Part 1 AGM Report / Contract Terms

ILI Coordinator or designate to review the incoming report and complete basic checks to ensure report format and contract terms have been met.

Vendor: Axiom Report Due Date Unknown Report Received Date: October 23, 2003

Check List for Deliverables

Basic checks to determine if requested or required items as outlined in the contract (and/or formally requested) were provided and are in the correct format (indicate NA if not applicable).

	Required / Requested	Received Hardcopy	Received Electronic	Format Good
Run Summary	☐	☒	☒	Yes
AGM Maps	☐	☐	☐	Yes/No
AGM GPS Information	☐	☒	☐	Yes
AGM Sketches	☐	☐	☐	Yes/No
AGM Photos	☐	☐	☐	Yes/No

Comments (if report not received by due date or there is any missing information, in which case it should be documented with new deliverable dates – Note; if data can be assessed in the present format then assessment should begin on data as is)

Due: Rec'd:
Due: Rec'd:

Complete and confirmed by Anna Warawa Date: November 12, 2003

Part 2 Data Assessment

Excavation Program Assistant or designate to complete a QA assessment of the AGM report to confirm data is sufficient, acceptable and consistent with Enbridge Route Sheets and or other documented information about the pipeline segment. When ILI report received, compare AGM data to ILI Marker List to determine if data is consistent. Note – the items outlined below are intended to represent some of the ways that can be used to evaluate the data and is not intended as a comprehensive list (nor as a requirement) for evaluating AGM data.

ILI Report Received: mm/dd/yy

Validation Method(s) Used		Valid
☐	AGM data and ENB Route Sheets match (y/n)	Yes/No
☐	Marker list and tracking report match (y/n)(AGM numbers, locations, etc).	Yes/No

Comments and / or Actions Required to Validate Data

Due: mm/dd/yy Rec'd: mm/dd/yy

Data evaluation completed by Martha Vega-Smith Date: mm/dd/yy

Anna M Warawa

11/12/2003 08:41 AM

To: Pipeline Integrity
cc: Pipeline Integrity DMS@IPL
Subject: Line 5 (20 inch) Straits of Mackinaw West Leg Axiom Tracking BJ Pipeline Services Geopig Tool July 2003 <PRG.LINE05.20".straits.geo-03>
Expire On:

The above mentioned report was received on October 24, 2003.

Below the quality assurance form requiring further input by Martha.



Line 5 (20 inch) Straits of Mackinac West Leg Axiom Tracking BJ Pipeline Services Geopig Jt

Hard copy report will be available with Martha.

AGM Report
Data Assessment

Line Number 5 Diameter 20" Segments Inspected: Straits of Mackinac - West Leg

Inspection Tool BJ Pipeline Services Geopig Run Date: July 12, 2003

Part 1 AGM Report / Contract Terms

ILI Coordinator or designate to review the incoming report and complete basic checks to ensure report format and contract terms have been met.

Vendor: Axiom Report Due Date Unknown Report Received Date: October 24, 2003

Check List for Deliverables

Basic checks to determine if requested or required items as outlined in the contract (and/or formally requested) were provided and are in the correct format (indicate NA if not applicable).

	Required / Requested	Received Hardcopy	Received Electronic	Format Good
Run Summary	☐	☒	☒	Yes
AGM Maps	☐	☐	☐	Yes/No
AGM GPS Information	☐	☒	☐	Yes
AGM Sketches	☐	☐	☐	Yes/No
AGM Photos	☐	☐	☐	Yes/No

Comments (if report not received by due date or there is any missing information, in which case it should be documented with new deliverable dates – Note; if data can be assessed in the present format then assessment should begin on data as is)

Due: Rec'd:
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Complete and confirmed by Anna Warawa Date: November 12, 2003

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Excavation Program Assistant or designate to complete a QA assessment of the AGM report to confirm data is sufficient, acceptable and consistent with Enbridge Route Sheets and or other documented information about the pipeline segment. When ILI report received, compare AGM data to ILI Marker List to determine if data is consistent. Note – the items outlined below are intended to represent some of the ways that can be used to evaluate the data and is not intended as a comprehensive list (nor as a requirement) for evaluating AGM data.

ILI Report Received: mm/dd/yy

Validation Method(s) Used		Valid
☐	AGM data and ENB Route Sheets match (y/n)	Yes/No
☐	Marker list and tracking report match (y/n)(AGM numbers, locations, etc).	Yes/No

Comments and / or Actions Required to Validate Data

Due: mm/dd/yy Rec'd: mm/dd/yy

Data evaluation completed by Martha Vega-Smith Date: mm/dd/yy

info@axiompipe.com

AXIOM PIPELINE SOLUTIONS INC.

Tel: (780)424-9262 • 11339-111 Ave. Edmonton Alberta Canada T5G 0C8 • Fax: (780)421-4325

PIPELINE INTEGRITY

OCT 24 2003

TO: ENBRIDGE PIPELINES LTD.
10201 Jasper Avenue
P.O. Box 398
Edmonton, Alberta T5J 2J9

DATE: Sept 30, 2003

INVOICE: 03.01.71

JOB No: 03.01.171

P.O. No: WP-91002-00007-03

ATTN: Don Engen –

RE: CTooL Operation/MFL/Geopig – Line 5
Mackinaw WEST

Qty	Description	Unit Price	Sub-Total
	LINE 5 – Mackinaw WEST LEG		
70	Operations – (1 Technician – 70.0 hrs)	$40.00	$2,800.00
12	Reporting – (1 Technician – 10 hrs)	$35.00	$420.00
7	Accommodations – (7.0 Days, 1 Technician)	$100.00	$700.00
7	Subsistence – (7.0 Days, 1 Technician)	$35.00	$245.00
8	Communication (8.0 Days, 1 Unit)	$20.00	$160.00
8	Vehicle Days – (8.0 Days, 1 Unit)	N/C	$0.00
1000	Mileage – (1 Unit – 1000 Miles)	$0.55	$550.00
	Supplemental Costs (Cost + 15%)		
1	Return Flight – Edmonton to Green Bay	$2,780.78	$2,780.78
1	Vehicle Rental	$896.75	$896.75
	All values in US Dollars.		
		Subtotal	$8,552.53
	TERMS: NET 15 DAYS	**Total**	**$8,552.53**

3/6/03
10-27-03

APPROVED
BY
EMP # DATE MM / DD / YY
TOTALS CHECKED ORDER # WO 91002-00007-03
PROJECT CHARGE
TASK EXP TYPE COST CTR.

912045C0093 02 1620104 912C4
OPERATING COST
LOB CONT. SEG. COST CTR. ACCOUNT SUBACCOUNT INTER-LOB

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00007 -03

LOCATION: Edmonton, Alberta

TO: Axiom Pipeline Solutions Inc.
11339 – 111 Avenue
Edmonton, Alberta
T5G 0C8
Attention: Brian Powlousky

DATE: March 10, 2003
COMMENCEMENT DATE: March 10, 2003
COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To provide personnel, material and equipment to prepare the 20-inch CTool and inspect Line 5 (20-inch), two sections at the Straits of Mackinac, Michigan. Each section 4.2 miles (6.7 km) long. Some GPS surveying is also required at the Straits. A field report of the CTool inpsection is required as soon as possible after each inspection. A final report is required within 30 days of the completion of the inspection.

Estimated Value $

	Project #	Task #	Exp Type #	Exp. Organization #
Capital Cost	91204SC0093	02	62010-01	91204
	91204SC0093	03	62010-01	91204

	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #
Operating Costs						

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc. – Edmonton, Alberta
IT'S AGENT

APPROVAL

Name of Contractor: Axiom Pipeline Solutions Inc.

By: _____ Date: 20/MAR/03
SIGNATURE

7.

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00007 -03

LOCATION: Edmonton, Alberta

TO: Axiom Pipeline Solutions Inc.
11339 – 111 Avenue
Edmonton, Alberta
T5G 0C8
Attention: Brian Powlousky

DATE: March 10, 2003

COMMENCEMENT DATE: March 10, 2003

COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To provide personnel, material and equipment to prepare the 20-inch CTool and inspect Line 5 (20-inch), two sections at the Straits of Mackinac, Michigan. Each section 4.2 miles (6.7 km) long. Some GPS surveying is also required at the Straits. A field report of the CTool inpsection is required as soon as possible after each inspection. A final report is required within 30 days of the completion of the inspection.

Company Information Only

91204SC0093 / 02 / 62010-01 US $34,000
91204SC0093 / 03 / 62010-01 US $ 2,000

Covered to Alaska Pipeline

Estimated Value $

	Project #	Task #	Exp Type #	Exp. Organization #
Capital Cost	91204SC0093	02	62010-01	91204
	91204SC0093	03	62010-01	91204

	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #
Operating Costs						

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc. – Edmonton, Alberta
IT'S AGENT

APPROVAL

Name of Contractor: Axiom Pipeline Solutions Inc

By: _____ Date: _____
SIGNATURE

info@axiompipe.com

AXIOM PIPELINE SOLUTIONS INC.

Tel: (780)424-9262 • 11339-111 Ave. Edmonton Alberta Canada T5G 0C8 • Fax: (780)421-4325

DAILY SUMMARY

ENBRIDGE PIPELINES LTD.

CTOOL OPERATIONS / MFL / GEOPig Tracking – Line 5 Straits of Mackinaw (WEST Leg)

Enbridge Project # WP 91002-00007-03 **Axiom reference # 03.01.171**

July 6, 2003

Duties: Mobilize Edmonton to Green Bay. Drive to St. Ignace.

Time:
Brian Powlousky – 8.0

Accommodations – 1.0
Subsistence – 0.0
Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 276 Miles

July 7, 2003

Duties: Job delay, stand-by.

Time:
Brian Powlousky – 8.0

Accommodations – 1.0
Subsistence – 1.0
Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 0.0 Miles

July 8, 2003

Duties: Mobilize to Escanaba; meet with PLM, and prep CTool.

Time:
Brian Powlousky – 8.0

Accommodations – 1.0
Subsistence – 1.0
Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 159 Miles

info@axiompipe.com

AXIOM PIPELINE SOLUTIONS INC.

Tel: (780)424-9262 • 11339-111 Ave. Edmonton Alberta Canada T5G 0C8 • Fax: (780)421-4325

July 9, 2003

Duties: Complete CTool preparations. Mobilize with Escanaba PLM to St. Ignace.

Time:

Brian Powlousky – 8.0

Accommodations – 1.0
Subsistence – 1.0
Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 160 Miles

July 10, 2003

Duties: Load and launch CTool. Download and analyze data.

Time:

Brian Powlousky – 8.0

Accommodations – 1.0
Subsistence – 1.0
Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 49 Miles

July 11, 2003

Duties: Meet with D. Demich to discuss results of CTool run. Load and launch GeoPig. Track GeoPig across wet leg of Straits.

Time:

Brian Powlousky – 8.0

Accommodations – 1.0
Subsistence – 1.0
Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 54 Miles

July 12, 2003

Duties: Assist in loading MFL, launch, track and trap. Assist in removal of MFL. Mobilize to Escanaba with PLM. Provide reporting to GE. Pack up CTool for shipping. Mobilize to Green Bay.

ENBDNR0006867

info@axiompipe.com

AXIOM PIPELINE SOLUTIONS INC.

Tel: (780)424-9262 • 11339-111 Ave. Edmonton Alberta Canada T5G 0C8 • Fax: (780)421-4325

Time:
Brian Powlousky – 14.0

Accommodations – 1.0
Subsistence – 1.0
Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 292 Miles

July 13, 2003

Duties: Demobilize Green Bay to Winnipeg.

Time:
Brian Powlousky – 8.0

Accommodations – 0.0
Subsistence – 1.0
Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 10 Miles

Aug 13, 2003

Duties: Reporting.

Time:
Jordan Dyck – 8.0

Accommodations – 0.0
Subsistence – 0.0
Communications – 0.0
Vehicle day – 0.0
Mileage (1 unit) – 0.0 Miles

Sept 30, 2003

Duties: Reporting. Rebuild 3 reports for Line 5 Mackinaw East at Enbridge request.

Time:
Jordan Dyck – 4.0

Accommodations – 0.0
Subsistence – 0.0
Communications – 0.0
Vehicle day – 0.0
Mileage (1 unit) – 0.0 Miles

info@axiompipe.com

AXIOM PIPELINE SOLUTIONS INC.

Tel: (780)424-9262 • 11339-111 Ave. Edmonton Alberta Canada T5G 0C8 • Fax: (780)421-4325

Summary:

Item	Quantity	Total$
Operation's	70.0 Hrs	$ 2,800.00
Reporting	12.0 Hrs	$ 420.00
Accommodations	7.0 Days	$ 700.00
Subsistence	7.0 Days	$ 245.00
Communications	8.0 Days	$ 160.00
Vehicle Days	8.0 Days	$ N/C
Mileage	1000 Miles	$ 550.00
		$ 4,755.00

Supplemental Costs: (cost +15%)

Flights

Brian — Edmonton to Green Bay, Green Bay to Winnipeg	$2,780.78
Converted @ 0.74789 July 03, 2003	$2,780.78

Vehicle Rental

Brian	$ 896.75
	$ 896.75

ENBDNR0006869

TRAVEL SERVICE (1985) LTD.
11733 - 95 STREET, EDMONTON, ALBERTA, CANADA T5G 1M1
TELEPHONE (780) 477-3551
FAX (780) 477-9871
EMAIL: travel@buttetravel.com
HENRY F. WOUDSTRA, MANAGER

Established 1960
Member IATA
Member GIANTS
Member CLIA
Member ACTA

THIS RECEIPT MAY BE REQUIRED AT CHECK-IN AND MUST BE PRESENTED TO CUSTOMS AND IMMIGRATION IF REQUESTED

NAME: POWLOUSKY/BRIAN MR ETKT ITINERARY/RECEIPT
BUTTE TRAVEL SERVICE LTD 03JUL03
TICKET NO. 012 1676698499 PLACE OF ISSUE: EDMONTON AB/CA
ISSUED BY: NORTHWEST AIRLINES INC

FARE	TAX	TAX	TAX	TOTAL
CAD 2947.00	11.22CA	208.13XG	66.85XT	CAD 3233.20

FORM OF PAYMENT: CC

6JUL YEA NW X/MSP NW GRB 05.53 1081.96 NW X/MSP NW YEA 05.53 1081.96 NUC 2174.98 END ROE1.354941 XT 36.28US 15.00SQ 9.48XY 6.09XFMSP4.5

CARRIAGE AND OTHER SERVICES PROVIDED BY THE CARRIER ARE SUBJECT TO CONDITIONS OF CARRIAGE WHICH ARE HEREBY INCORPORATED BY REFERENCE. THESE CONDITIONS MAY BE OBTAINED FROM THE ISSUING CARRIER.

NOTICE

IF THE PASSENGERS JOURNEY INVOLVES AN ULTIMATE DESTINATION OR STOP IN A COUNTRY OTHER THAN THE COUNTRY OF DEPARTURE THE WARSAW CONVENTION MAY BE APPLICABLE AND THE CONVENTION GOVERNS AND IN MOST CASES LIMITS THE LIABILITY OF CARRIERS FOR DEATH OR PERSONAL INJURY AND IN RESPECT OF LOSS OF OR DAMAGE TO BAGGAGE.

CR	FLT	DATE	FROM	TO	DEP	ST	CL	BG	NVB	NVA
NW	1028	06JUL	EDMONTON/INTL	MPLS/ST PAUL	810A	OK	Y	2PC		
NW	1278	06JUL	MPLS/ST PAUL	GREEN BAY	110P	OK	Y	2PC		
NW	5631	10JUL	GREEN BAY	MPLS/ST PAUL	825A	OK	Y	2PC		
NW	457	10JUL	MPLS/ST PAUL	EDMONTON/INTL	111A	OK	Y	2PC		

OPERATED BY NORTHWEST AIRLINK

ITEMS CHECKED BAGGAGE RETURNED
SEAT ASSIGNMENTS MADE

PRE-CONFIRMATION:
INTERNATIONAL FLIGHT RESERVATIONS (except charters) must be reconfirmed at least three days (72 hours) before returning home. Failure to reconfirm your flights could result in automatic cancellation by the airlines.

..... Valid Canadian Passport ..... Vaccination
..... Proof of Canadian Citizenship ..... Visa
FREE BAGGAGE ALLOWANCE: ☐ 64 KG (2 PIECES X 32KG);
☐ _____KG TOTAL

We reserve the right to charge the following cancellation penalties in addition to appropriate airline fees: Domestic $50; International $100 p.p.

• YOUR PROFESSIONAL AGENT •
All fares and schedules are quoted subject to alteration

ITINERARY

TRAVEL SERVICE (1985) LTD.
11733 - 95 STREET, EDMONTON, ALBERTA, CANADA T5G 1M1
TELEPHONE (780) 477-3661
FAX (780) 477-9871
EMAIL: travel@buttetravel.com
HENRY P. WOUDSTRA, MANAGER

Established 1980
Member IATA
Member GIANTS
Member CLIA
Member ACTA

AXIOM PIPELINE SOLUTIONS
11339 111 AVE
EDMONTON AB
T5G 0C8

DATE : 03 JUL 2003
COUNSELLOR : HEIDI
LOCATOR : K3HPH4
CLIENT NBR : 17
INVOICE : 37516

POWLOUSKY/BRIAN MR

FROM	TO	CARRIER	FLT/CL	DATE	DEP	ARR	ST
TOUR				06 JUL 03			
LOCATION-EDMONTON/INTL							
		AIR BOOKING FEE (50.00 X 1) TTL GST 3.50					
EDMONTON/INTL	MPLS/ST PAUL	NORTHWST AIR	1022 Y	06 JUL 03	810A	1146A	OK
ARRIVES TERMINAL -L							
AIRCRAFT AIRBUS A319 JET			NONSTOP		FLYING TIME		2:36
SEAT 11D							
MPLS/ST PAUL	GREEN BAY	NORTHWST AIR	1278 Y	06 JUL 03	110P	209P	OK
DEPARTS TERMINAL -L							
AIRCRAFT DC-9 JET			NONSTOP		FLYING TIME		:59
SEAT SELECTION AT AIRPORT ONLY.							
GREEN BAY	MPLS/ST PAUL	NORTHWST AIR	5631 Y	10 JUL 03	825A	935A	OK
ARRIVES TERMINAL -L							
AIRCRAFT CANADAIR JET			NONSTOP		FLYING TIME		1:10
SEAT 11C							
OPERATED BY NORTHWEST AIRLINK							
MPLS/ST PAUL	EDMONTON/INTL	NORTHWST AIR	437 Y	10 JUL 03	1117A	109P	OK
DEPARTS TERMINAL -L							
AIRCRAFT AIRBUS A319 JET			NONSTOP		FLYING TIME		2:52
SEAT SELECTION AT AIRPORT ONLY.							

YOU HAVE DECLINED MEDICAL INSURANCE
YOU HAVE DECLINED CANCELLATION INSURANCE
THANK YOU FOR BOOKING WITH BUTTE TRAVEL

ITEMS CHECKED BELOW ARE REQUIRED FOR YOUR VACATION/TRIP

..... Valid Canadian Passport ..... Vaccination
..... Proof of Canadian Citizenship ..... Visa
FREE BAGGAGE ALLOWANCE: ☐ 64 KG (2 PIECES X 32KG);
☐ _____KG TOTAL

RECONFIRMATION:
All INTERNATIONAL FLIGHT RESERVATIONS (except charters) must be reconfirmed at least three days (72 hours) before returning home. Failure to reconfirm your flights could result in automatic cancellation by the airlines.

We reserve the right to charge the following cancellation penalties in addition to appropriate airline fees: Domestic $50; international $100 p.p.

• YOUR PROFESSIONAL AGENT •
All fares and schedules are quoted subject to alterations

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Established 1960
Member IATA
Member GIANTS
Member CLIA
Member ACTA

AXIOM PIPELINE SOLUTIONS
11339 111 AVE
EDMONTON AB
T5G 0C8

DATE : 03 JUL 2003
COUNSELLOR : HEIDI
LOCATOR : K3HPH4
CLIENT NBR : 17
INVOICE : 37516

POWLOUSKY/BRIAN MR

FROM	TO	CARRIER	FLT/CL	DATE	DEP	ARR	ST

TICKET NUMBERS :

POWLOUSKY/BRIAN MR 1676698499 CAD 3233.20
CARD VI4500600995844010

AIR TRANSPORTATION	CAD	2947.00
TAX GST	CAD	208.13
AIRPORT IMPROVEMENT FEE	CAD	15.00
TAX OTHER	CAD	63.07

TTL	CAD	3233.20
TOTAL AIR BOOKING FEE		53.50
SUB TOTAL	CAD	3286.70
PYMT BY CC VI4500600995844010		53.50-
CREDIT CARD PAYMENT	CAD	3233.20-
AMOUNT DUE	CAD	0.00

ITEMS CHECKED BELOW ARE REQUIRED FOR YOUR VACATION/TRIP

..... Valid Canadian Passport ..... Vaccination
..... Proof of Canadian Citizenship ..... Visa
FREE BAGGAGE ALLOWANCE: ☐ 64 KG (2 PIECES X 32KG);
☐ _____KG TOTAL

RECONFIRMATION:
All INTERNATIONAL FLIGHT RESERVATIONS (except charters) must be reconfirmed at least three days (72 hours) before returning home. Failure to reconfirm your flights could result in automatic cancellation by the airlines.

We reserve the right to charge the following cancellation penalties in addition to appropriate airline fees: Domestic $50; International $100 p.p.

• YOUR PROFESSIONAL AGENT •

ITINERARY

All fares and schedules are quoted subject to alterations

Budget.

AN INDEPENDENTLY OWNED AND OPERATED BUDGET SYSTEM LICENSEE

BUDGET RENT A CAR OF GREEN BAY
AUSTIN STRAUBEL AIRFIELD
2077 AIRPORT DRIVE
AN INDEPENDENT BUDGET SYSTEM LICENSEE
(920)498-4855

FORM # WIS-114L-4 (9/02)

INSURANCE CERTIFICATE NO. (TRUCKS ONLY)

IDENTIFICATION OR BILLING INSTRUCTIONS

CREDIT CARD/DIRECT BILL NO./P.O. NO./EXP. DATE

079132
VI 4500 [redacted]

RETURN GRB AP REPLACEMENT

RENTAL AGREEMENT NO. GRB 0081244 ORIGINAL

COMM ☐ PERSONAL ☐

OWNING LOC. GRB AP

VEHICLE NO. 1 933209 CLASS

LICENSE NO. 732BVC WI

MAKE/MODEL DURANG DDDO 3

MLS IN 13977 TIME IN 07/13/03 10.42

MLS OUT 13977 TIME OUT [redacted]

ARRIVAL DATE/METHOD/TIME/MP/CAR TYPE/DA OR U/RETURN DATE

70603 1400 DG 71003 800

RENTER
POWLOUSKI, B

RESIDENCE
11339 111 AVE NW

CITY/STATE/ZIP
EDMONTON AB CAN T5B0C8

HOME PHONE D.O.B. BUDGET CUSTOMER NUMBER (BCN)
(780)975-1323 08/04/65

LICENSE NO./EXP. DATE/STATE
118429873 08/04/03 CAN

COMPANY

COMPANY PHONE NO./CORPRATE NO.

LOCAL CONTACT PHONE NO.

ADDITIONAL DRIVER/DOB
NO DRIVERS ALLOWED

LICENSE NO./EXP. DATE/STATE

REMARKS

Free Miles For Daily Rate = 200

MLS DRVN 1000	RENTAL TIME SPECIAL			RENTAL TIME REGULAR	
MIN/MAX RENTAL				MLS @ .300	
MILEAGE ALLOWANCE				DAY @ 79.00	
				HRS @ 26.34	
PREPAID VOUCHER OR COUPON VALUE				MLS @ 395.00	395.00

ATTENTION
- DAILY RATE IS BASED ON 24 HOUR DAY MINIMUM CHARGE
- DISCOUNT RATES ONLY FOR SPECIFIED PERIOD
- RATES DO NOT INCLUDE FUEL OR REFUELING CHARGE

☐ RENTER PURCHASED FUEL AT TIME OF RENTAL (PARA. 9)

395.00

TOTAL TIME/MILEAGE 395.00

DISCOUNT TOTAL

RETURN LOCATION CHARGE

SUB TOTAL

ONLY DRIVERS AUTHORIZED BY BUDGET ARE PERMITTED TO OPERATE THE VEHICLE. RENTER IS RESPONSIBLE FOR ALL INJURY AND DAMAGE CAUSED BY UNAUTHORIZED DRIVERS.

DUE DATE AUTHORIZED RETURN

07/13/03 AUSTIN STRAUBEL AIRFIELD

LDW CARGO VEHICLE DAMAGE LIMIT _____ (see paragraph 4B)

THEFT, VANDALISM AND DAMAGE TO RENTED VEHICLE: Renter and Authorized Drivers are responsible for loss and damage as described in paragraph 4. Renter may avoid or limit this responsibility by purchasing a Loss Damage Waiver.

PERSONAL INJURY AND PROPERTY DAMAGE: As described in paragraph 5, and subject to Renter's Indemnification (paragraph 6), Budget provides protection to the extent it is needed to meet the minimum financial responsibility limits and minimum no-fault benefits required by applicable law after payment of all insurance and other protection available to the driver of the Vehicle and/or injured passenger(s) in the Vehicle.

OPTIONAL SERVICES: LDW for loss damage waiver, PAE for personal accident and effects insurance, PAC for personal accident and cargo insurance, ATP for auto tow protection, PSP for emergency sickness protection, and SLI for supplemental liability insurance.

X ACCEPT LDW — X DECLINE LDW

X ACCEPT PAI — X DECLINE PAI

ACCEPT SLI — X DECLINE SLI

ALL INFORMATION ENTERED ON THIS PAGE IS CORRECT *(INCLUDING OPTIONS ACCEPTED OR DECLINED BY ME)*, AND I AGREE TO ALL TERMS OF THIS AGREEMENT (PAGES 1 AND 2).

X

PREPARED BY NICHOLAS [redacted] CLOSED BY 2648 LOONIS

LDW/GARS @ 18.95/DAY		132.65
SALES TAX	3.000% 5.500%	48.20
PAC @ 4.95/DAY		34.65
SLI @ 10.95/DAY BOS 12.5 @ 4.25/Bal.		76.65 53.13
UNDERAGE FEE 10.00/DA		
GRB 0081244		
RENTAL AGREEMENT NO. 10%ACCESS	SUB TOTAL	39.50 779.78
BILLING TYPE/AMOUNT VI 779.78	LESS DEPOSIT	
	NET DUE RENTER	NET DUE 779.78

ALL CHARGES SUBJECT TO FINAL AUDIT

ENBDNR0006873

Don L Engen
09/25/2003 03:37 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 09/25/2003 03:37 PM -----

Rebeca Suarez@LPL
09/25/2003 09:11 AM

To: Walter J Kresic/CNPL/Enbridge@IPL
cc: Don L Engen/CNPL/Enbridge@IPL, Jerry Walker/US/Enbridge@LPL
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>
Expire On:

Good morning Walter,

I appreciate your response and approval for increase of the work order mentioned above. I will try to answer your questions to the best of my knowledge.

-Electronic approval is sufficient and I do not require your signature on the hardcopy, as this electronic approval will be printed and filed along with the hard copy.

-Presently, we are required to acquire approvals according to approval authority levels for all work order amount increases. We were not aware that past practices allowed for a 10% overage. We will incorporate going forward.

-If you will notice below, I did indicate in my note that Don has approval authority to approve the invoice and not the work order increase which was the reason for my statement, "We will need to get Walter Kresic's approval on the work order increase." According to the database, Don has an approval authority limit level 7, which is $50,000 on Capital Projects and $5,000 on Operating Budget. Please feel free to correct me if this information is not accurate. The invoice which I was referring to is in the amount of $19,937.50.

If you have any further questions, please feel free to contact myself or Jerry Walker, our Accounts Payables and Purchasing Manager. I would be happy to help with any questions or concerns.

Have a great day!

Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com

Walter J Kresic@IPL

Walter J Kresic@IPL
09/24/2003 04:49 PM

To: Rebeca Suarez/US/Enbridge@LPL
cc: Don L Engen/CNPL/Enbridge@IPL
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>

This note serves to give my approval of the invoice as well as the $750 revision on the invoice total. However, I am assuming that electronic approval is sufficient in this case and that you do not require my signature on the hardcopy - please confirm that electronic approval is sufficient.

On a related item, it seems unusual that Accounting would require this level of approval for a $750 revision on a WO that is valued at $155,000 - this amounts to an overage of only 0.5%. While I understand the need to resolve differences in actuals versus WO, I would have expected that there would be a threshold beyond which a revision is not required (i.e. 10%) - please confirm that the Corporate policy is to gather approval for any WO increase. Further, you indicate in your note below that Don Engen has signing authority for this amount - I have not approved Don's authority to this level and would appreciate if you could confirm what his formal level is based on information within your database.

----- Forwarded by Walter J Kresic/CNPL/Enbridge on 09/24/2003 03:39 PM -----



Don L Engen
09/23/2003 05:19 PM

To: Walter J Kresic/CNPL/Enbridge@IPL
cc: Pipeline Integrity DMS@IPL
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 09/23/2003 05:18 PM -----



Rebeca Suarez@LPL
09/23/2003 10:26 AM

To: Don L Engen/CNPL/Enbridge@IPL
cc: Pipeline Integrity DMS@IPL
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>
Expire On:

Hi Don,

I just listened in to your message and then noticed an email from you, so I'll answer to your email and then if you need me to call you just let me know.

Your approval *on the invoice* is sufficient because it is within your approval authority limit. We would not be allowed to pay it with his signature only because he is not listed in the approval database. We will need to get Walter Kresic's approval on the work order increase.

We do need to revise any increases to all work orders. In order to be able to match the invoice to the work order, the work order needs to have at lease the amount of the invoice available and I do need to get approvals on any increase to the work order(s).

Again,

Please let me know if you need any further information.

Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com

Don L Engen@IPL



Don L Engen@IPL
09/23/2003 11:13 AM

To: Rebeca Suarez/US/Enbridge@LPL
cc: Pipeline Integrity DMS@IPL
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>

Hi Rebeca,

Does this invoice need to be approved by Walter Kresic or is the previous approver - Brad Smith #3764 OK? Brad was temporary supervisor while Walter was away. Also, does a $750.00 increase on a $155,000 WO actually require a WO revision. Please let us know when you get a chance. I also left you a phone message.

Thanks.

Don Engen
Pipeline Integrity
Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234

Rebeca Suarez@LPL



Rebeca Suarez@LPL
09/23/2003 08:43 AM

To: Don L Engen/CNPL/Enbridge@IPL
cc:
Subject: 91002-00009-03
Expire On:

Just following up on my previous email. Invoice is now past due.

Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com

----- Forwarded by Rebeca Suarez/US/Enbridge on 09/23/2003 09:42 AM -----



Rebeca Suarez
09/04/2003 02:45 PM

To: Don L Engen/CNPL/Enbridge@IPL
cc:
Subject: 91002-00009-03

Hello Don,

We will need to increase this work order to $155,750.00 from $155,000.00 in order to cover your approved invoice no. CAN2316 for PII Canada Ltd. Please advise. We also have another approval signature on the invoice that we can't read. The employee number is 3764, which is not in the approval database either. We can't tell who this is. Can you please try and help me out with identifying the approver?

Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com

Don L Engen
09/25/2003 03:38 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 09/25/2003 03:38 PM -----

Walter J Kresic
09/25/2003 11:18 AM

To: Rebeca Suarez/US/Enbridge@LPL
cc: Jerry Walker/US/Enbridge@LPL, Don L Engen/CNPL/Enbridge@IPL
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>
Expire On:

Thanks for the info Rebecca. Two points as follows:

- Regarding the 10% - your note indicates "we will incorporate going forward". My point was that this particular instance (requiring approval for $750) seemed unusual. My recommendation is that we incorporate only what is policy. I will leave it to Accounting to improve/modify the policy, based on Accounting's discretion, with consideration to my opinion that I viewed this process unusual.
- It was helpful that you clarified the invoice amount as being $19,900 - I thought the approval authority was for $155,000. The actual amount is within Don's authority limits and no further action is required.

Cheers.

Rebeca Suarez@LPL

Rebeca Suarez@LPL
09/25/2003 09:11 AM

To: Walter J Kresic/CNPL/Enbridge@IPL
cc: Don L Engen/CNPL/Enbridge@IPL, Jerry Walker/US/Enbridge@LPL
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>
Expire On:

Good morning Walter,

I appreciate your response and approval for increase of the work order mentioned above. I will try to answer your questions to the best of my knowledge.

-Electronic approval is sufficient and I do not require your signature on the hardcopy, as this electronic approval will be printed and filed along with the hard copy.

-Presently, we are required to acquire approvals according to approval authority levels for all work order amount increases. We were not aware that past practices allowed for a 10% overage. We will incorporate going forward.

-If you will notice below, I did indicate in my note that Don has approval authority to approve the invoice and not the work order increase which was the reason for my statement, "We will need to get Walter Kresic's approval on the work order increase." According to the database, Don has an approval authority limit level 7, which is $50,000 on Capital Projects and $5,000 on Operating Budget. Please feel free to

correct me if this information is not accurate. The invoice which I was referring to is in the amount of $19,937.50.

If you have any further questions, please feel free to contact myself or Jerry Walker, our Accounts Payables and Purchasing Manager. I would be happy to help with any questions or concerns.

Have a great day!

Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com

Walter J Kresic@IPL

Walter J Kresic@IPL
09/24/2003 04:49 PM

To: Rebeca Suarez/US/Enbridge@LPL
cc: Don L Engen/CNPL/Enbridge@IPL
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>

This note serves to give my approval of the invoice as well as the $750 revision on the invoice total. However, I am assuming that electronic approval is sufficient in this case and that you do not require my signature on the hardcopy - please confirm that electronic approval is sufficient.

On a related item, it seems unusual that Accounting would require this level of approval for a $750 revision on a WO that is valued at $155,000 - this amounts to an overage of only 0.5%. While I understand the need to resolve differences in actuals versus WO, I would have expected that there would be a threshold beyond which a revision is not required (i.e. 10%) - please confirm that the Corporate policy is to gather approval for any WO increase. Further, you indicate in your note below that Don Engen has signing authority for this amount - I have not approved Don's authority to this level and would appreciate if you could confirm what his formal level is based on information within your database.

----- Forwarded by Walter J Kresic/CNPL/Enbridge on 09/24/2003 03:39 PM -----



Don L Engen
09/23/2003 05:19 PM

To: Walter J Kresic/CNPL/Enbridge@IPL
cc: Pipeline Integrity DMS@IPL
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 09/23/2003 05:18 PM -----



Rebeca Suarez@LPL
09/23/2003 10:26 AM

To: Don L Engen/CNPL/Enbridge@IPL
cc: Pipeline Integrity DMS@IPL
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>
Expire On:

Hi Don,

I just listened in to your message and then noticed an email from you, so I'll answer to your email and then if you need me to call you just let me know.

Your approval *on the invoice* is sufficient because it is within your approval authority limit. We would not

be allowed to pay it with his signature only because he is not listed in the approval database. We will need to get Walter Kresic's approval on the work order increase.

We do need to revise any increases to all work orders. In order to be able to match the invoice to the work order, the work order needs to have at lease the amount of the invoice available and I do need to get approvals on any increase to the work order(s).

Again,

Please let me know if you need any further information.

Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com

Don L Engen@IPL



Don L Engen@IPL
09/23/2003 11:13 AM

To: Rebeca Suarez/US/Enbridge@LPL
cc: Pipeline Integrity DMS@IPL
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>

Hi Rebeca,

Does this invoice need to be approved by Walter Kresic or is the previous approver - Brad Smith #3764 OK? Brad was temporary supervisor while Walter was away. Also, does a $750.00 increase on a $155,000 WO actually require a WO revision. Please let us know when you get a chance. I also left you a phone message.

Thanks.

Don Engen
Pipeline Integrity
Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234

Rebeca Suarez@LPL



Rebeca Suarez@LPL
09/23/2003 08:43 AM

To: Don L Engen/CNPL/Enbridge@IPL
cc:
Subject: 91002-00009-03
Expire On:

Just following up on my previous email. Invoice is now past due.

Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com

----- Forwarded by Rebeca Suarez/US/Enbridge on 09/23/2003 09:42 AM -----



Rebeca Suarez
09/04/2003 02:45 PM

To: Don L Engen/CNPL/Enbridge@IPL
cc:
Subject: 91002-00009-03

Hello Don,

We will need to increase this work order to $155,750.00 from $155,000.00 in order to cover your approved invoice no. CAN2316 for PII Canada Ltd. Please advise. We also have another approval signature on the invoice that we can't read. The employee number is 3764, which is not in the approval database either. We can't tell who this is. Can you please try and help me out with identifying the approver?

Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com



Don L Engen
09/25/2003 07:43 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 09/25/2003 07:43 AM -----

Walter J Kresic
09/24/2003 03:49 PM

To: Rebeca Suarez/US/Enbridge@LPL
cc: Don L Engen/CNPL/Enbridge@IPL
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>
Expire On:

This note serves to give my approval of the invoice as well as the $750 revision on the invoice total. However, I am assuming that electronic approval is sufficient in this case and that you do not require my signature on the hardcopy - please confirm that electronic approval is sufficient.

On a related item, it seems unusual that Accounting would require this level of approval for a $750 revision on a WO that is valued at $155,000 - this amounts to an overage of only 0.5%. While I understand the need to resolve differences in actuals versus WO, I would have expected that there would be a threshold beyond which a revision is not required (i.e. 10%) - please confirm that the Corporate policy is to gather approval for any WO increase. Further, you indicate in your note below that Don Engen has signing authority for this amount - I have not approved Don's authority to this level and would appreciate if you could confirm what his formal level is based on information within your database.

----- Forwarded by Walter J Kresic/CNPL/Enbridge on 09/24/2003 03:39 PM -----



Don L Engen
09/23/2003 05:19 PM

To: Walter J Kresic/CNPL/Enbridge@IPL
cc: Pipeline Integrity DMS@IPL
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 09/23/2003 05:18 PM -----



Rebeca Suarez@LPL
09/23/2003 10:26 AM

To: Don L Engen/CNPL/Enbridge@IPL
cc: Pipeline Integrity DMS@IPL
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>
Expire On:

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We do need to revise any increases to all work orders. In order to be able to match the invoice to the work order, the work order needs to have at lease the amount of the invoice available and I do need to get approvals on any increase to the work order(s).

Again,

Please let me know if you need any further information.

Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com

Don L Engen@IPL



Don L Engen@IPL
09/23/2003 11:13 AM

To: Rebeca Suarez/US/Enbridge@LPL
cc: Pipeline Integrity DMS@IPL
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>

Hi Rebeca,

Does this invoice need to be approved by Walter Kresic or is the previous approver - Brad Smith #3764 OK? Brad was temporary supervisor while Walter was away. Also, does a $750.00 increase on a $155,000 WO actually require a WO revision. Please let us know when you get a chance. I also left you a phone message.

Thanks.

Don Engen
Pipeline Integrity
Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234

Rebeca Suarez@LPL



Rebeca Suarez@LPL
09/23/2003 08:43 AM

To: Don L Engen/CNPL/Enbridge@IPL
cc:
Subject: 91002-00009-03
Expire On:

Just following up on my previous email. Invoice is now past due.

Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com

----- Forwarded by Rebeca Suarez/US/Enbridge on 09/23/2003 09:42 AM -----



Rebeca Suarez
09/04/2003 02:45 PM

To: Don L Engen/CNPL/Enbridge@IPL
cc:
Subject: 91002-00009-03

Hello Don,

We will need to increase this work order to $155,750.00 from $155,000.00 in order to cover your approved invoice no. CAN2316 for PII Canada Ltd. Please advise. We also have another approval signature on the

invoice that we can't read. The employee number is 3764, which is not in the approval database either. We can't tell who this is. Can you please try and help me out with identifying the approver?

Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com

Rebeca Suarez@LPL
09/23/2003 10:26 AM

To: Don L Engen/CNPL/Enbridge@IPL
cc: Pipeline Integrity DMS@IPL
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>
Expire On:

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Again,

Please let me know if you need any further information.

Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com

Don L Engen@IPL

Don L Engen@IPL
09/23/2003 11:13 AM

To: Rebeca Suarez/US/Enbridge@LPL
cc: Pipeline Integrity DMS@IPL
Subject: Re: 91002-00009-03<PRG.LINE05.20".straits.ml-03>

Hi Rebeca,

Does this invoice need to be approved by Walter Kresic or is the previous approver - Brad Smith #3764 OK? Brad was temporary supervisor while Walter was away. Also, does a $750.00 increase on a $155,000 WO actually require a WO revision. Please let us know when you get a chance. I also left you a phone message.

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Pipeline Integrity
Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234

Rebeca Suarez@LPL

Rebeca Suarez@LPL

To: Don L Engen/CNPL/Enbridge@IPL

09/23/2003 08:43 AM

cc:
Subject: 91002-00009-03
Expire On:

Just following up on my previous email. Invoice is now past due.

Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com

----- Forwarded by Rebeca Suarez/US/Enbridge on 09/23/2003 09:42 AM -----

Rebeca Suarez
09/04/2003 02:45 PM

To: Don L Engen/CNPL/Enbridge@IPL
cc:
Subject: 91002-00009-03

Hello Don,

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Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com



Don L Engen
09/23/2003 10:04 AM

To: Rebeca Suarez/US/Enbridge@LPL
cc: Pipeline Integrity DMS
cc: Don L Engen/CNPL/Enbridge@IPL
Subject: Re: 91002-00009-03
Expire On:

Hi Rebeca,

Does this invoice need to be approved by Walter Kresic or is the previous approver - Brad Smith #3764 OK? Brad was temporary supervisor while Walter was away. Also, does a $750.00 increase on a $155,000 WO actually require a WO revision. Please let us know when you get a chance. I also left you a phone message.

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Pipeline Integrity
Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234

Rebeca Suarez@LPL



Rebeca Suarez@LPL
09/23/2003 08:43 AM

To: Don L Engen/CNPL/Enbridge@IPL
cc:
Subject: 91002-00009-03
Expire On:

Just following up on my previous email. Invoice is now past due.

Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com

----- Forwarded by Rebeca Suarez/US/Enbridge on 09/23/2003 09:42 AM -----



Rebeca Suarez
09/04/2003 02:45 PM

To: Don L Engen/CNPL/Enbridge@IPL
cc:
Subject: 91002-00009-03

Hello Don,

We will need to increase this work order to $155,750.00 from $155,000.00 in order to cover your approved invoice no. CAN2316 for PII Canada Ltd. Please advise. We also have another approval signature on the invoice that we can't read. The employee number is 3764, which is not in the approval database either. We can't tell who this is. Can you please try and help me out with identifying the approver?

Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com



Don L Engen
09/23/2003 09:12 AM

To: Walter J Kresic/CNPL/Enbridge,
cc: Pipeline Integrity DMS
cc:
Subject: 91002-00009-03<PRG.LINE05.20".straits.ml-03>
Expire On:

Walter,

Would you please approve the revision for WO 91002-00009-03 as per the explanation below and forward to Rebeca Suarez in Houston. We will need to increase this work order to $155,750.00 from $155,000.00. Apparently Brad Smith was not in the approval database. The invoice is now past due.

Thanks.
Don
----- Forwarded by Don L Engen/CNPL/Enbridge on 09/23/2003 09:12 AM -----

From: Don L Engen on 09/04/2003 05:05 PM

To: Walter J Kresic/CNPL/Enbridge@IPL
cc: Pipeline Integrity DMS@IPL
Subject: 91002-00009-03<PRG.LINE05.20".straits.ml-03>

Walter,

Line 5 (20") Straits PII MFL.

The slight cost overrun was due to a second mobilization and not completing the work in the first quarter to take advantage of the entire discount. Could you please approve and forward to Rebeca. The approver for this invoice was Brad Smith. You were away from the office on business at the time.

Don
----- Forwarded by Don L Engen/CNPL/Enbridge on 09/04/2003 04:57 PM -----



Rebeca Suarez@LPL
09/04/2003 01:45 PM

To: Don L Engen/CNPL/Enbridge@IPL
cc:
Subject: 91002-00009-03
Expire On:

Hello Don,

We will need to increase this work order to $155,750.00 from $155,000.00 in order to cover your approved invoice no. CAN2316 for PII Canada Ltd. Please advise. We also have another approval signature on the invoice that we can't read. The employee number is 3764, which is not in the approval database either. We can't tell who this is. Can you please try and help me out with identifying the approver?

Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com



Don L Engen

09/08/2003 09:39 AM

To: Walter J Kresic/CNPL/Enbridge
cc: Pipeline Integrity DMS
cc: Pipeline Integrity DMS
Subject: 91002-00010-03<PRG.LINE05.20".straits.geo-03>
Expire On:

Walter,

Please approve this Work Order revision for BJ's Geopig inspection on Line 5 (20") and forward to Rebeca Suarez in Houston. The original estimate was for $185,000 to do both legs at the Straits of Mackinac, assuming the work was completed in one mobilization. The additional $73,000 is because a second remob was required for the Geopig to inspect the second leg at the Straits of Mackinac. Approvals for revisions to US Work Orders are done electronically. There are sufficient funds in the budget to accommodate this revision.

Thanks.
Don
----- Forwarded by Don L Engen/CNPL/Enbridge on 09/08/2003 09:39 AM -----



Rebeca Suarez@LPL

09/04/2003 01:50 PM

To: Walter J Kresic/CNPL/Enbridge@IPL
cc: Don L Engen/CNPL/Enbridge@IPL
Subject: 91002-00010-03
Expire On:

Hello Walter,

We received your approved invoice for BJ Process and Pipeline Services. In order to pay this invoice we will need to increase the work order from $185,000.00 to $258,000.00. Do I have your approval to do so? Please advise.

Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com

Don L Engen
09/04/2003 05:06 PM

To: Walter J Kresic/CNPL/Enbridge
cc: Pipeline Integrity DMS
cc: Don L Engen/CNPL/Enbridge@IPL
Subject: Re: 91002-00010-03<PRG.LINE05.20".straits.geo-03>
Expire On:

Yes we are within budget. I think you just need to reply to Rebeca with your approval.
Walter J Kresic

Walter J Kresic
09/04/2003 04:56 PM

To: Don L Engen/CNPL/Enbridge@IPL
cc:
Subject: Re: 91002-00010-03<PRG.LINE05.20".straits.geo-03>
Expire On:

Revise the work order according the appropriate methods and I will sign - is this within budget?

Don L Engen

Don L Engen
09/04/2003 04:40 PM

To: Walter J Kresic/CNPL/Enbridge@IPL
cc: Pipeline Integrity DMS@IPL
Subject: 91002-00010-03<PRG.LINE05.20".straits.geo-03>
Expire On:

Walter,

Line 5 (20") Straits.
The original WO assumed one mobilization for the Geopig. Because of the second mob, the costs escalated to $258,000.
----- Forwarded by Don L Engen/CNPL/Enbridge on 09/04/2003 04:37 PM -----

Rebeca Suarez@LPL
09/04/2003 01:50 PM

To: Walter J Kresic/CNPL/Enbridge@IPL
cc: Don L Engen/CNPL/Enbridge@IPL
Subject: 91002-00010-03
Expire On:

Hello Walter,

We received your approved invoice for BJ Process and Pipeline Services. In order to pay this invoice we will need to increase the work order from $185,000.00 to $258,000.00. Do I have your approval to do so? Please advise.

Rebeca Suarez (Becky)
Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com



Don L Engen

09/04/2003 04:36 PM

To: Walter J Kresic/CNPL/Enbridge,
cc: Pipeline Integrity DMS
cc:
Subject: 91002-00010-03<PRG.LINE05.20".straits.geo-03>
Expire On:

Walter,

Line 5 (20") Straits.
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Rebeca Suarez@LPL

09/04/2003 01:50 PM

To: Walter J Kresic/CNPL/Enbridge@IPL
cc: Don L Engen/CNPL/Enbridge@IPL
Subject: 91002-00010-03
Expire On:

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Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com



Don L Engen
09/04/2003 04:57 PM

To: Walter J Kresic/CNPL/Enbridge,
cc: Pipeline Integrity DMS
cc:
Subject: 91002-00009-03<PRG.LINE05.20".straits.ml-03>
Expire On:

Walter,

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cc:
Subject: 91002-00009-03
Expire On:

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Enbridge Energy Company Inc.
Purchasing Dept.
713-821-2049
713-353-5666 fax
NOTE******NEW EMAIL**********Rebeca.Suarez@Enbridge.com

ORIGINAL

GE Power Systems
Oil & Gas

PII Canada Limited
1003 -11th Street S.W.
Calgary, Alberta T2R 1G2
Canada
Tel (403) 262-7447

INVOICE

Enbridge Energy, Limited Partnership
Suite 3300, 1100 Louisiana
Houston, TX 77002

PIPELINE INTEGRITY
AUG 01 2003

Attention: Mr. Don Engen

INVOICE NO.:	**CAN2316**
DATE:	August 1. 2003
TERMS:	Thirty (30) Days Upon Receipt
GST NO.:	872167978RP
LAUNCHING PROVINCE:	Michigan USA

Any questions concerning your invoice? **Call Maureen Miller (403) 298- 0240**

Name of Job:	20" Strait of Mackinac - Mackinaw B	**Inspection Length:**	20G - 6.7km
Contract No:	C2001-25	**Work Order No.**	91002-00009-03
PII Ref. No.:	101211_20G **Technology:** MFL	**Date of Service:**	July 12, 2003

This invoice is for the following services performed under the contract between Enbridge Energy Limited Partnership and PII (Canada) Limited:

US Dollars

Total Line Contract Price:

Inspection: 75,000.00X0.97		72,750.00
PipeImage=		7,000.00
	Total	$79,750.00

Invoicing Schedule:

Mobilization (10%)		7,975.00
Inspection (65%)		51,837.50
Final Report (25%)		19,937.50
	Total	$79,750.00

Previously Invoiced:

Date:	Invoice #:	Amount:
14-Jul-03	CAN2308	59,812.50

Current Charges:

Final Report	19,937.50

TOTAL **$19,937.50**

PLEASE WIRE PAYMENT TO:

The Toronto-Dominion Bank
Calgary, Alberta
Account of PII (Canada) Limited
Account No: 0805 0338152

317E
08-20-03

Overdue accounts are subject to a 1.5% interest charge per month

APPROVED
BY
EMP # DATE
MM / DD / YY
TOTALS CHECKED ORDER # WO-91002-00009-03

PROJECT CHARGE				
PROJECT		TASK	EXP TYPE	COST CTR
91204SC00931	01		12010-01	91204

OPERATING COST					
LOB	CONT SEG	COST CTR	ACCOUNT	SUBACCOUNT	INTER-LOB

Tool mobilization charges do not apply for the first mobilization of any inspection project. These fees are built in to the inspection fees. These mobilization charges only apply to re-run situations.

Miscellaneous/Optional Charges

LAPA	$5000.00 per line segment
PipeImage	$7000.00 per line segment

Cleaning Services

Quote provided on an as needed basis. Prices and program will designed by Vendor cleaning experts. If a Vendor cleaning program is accepted by the Company, the Vendor assumes full responsibility for the success of the inspection due to line cleanliness.

Tracking Services

Quote provided on an as needed basis.

Discount Opportunities

Discounts apply to all previous and subsequent inspections upon reaching the $5 million annual target.

Assuming inspection revenue to the Vendor as per pricing matrix attached, the Vendor would build the following discounts in to pricing from day 1 of any year.

UltraScan CD – 4%

UltraScan WM – 0%

Magnescan – 3% (Additional 5% reduction for first quarter inspections)

Elastic Wave – 0

TranScan – 5%

ENBDNR0006893

Exhibit C
Pricing and Payments

Enbridge 2001- 2004 Inspection Program Pricing

Pricing can be extended to all Enbridge Inc. wholly owned subsidiaries without exclusivity terms.

Pricing for Exclusive arrangement with PII (All prices in US $)

UltraScan WM

Minimum Line Segment Inspection Price	$125,000
For every km inspected	$ 1,525
Rerun Fees + applicable Standby and consumables charge	$ 45,000
Stand-By Charges (per day rate)	
Crew	$ 3,333
Tool	$ 3,333

UltraScan WM + Scoutscan Solo

Minimum Line Segment Inspection Price	$200,000
For every km inspected	$ 1,955
Rerun Fees for UltraScan + applicable Standby and consumables charge	$ 45,000
Rerun Fees for ScoutScan Solo	$ 25,000
Stand-By Charges (per day rate)	
Each Crew	$ 3,333
Each Tool	$ 3,333

MagneScan

Minimum Line Segment Inspection Price	$ 75,000
For every km inspected	$ 1,170
Rerun Fees	$ 30,000
Stand-By Charges (per day rate)	
Crew	$ 3,333
Tool	$ 3,333

ENBDNR0006894

Exhibit C
Pricing and Payments

Should the Company fail to pay the Vendor any amount due under the Contract at the due date of payment the Company shall be liable to pay interest on the unpaid amount from the due date of payment to the actual date of payment at a rate of interest two percentage points above the prime rate at Morgan Guaranty Trust Company in New York from time to time in force.

All payments made by the Company under this Agreement shall be paid in United States dollars. All payments to the Vendor shall be made by wire transfer or cheque into the following bank account:

The Toronto-Dominion Bank

Calgary, Alberta, Canada

Account of PII (Canada) Limited

Canadian Account No. 0805 0338152

Payment Stages

Payment of the Contract Sums shall be as follows:

For MagneScan, TranScan, UltraScan WM Inspections

Mobilization	10% of fee
Inspection	65% of fee
Report	25% of fee

For UltraScan CD and EW Inspection

Upon Mobilization	25%
Upon Inspection	50%
Upon Final Report	25%

ENBDNR0006895

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00009 -03

LOCATION: Edmonton, Alberta

TO: PII (Canada) Limited
1003 – 11th Street SW
Calgary, Alberta
T2R 1G2
Attention: Daryl Ronsky

DATE: March 10, 2003

COMMENCEMENT DATE: March 10, 2003

COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To supply a 20-inch MagneScan 020 MFL tool, personnel, material and equipment to inspect two 20-inch sections of Line 5 at the Straits of Mackinac in Michigan. Each section is approximately 4.2 miles (6.7 km) long. A preliminary report of the inspection is due within one calendar month of the data being received at the Vendor's facility. A final report is due 60 working days from when the data is received at the Vendor's facility.
Terms and conditions of Agreement C2001-25 take precedence over the Work Order Contract General Conditions

Company Information Only
Estimate US $155,000

My executed copy to Houston March 27

Estimated Value $

Capital Cost	Project #		Task #		Exp Type #	Exp. Organization #
	91204SC0093		01		62010-01	91204
Operating Costs	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

Name of Contractor: PII (Canada) Limited

BY. Don Engen – Enbridge Pipelines Inc 3176 20:44
IT'S AGENT

APPROVAL W. Kresin 2879

By: _____ Date: _____
SIGNATURE

RIGHT-TO-AUDIT

THE COMPANY SHALL BE GRANTED THE RIGHT-TO-AUDIT CONTRACTORS AND SUB-CONTRACTORS RECORDS UPON REASONABLE NOTICE FOR ALL COST-PLUS WORK ORDER BILLINGS.

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00009 -03

LOCATION: Edmonton, Alberta

TO: PII (Canada) Limited
1003 – 11th Street SW
Calgary, Alberta
T2R 1G2
Attention: Daryl Ronsky

DATE: March 10, 2003

COMMENCEMENT DATE: March 10, 2003

COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To supply a 20-inch MagneScan 020 MFL tool, personnel, material and equipment to inspect two 20-inch sections of Line 5 at the Straits of Mackinac in Michigan. Each section is approximately 4.2 miles (6.7 km) long. A preliminary report of the inspection is due within one calendar month of the data being received at the Vendor's facility. A final report is due 60 working days from when the data is received at the Vendor's facility.
Terms and conditions of Agreement C2001-25 take precedence over the Work Order Contract General Conditions

Estimated Value $

Capital Cost	Project # 91204SC0093		Task # 01		Exp Type # 62010-01	Exp. Organization # 91204
Operating Costs	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY. Don Engen – Enbridge Pipelines Inc.
IT'S AGENT

APPROVAL W. Kresin 2879

Name of Contractor: PII (Canada) Limited

By: _____ Date: MARCH 20, 2003
SIGNATURE

RIGHT-TO-AUDIT

THE COMPANY SHALL BE GRANTED THE RIGHT-TO-AUDIT CONTRACTORS AND SUB-CONTRACTORS RECORDS UPON REASONABLE NOTICE FOR ALL COST-PLUS WORK ORDER BILLINGS.

403 537 5235 Lois Jean

BJ Process and Pipeline Services

4101 OATES ROAD HOUSTON, TX 77013 TELEPHONE (832) 519-2000 (800) 345-8723 FAX (832) 519-2001
P.O. BOX 23656 HOUSTON, TX 77228-3656

PIPELINE INTEGRITY

AUG 07 2003

INVOICE

Date: 07/28/03
ENBR

No. 16-1258

Sold To: ATTN: CARL MIKKOLA
ENBRIDGE (U.S.) INC.
1100 LOUISIANA
SUITE 3300
HOUSTON TX 77002

Ship To: ENBRIDGE (U.S.) INC.
1100 LOUISIANA
SUITE 3300
HOUSTON TX 77002

( ) -

Terms: NET 30 DAYS

PO Number	Ord Date	Shp Date	Ship Via	SO No.
00028823		07/25/03		00028823

Part No.	Ord	Shp	Description	Price	Total
	0	0	This invoice covers charges for the 20" GEOPIG Run - Mackinaw Straight Crossing Project.	.00	.00
	1	1	We invoice you the full amount upon completion of field operations & final report.	129000.00	129000.00

R 31761
08-20-03

APPROVED
BY W Kuksi
EMP # 18179 DATE Aug 29/03
TOTALS CHECKED ORDER # WO-91002-00010-03
PROJECT CHARGE
PROJECT TASK EXP. TYPE COST CTR.
91204SC0093 C2 162010-9 91204
OPERATING COST
LOB CONT. SEG. COST CTR. ACCOUNT SUBACCOUNT INTER-LOB

Non-Taxable	Taxable	Sales Tax	Freight	Misc	Invoice Total
129000.00	.00	.00	.00	.00	129000.00

PLEASE REMIT PAYMENT TO: BJ PROCESS & PIPELINE SERVICES CO. P.O. BOX 4346 DEPT. 412, HOUSTON, TX 77210-4346

403 337 3235 Cris Sch

BJ Process and Pipeline Services

4101 OATES ROAD HOUSTON, TX 77013 TELEPHONE (832) 519-2000 (800) 345-8125 FAX (832) 619-8201
P.O. BOX 23656 HOUSTON, TX 77228-3656

PIPELINE INTEGRITY

AUG 07 2003

I N V O I C E

Date: 07/28/03
ENBR

No. 16-1258

Sold To: ATTN: CARL MIKKOLA
ENBRIDGE (U.S.) INC.
1100 LOUISIANA
SUITE 3300
HOUSTON TX 77002

Ship To: ENBRIDGE (U.S.) INC.
1100 LOUISIANA
SUITE 3300
HOUSTON TX 77002

( ) -

Terms: NET 30 DAYS

PO Number	Ord Date	Shp Date	Ship Via	SO No.
00028823		07/25/03		00028823

Part No.	Ord	Shp	Description	Price	Total
	0	0	This invoice covers charges for the 20" GEOPIG Run - Mackinaw Straight Crossing Project.	.00	.00
	1	1	We invoice you the full amount upon completion of field operations & final report.	129000.00	129000.00

K 31764
08-20-03

APPROVED

BY _____
EMP # _____ DATE _____
TOTALS CHECKED _____ ORDER # WO-91002-00010-03 (MM/DD/YY)

PROJECT CHARGE

PROJECT	TASK	EXP TYPE	COST CTR.
91204SC0093	02	1620104	91204

OPERATING COST

LOB	CONT. SEG.	COST CTR.	ACCOUNT	SUBACCOUNT	INTER-LOB

Non-Taxable	Taxable	Sales Tax	Freight	Misc	Invoice Total
129000.00	.00	.00	.00	.00	129000.00

ab

PLEASE REMIT PAYMENT TO: BJ PROCESS & PIPELINE SERVICES CO. P.O. BOX 4346 DEPT. 412, HOUSTON, TX 77210-4346

1.0 Executive Summary

The objective of this Inertial Geometry Survey Inspection with BJ's GEOPIG™ mechanical caliper tool is to provide a continuous internal inspection for Enbridge Pipelines Inc. of their twin 20" lines crossing the Mackinaw Straight. The GEOPIG inspection provides the following:

- High-resolution caliper data which determines the location, size and shape of mechanical damage in the pipeline including dents, wrinkles, buckles, ovality and other features in the pipeline.
- Information on bending strain in the pipeline due to slope instability, settlement, free spanning, river crossings, frost heave, and/or other forces acting on the pipeline
- Plan, profile and chainage information for the pipeline, as well as geographical UTM coordinates for an accurate and instantaneous assessment of the location of anomalies and features, saving time and money while eliminating unnecessary excavations.

The data collected by the GEOPIG can be viewed and analyzed on BJ's interactive PC software, GEODENT and GEODISPLAY. These software programs are included free of charge in the cost of the inspection services.

The processed data and pipeline defect assessment will be provided in both hard copy and CD-ROM formats.

To provide Enbridge with total flexibility, we have provided optional costs for completion of the project within one mobilisation (inspection of both line sections within one mobilisation) or alternatively using two mobilisations (inspection of one line per mobilisation).

The cost of the GEOPIG inspections is are as follows:

ITEM	COST (in US$) Complete project in one mobilisation	COST (in US$) Complete project in two mobilisations
Tool Preparation	$60,500	$107,500
Mobilization / Demobilization	$33,500	$62,000
Inspection Survey and Field Report	$59,500	$57,000
Final Report Preparation	$31,500	$31,500
TOTAL	**$185,000**	**$258,000**

The following proposal provides details of the services provided, a description of the GEOPIG mechanical caliper tool, and detailed cost information.

BJ INVOICE 16-1258 IS FOR $129,000 (50% OF $258,000) DUE TO THE NEED FOR A SECOND MOBILIZATION.
D.S. 08-20-03

WO 91002-00010-03 WILL REQUIRE AN ADDITIONAL $73,000.
D.S. 08-20-03

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00010 -03

LOCATION: Edmonton, Alberta

TO: BJ Pipeline Inspection Services
(a division of BJ Process and
Pipeline Services Company
Ltd.)
4839 – 90th Avenue SE
Calgary, Alberta
T2P 2H4

DATE: March 10, 2003
COMMENCEMENT DATE: March 10, 2003
COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To provide a 20-inch Geopig inspection tool plus personnel, material and equipment to inspect two 20-inch sections of Line 5 crossing the Straits of Mackinac in Michigan. Each section is approximately 4.2 miles (6.7 km) in length.

It is requested all dents, wrinkles, buckles, ovality and any other features causing a restriction of 2 percent or greater be reported. A preliminary field report is required as soon as possible on completion of the inspection.

As per BJ proposal T/0620/02/USR/41 of February 23, 2003, Terms and conditions of Agreement CP2003-05 take precedence over the Work Order Contract General Conditions.

Company Information Only
Estimate US $185,000

Sent to Houston Apr 3/03

Estimated Value $

Capital Cost	Project #		Task #		Exp Type #	Exp. Organization #
	91204SC0093		02		62010-01	91204
Operating Costs	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc. – Edmonton, Alberat
IT'S AGENT

APPROVAL W. Knesn 28-79

Name of Contractor: BJ Pipeline Inspection Services

By: _____ Date: _____
SIGNATURE

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

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It is requested all dents, wrinkles, buckles, ovality and any other features causing a restriction of 2 percent or greater be reported. A preliminary field report is required as soon as possible on completion of the inspection.
As per BJ proposal T/0620/02/USR/41 of February 23, 2003, Terms and conditions of Agreement CP2003-05 take precedence over the Work Order Contract General Conditions.

Estimated Value $ AS PER BJ PROPOSAL T0620/03/USR

Capital Cost	Project # 91204SC0093	Task # 02	Exp Type # 62010-01	Exp. Organization # 91204	
Operating Costs	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #

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ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc – Edmonton, Alberta
IT'S AGENT

Name of Contractor: BJ Pipeline Inspection Services

APPROVAL W. K. WEST c 2879

SIGNATURE

Date: MARCH 31st 2003

Don L Engen
08/18/2003 01:22 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: West Leg Straits Update 8/18/03<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 08/18/2003 01:22 PM -----

Mike D Goman@LPL
08/18/2003 12:49 PM

To: Mark S Sitek/LPL@LPL, Al V Aleknavicius/LPL@LPL, Adam J Erickson/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Grant P Henningsen/LPL@LPL, Kent Cornelius/CNPL/Enbridge@IPL, Doug A Barry/CNPL/Enbridge@IPL, Bruce Paul/CNPL/Enbridge@IPL, Greg L Sevick/CNPL/Enbridge@IPL, Gordon Good/CNPL/Enbridge@IPL, Pipeline Schedulers
cc:
Subject: West Leg Straits Update 8/18/03
Expire On:

Just a quick note to let everyone know that as of approximately 10:30 MST today the final screw anchor was placed on the West Leg of the Straits, completing the 2003 inspection and stabilization program. The repair barge demobilization began immediately after the anchor was installed. Attached below is the span table for the West Leg. Please let myself or Adam Erickson know if you have any questions. Thanks.

Enbridge Energy
2003 Straits of Mackinac Inspection & Repair
West Leg
Repairable Span List

Span Number	Length (ft)	Water Depth (ft)	Date Identified	Date Repaired	Repair Method	Comments
W01	153	75	7/28/2003	8/16/2003	Screw Anchor	
W29	147	135	7/29/2003	8/10/2003	Screw Anchor	Anchors hit rock, made adapting collars
W42	140	170	7/29/2003	8/12/2003	Screw Anchor	
W43	149	165	7/29/2003	8/12/2003	Screw Anchor	
W48	144	180	7/30/2003	8/18/2003	Screw Anchor	
W58	106	205	7/30/2003	8/6/2003	Screw Anchor	Repaired in conjunction w/ Span W59
W59	286	225	7/30/2003	8/5/2003	2 Screw Anchors	
W60	162	160	7/30/2003	8/9/2003	Screw Anchor	
W68	148	200	7/31/2003	8/16/2003	Screw Anchor	
W71	57	225	7/31/2003	8/14/2003	Screw Anchor	Replace 2001 Mechanical Support w/ Screw Anchor
W72	124	240	7/31/2003			
	= Spans over 195 feet in length.					

Mike Goman
Region Engineer
Enbridge (U.S.) Inc.
Office: 218-759-6622
Cell: 218-766-0608
Fax: 218-751-0344

Anna M Warawa
08/08/2003 11:59 AM

To: Pipeline Integrity
cc: Pipeline Integrity DMS@IPL
Subject: <PRG.LINE05.20".straits.ml-03>
Expire On:

The above mentioned report was received on August 5, 2003.

Below the quality assurance requiring further by Vanessa.



Line 5 (20 inch) Straits of Mackinac West Leg PII Metal Loss June 2

Scanned image, providing further information regarding this survey.



Pressure Based Pipeline Summary Rpt - GE(F

Report will be available with Vanessa.

Don,

Please provide the report due date.

Thanks,

Anna

Corrosion In-Line Inspection
Data Assessment and QA Checklist

Line Number 5 Diameter 20"

Segments Inspected Straits of Mackinac (West) 101211_20G

Inspection Tool Metal Loss (MFL) with IMU Vendor GE - PII

Part 1 ILI Report / Contract Terms

ILI Coordinator or designate to review the incoming report and complete basic checks to ensure report format and contract terms have been met.

Run Date June 12, 2003

Section Analyzed Straits of Mackinac (West)

Report Due Date Not documented (Don to provide upon return) Report Received Date August 5, 2003

Comments (if report not received by due date)

Check List for Deliverables

Basic check to determine if requested or required items as outlined in the contract (and/or formally requested) were provided and are in the correct format (indicate NA if not applicable).

	Required / Requested	Received Hardcopy	Received Electronic	Format Good
Marker List	☒	☒	☒	Yes
Nominal Wall thickness listing	☒	☒	☐	Yes
Pipe Listing	☒	☒	☒	Yes
Pipe Tally	☒	☒	☒	Yes
PipeImage	☒	☐	☒	Yes
IMU / GPS Information	☐	☐	☐	
Morrison Format	☐	☐	☒	N/A
LAPA	☐	☐	☐	
Rstreng Eff Area	☐	☐	☐	
On network	☒	☐	☒	Yes
Dent Report	☐	☒	☐	
	☐	☐	☐	

Comments and / or Actions Required To Complete Reporting Requirements

Improved documentation is required when IMU is being used. This survey should have data documenting that the GPS data is included.

Complete and confirmed by Anna Warawa Date: August 8, 2003

Part 2 Data Assessment

Excavation Coordinator or designate to complete a QA assessment of the ILI data to confirm the data is acceptable and consistent with historical and / or other documented information about the pipeline segment. The analysis consists of expert based judgement of data validity.

QA Data Check

- ξ Is format acceptable for analysis (y/n)
- ξ Are all CD files acceptable for analysis (y/n)
  (i.e. files can all be opened & data is formatted)

Comments and / or Actions Required To Fix Data

QA data check completed by Date

Data Validation

Compare ILI data to historical information to determine if data is consistent with past results and expectations. Note – the items outlined below are intended to represent some of the ways that can be used to evaluate the data and is not intended as a comprehensive list (nor as a requirement) for evaluating ILI data. Methods used should be checked (y/n). Comments can be provided below.

Validation Method(s) Used	Valid
☐ Girth weld numbers okay (y/n)	
☐ Marker list and tracking report match (y/n) (AGM numbers, locations, etc).	
☐ Data consistent with historical ILI information	
☐ RPRs consistent w/ historical or expected results	
☐ RPRs consistent w/ current operating pressures	
☐ Trend plots consistent w/ historical results	
☐ Sentenced plots consistent w/ historical results	
☐ Exploratory dig results consistent w/ ILI data	
☐ Comparison of data to previously excavated data	
☐	
☐	
☐	

Comments and / or Actions Required To Validate Data

Data evaluation completed by Date
Date

Comments (any missing information should be documented with new deliverable dates – Note; if data can be assessed in the present format then assessment should begin on data as is)

Due:	Rec'd:
Due:	Rec'd:
Due:	Rec'd:
Due:	Rec'd:

Reviewed/Approved by
Excavation Coordinator: Date
Supervisor of Integrity Programs: Date

Part 3 Analysis / Generation of Excavation Packages

Excavation Coordinator or designate shall analyze the ILI information, develop a master dig list, determine whether pressure restrictions are required and outline any phased dig programs that may be required to meet operating requirements, resource requirements and / or HCA regulations.

Generate Master Dig List **Date Complete**

Generate master dig list with all features that meet Enbridge dig criteria.
Identify and document (on master list) all features that have been previously excavated
And recoated or repaired.

Evaluation of remaining features **Required** **Action By**

Is a temporary restriction being requested?
If yes, is there a Capacity Impact?

Is a phased excavation program required?
Note: For HCA's in the US phased programs may not be allowed

No. of phases
Phase criteria Phase 1 -
Phase 2 -
Phase 3 -

Reason for Phased Program:
Due to Capacity Impacts?
Other

Preparation of Dig Packages

Action By **Date Complete**

Prepare Dig List / Status Table
(including HCA or other requirements)

Request Environmental Assessments

Complete Dig Packages and Submit to Operations

Comments

NOTE: This document should be kept electronically in the network neighbourhood along with the Master Dig Lists, Excavation Program Status Tables and any supporting documentation re: decision making processes that were used. Hard copy of this form, the Master Dig List, Excavation Status Sheets and documents describing decision making processes should be inserted and retained at the front of the hard copy ILI report received from the Vendor.

3.2.5. Girth Weld Anomaly Report

The girth weld anomaly report provides a list of all significant girth weld anomalies that have been detected along the pipeline.

Incomplete welds and circumferential cracks within the weld are examples of girth weld anomalies.

No girth weld anomalies have been detected during this pipeline inspection.

Special Girth Weld Inspection

The welds in this pipeline were of special concern because of the risk of changes in the lake bottom, which might expose the pipe and subject it to bending stress from the currents.

All welds were inspected at least twice by different people during the regular analysis. No areas of strong concern were noted but some minor irregularities were recorded and retained for further assessment.

All welds exhibit a subtle but unusual end preparation on the inside surface. This is always restricted to a band less than 3 inches from the end of the pipe. For some welds the prepared band is uniform width and intensity and for other it is an irregular width. The effect suggests a single light pass with a grinder around the inside surface prior to welding; it does not compromise the integrity of the welds.

Our weld inspection expert in Britain also examined all of the welds on this pipeline. He observed that many of the welds show some evidence of minor hi-low (wall misalignment), which was responsible for the minor irregularities noted during the analysis. The more significant of these and a sampling of other welds were crosschecked in detail between the earlier and current inspections.

Weld signals in areas of mid-line curvature, centered on welds 5970, 6060 - 6110, 6260, and 8190 - 8200 were examined closely and also found to be well within normal variation.

The welds throughout were found to be sound, with no evidence of significant anomalies present. The main observation is that there is a degree of hi-low present on the majority of the welds. The level of this misalignment effect is not unusual in the experience of our expert, given the diameter and wall thickness of the pipeline. Construction specifications allow a degree of hi-low, and all the welds are assessed as being well within the acceptable tolerance.

ENBDNR0006908

jfalk@bjservices.ca

07/29/2003 06:06 PM

To: Don.Engen@enbridge.com, Garrett.Wilkie@enbridge.com, pidms@cnpl.enbridge.com
cc:
Subject: Line 5 Mackinaw Geopig final report
Expire On:

We have couriered a printed copy of the report to Anna Warawa - if you would like additional copies please let us know.

(See attached file: FINAL REPORT Enbridge NPS20 Line 5 (West)-BJ Survey 2003.doc)

==========

Joel Falk
BJ Pipeline Inspection Services
Calgary, AB
ph. 403-531-5469



FINAL REPORT Enbridge NPS20 Line 5 (West)-BJ Survey 2(

jfalk@bjservices.ca

07/29/2003 06:13 PM

To: Don.Engen@enbridge.com, Garrett.Wilkie@enbridge.com, pidms@cnpl.enbridge.com
cc:
Subject: Line 5 Mackinaw Pipeline data
Expire On:

(See attached file: Enbridge NPS20 Line 5 (West)-BJ Survey 2003.XLS)

==========

Joel Falk
BJ Pipeline Inspection Services
Calgary, AB
ph. 403-531-5469

Enbridge NPS20 Line 5 (West)-BJ Survey 200



Don L Engen

07/25/2003 05:01 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Line 5 (20") West Leg of Straits - Final report<PRG.LINE05.20".straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/25/2003 05:01 PM -----



jfalk@bjservices.ca

07/25/2003 04:22 PM

To: Don.Engen@enbridge.com, Garrett.Wilkie@enbridge.com, pidms@cnpl.enbridge.com
cc: jczyz@bjservices.ca
Subject: Line 5 (20") West Leg of Straits - Final report
Expire On:

As we were double-checking the results of the inspection, we noticed that we had undersized the two ovalities that we listed. The correct sizes for the two ovalities is 0.64" (3.2% OD) and 0.3" (1.5% OD).

We have updated the appropriate areas of the report, and will be sending the printed copy out on Monday. Since the original criteria was to report all features over 2%, we have decided to report only the 3.2% ovality in this updated report.

If you have any questions please don't hesitate to give me a call.

==========

Joel Falk
BJ Pipeline Inspection Services
Calgary, AB
ph. 403-531-5469

Don L Engen
07/25/2003 09:09 AM

To: pipeline Integrity DMS
cc:
cc:
Subject: Pipeline coords at 1 ft intervals in Line 5 20" Mackinaw Straits line<PRG.LINE05.20".straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/25/2003 09:09 AM -----

jfalk@bjservices.ca
07/24/2003 06:00 PM

To: Garrett.Wilkie@enbridge.com, Don.Engen@enbridge.com, pidms@cnpl.enbridge.com
cc: jon.wharf@og.ge.com
Subject: Pipeline coords at 1 ft intervals in Line 5 20" Mackinaw Straits line
Expire On:

(See attached file: Line_5 Pipeline Coords_1ft.xls)

==========

Joel Falk
BJ Pipeline Inspection Services
Calgary, AB
ph. 403-531-5469

Line 5 Pipeline Coords 1ft.:

Don L Engen
07/25/2003 09:08 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Pipeline features in Line 5 20" Mackinaw Straits line<PRG.LINE05.20".straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/25/2003 09:08 AM -----

jfalk@bjservices.ca
07/24/2003 05:54 PM

To: Garrett.Wilkie@enbridge.com, Don.Engen@enbridge.com, pidms@cnpl.enbridge.com
cc:
Subject: Pipeline features in Line 5 20" Mackinaw Straits line
Expire On:

(See attached file: Enbridge NPS20 Line 5 (West)-BJ Survey 2003.XLS)

==========

Joel Falk
BJ Pipeline Inspection Services
Calgary, AB
ph. 403-531-5469

Enbridge NPS20 Line 5 (West)-BJ Survey 200

jfalk@bjservices.ca

07/24/2003 05:47 PM

To: Garrett.Wilkie@enbridge.com, Don.Engen@enbridge.com, pidms@cnpl.enbridge.com
cc:
Subject: Enbridge LINE05 20" Mackinaw Straits Geopig report
Expire On:

Attached is an electronic copy of the final report. In separate emails I will send speadsheets of pipeline features and of coordinates of the line.

I will be sending a paper copy of the report as well as the data on CD tomorrow.

(See attached file: FINAL REPORT Enbridge NPS20 Line 5 (West)-BJ Survey 2003.doc)
==========

Joel Falk
BJ Pipeline Inspection Services
Calgary, AB
ph. 403-531-5469



FINAL REPORT Enbridge NPS20 Line 5 (West)-BJ Survey 2(

FINAL REPORT

GEOPIG GEOMETRY SURVEY

of

ENBRIDGE PIPELINES INC.

LINE 5

NPS 20 Straits of Mackinac (West)

Run: July 12, 2003

July 25, 2003

Job Reference: 0682-2/03/USR/41

Submitted by:

BJ Pipeline Inspection Services

4839 – 90th Ave S.E.

Calgary, Alberta

T2H 2H4

Tel: (403) 531-5300

Fax: (403) 236-8740

This report has been specifically prepared for Enbridge Pipelines Inc. Any use which a third party makes of this report, or any sole reliance on or decisions to be made based on the information contained herein, are the sole responsibility of such third parties. BJ Pipeline Inspection Services accepts no responsibility for the damages, if any, suffered by any third party as a result of decisions made or actions based on the information contained in this report.

Information provided herein represents the best efforts of BJ Pipeline Inspection Services personnel to evaluate the described lines. Judgments concerning pipe condition are left entirely to Enbridge Pipelines Inc. All information herein represents only BJ Pipeline Inspection Services opinion of the meaning of the Geopig information, and shall not be construed as a warranty or guarantee of the structural condition of the pipeline, its fitness for use, or any other condition.

Company:	**Enbridge Pipelines Inc**
Project Title:	**GEOPIG INSPECTION**
Document Title:	**FINAL REPORT - GEOPIG GEOMETRY SURVEY of Enbridge Pipelines Inc. Line 5 NPS 20 Straits of Mackinac (West)**

BJPIS Document No.: 0682-2/03/USR/41	BJPPS Job No.: 0682-2/03/USR/41
Enbridge Pipelines Inc Document No.:	Enbridge Pipelines Inc Contract No.

IRO:	**ORIGINAL**
CC/UC	

Signature legend:

Originator: Joel Falk

Checker: Jarek Czyz

Approver: Ron Wade

Issue	Description	Date	Originator	Checked	Approved
1	Original Issue	24/07/2003			

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REVISION RECORD

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REV NO.	REVISED SECTIONS	PARA NO.	DESCRIPTION OF CHANGES
A	-	-	Initial issue

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1 EXECUTIVE SUMMARY

BJ Pipeline Inspection Services performed an Inertial Geometry Survey of Enbridge Pipelines' 3.9 mile NPS 20 oil pipeline crossing the Straits of Mackinac (Line 5 West). The successful run was performed July 12, 2003.

The purpose of the inspection was to collect complete pipeline geometry data, which includes plan, profile, curvature, weld tally, pipe wall shape and deformations.

The data collected during the inspection is of very good quality. The analysis of the caliper data has identified no pipe wall anomalies greater than 2% O.D.

Based on the inertial data 23 bends have been identified with the angle larger than 1.5 degree and a radius of curvature less than 100 D. The tightest bend radius is 26.7 D. There are also 6 areas of bending strain larger than 0.15% that are not associated with bends; these are listed in Appendix 4. The largest strain is 0.28% and is a sagbend located at Enbridge chainage 150+07 ft.

GPS coordinates in UTM NAD83 of the launch and receive valve, provided by Axiom Pipeline Solutions Inc., were integrated with the pipe centerline coordinates obtained from the inertial survey. The resulting database provides a means for locating pipeline anomalies and a foundation for a GIS System.

The pipe tally including girth welds and pipe fittings can be displayed in BJ's software together with the data from the Geopig inspection.

The survey data and the BJ software for viewing it are stored on the enclosed CD-ROMS. The complete pipeline listing is also included in Microsoft Excel format in the file "Enbridge NPS20 Line 5 (West)-BJ Survey 2003.XLS" contained in the directory \BJ_ENB\L5-West\docs.

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2 SURVEY RESULTS

The Geopig inertial survey provides pipeline plan, profile and bending strain, allowing one to locate the pipeline in the UTM mapping projection, and to detect pipeline movement between runs. The positional information is derived from the onboard strapdown inertial unit, the odometer readings and the UTM coordinates of selected tie-points obtained from a GPS survey.

The caliper survey provides the information on the internal diameter and shape of the pipe, allowing for detection and measurement of pipe wall anomalies (dents, ovalities and wrinkles), valves, tees and girth welds.

2.1 Chainage

The Geopig chainage is the distance measured by the Geopig's odometers along the pipeline and is denoted as SCh (slack chainage) on the plots. It starts from 0.0 ft at the pig launcher and ends at 21898 ft in the receive trap. In this report all chainages have been provided in feet. The horizontal chainage is also available, and it represents the true horizontal distance of the surveyed pipeline.

2.2 GPS Tie Points

GPS coordinates of the launch and receive valve, provided by Axiom Pipeline Solutions Inc., were integrated with the pipe centerline coordinates obtained from the inertial survey. The resulting database provides a means for locating pipeline anomalies and a foundation for a GIS System. The coordinates are provided in Appendix 1. All coordinates given in this report are using UTM NAD 83 Zone 16N.

2.3 Pipe Anomalies

The quality of the caliper data was very good throughout the entire length of the pipeline. This data was used for detecting and sizing diameter restrictions and pipe wall anomalies, such as ovalities and dents. The anomaly size definition is provided in Section 4.4.

There are no pipe wall anomalies greater than 2% O.D. in the inspected pipeline. There are two features which are between 1% and 2% OD, both of which are ovalities. They are listed in Appendix 5 and plots of them appear in Appendix 8.

2.4 Bending Strain

The curvature data was processed using 5 m (16.4 ft) moving average (see section 4.3) in order to report the areas with bending strain greater than 0.15% that were not associated with field or factory bends. Six such areas have been detected in this line, and they are listed in the worksheet "Strains >0.15%" as well as in Appendix 4. Each strain is described in terms of chainage at its peak value, strain in horizontal and vertical plane, main orientation and radius of curvature. The largest strain is 0.28% and is a sagbend located at Enbridge chainage 150+07 ft. Plots for each of these strains are available in Appendix 7.

The text file "Pipe_Centerline.txt" stored in the directory "\BJ_ENB\L5-West\docs\" contains pipeline geometry data (at 1 ft spacing) along the pipeline that includes BJ

chainage, UTM coordinates, horizontal curvature radius, vertical curvature radius and total curvature radius.

2.5 Bends

The inertial data was used to find all bends with an angle greater than 1.5 degrees and a radius of curvature less than 100 D. Twenty-three such bends have been detected in this line, and they are listed in the worksheet "Bends" as well as in Appendix 2. Each bend is described in terms of chainage at its center, bend radius and angle, as well as change of direction in horizontal and vertical plane. The tightest bend radius is 26.7 D and it is located at Enbridge chainage 210+81 ft.

2.6 Pipe Tally

The list of pipeline features, such as valves and tees are included in the worksheet "Valves and Fittings" and Appendix 3.

The Geopig has also detected all the girth welds in the pipeline. They are listed in the worksheet "Weld Log", which contains the information on the length and start chainage of each pipe joint. The weld log combined with all the other features in the pipeline (valves, tees, strains and bends) are listed in Appendix 6 and the worksheet "Pipe Tally".

All the features included in the pipe tally can be displayed as "Client Inventory" in the GEODENT and GEODISPLAY programs, as shown on the sample plot above.

All the listings included in Appendices 1 to 5 are available in electronic form in the MS Excel spreadsheet "Enbridge NPS20 Line 5 (West)-BJ Survey 2003.XLS" contained in the directory \BJ_ENB\L5-West\docs.

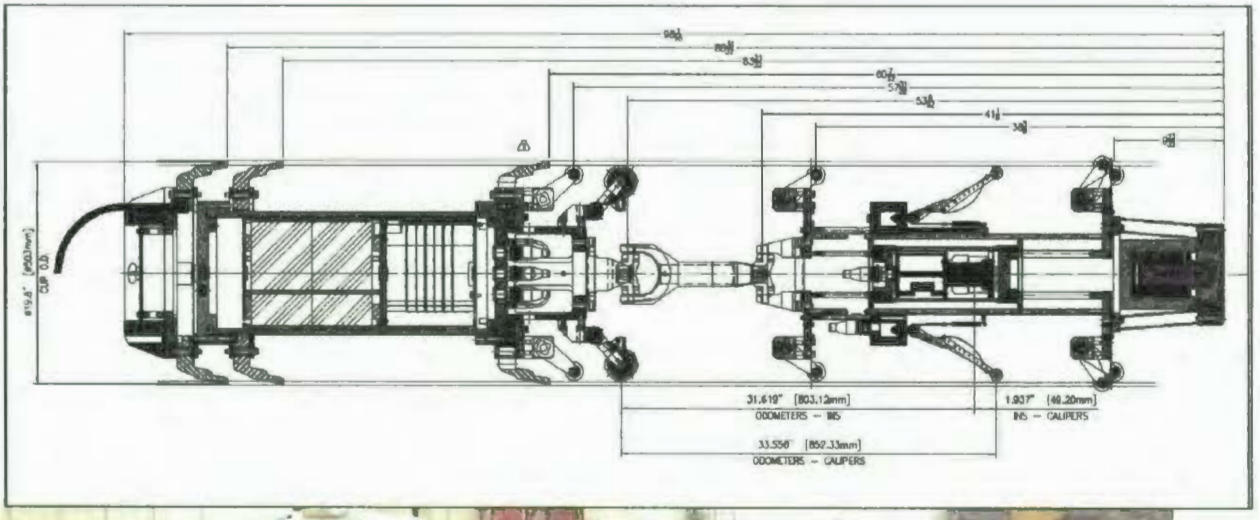
2.7 Plan and Profile

The first plot in Appendix 9 shows the plan and profile of the entire pipeline. The remaining 11 plots show the pipeline plan, profile, and vertical, horizontal and total strain at a scale of 2000 ft per page.

3 GEOPIG DESCRIPTION

3.1 System Description

The Geopig is designed to meet a large variety of user requirements using a modular system that integrates a variable number of different sensors. The design of NPS 20 Geopig consists of two pig carriers, as illustrated in the figures below.





20" Mechanical Caliper Geopig

A Strapdown Inertial Navigation System is the heart of the Geopig and delivers position and attitude of the pig along its trajectory within the pipe. Due to the nature of inertial measurements regular "updates" of attitude, position, and velocity are required. External position and attitude are taken from GPS results or alignment sheets.

The Geopig is suspended in the pipeline by urethane disks at front and rear of the carrier. This restricts the Geopig to move close and parallel to the pipe centre line. Mechanical callipers are mounted in the middle of the rear carrier, and they scan the wall of the pipeline and generate a full picture of the shape of the pipeline. Here the information on dents, ovalities, wrinkles and other features is extracted.

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The Geopig is completed by some other sensors and devices: odometers, which measure the distance travelled, tracking transmitter for location of the Geopig, and finally, storage device and power supply which allow independent operation for long measurement periods.

3.2 Strapdown Inertial Navigation System

The strapdown INS ultimately produces 3-dimensional measurement of inertial acceleration and angular rate directly from orthogonal triads of accelerometers, and single degree of freedom gyros. In the case of a pair of two degree of freedom gyros, a redundant or combined axis measurement is available, and is dealt with appropriately to produce 3 axis orthogonal angular rates. The strapdown accelerometers and gyros are complementary sensors which when coupled deliver the measurements for computing pipeline curvature, orientation of the curvature, and the positioning capability for location of the curvature or other detected features.

3.3 Caliper

One ring of mechanical calipers scans the wall of the pipe. The caliper arms are spaced at precisely machined constant angles around the ring on the pig. An accurate offset was added to these ranges to give the actual distance from the centre of the carrier to the pipe wall. There are 32 mechanical caliper arms mounted in the middle of the rear carrier.

3.4 Other Sensors and Components

Other sensors and components integrated in the Geopig are:

- Odometer wheels providing direct measurements of distance traveled (chainage). Velocity is derived from these time tagged distances.
- Temperature and pressure sensors
- A flash memory system, 640 Megabyte capacity
- Interface electronics
- Batteries
- Micro-processor controllers
- Power management module
- Pig Tracking Module (Electromagnetic)

3.5 Survey Accuracy Specifications

The accuracy of the Geopig measurements is as follows:

- Pipeline position 1:2,000
- Bending strain +/- 0.02%
- Bend angle +/- 0.1 °
- Anomaly size +/- 0.1"
- Temperature +/- 0.1 Deg C
- Pressure 0.1% or +/- 3 PSI (0.2 BARSG)

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4 DATA PROCESSING PROCEDURES

The primary function of the Geopig inertial survey is to determine the pipeline plan, profile and bending strain. This is achieved by computing the Geopig's trajectory during the run using the data collected by the onboard strapdown inertial unit and the odometers. Due to a tight fit of the Geopig cups into the pipe the tool rides practically along the pipe centerline. The only exception from this is the deviation of the tool trajectory from the pipe centerline due to serious pipe wall deformations, as well as "smoothing out the corners" over the transition length (equal to the distance between the cups) at the bend boundaries and at the girth welds exhibiting noticeable out-of-straightness, i.e. sudden change of direction due to the weld misalignment. That data it is then rotated into the GPS co-ordinates of the selected tie-points along the line (usually a few km apart) to obtain the desired location accuracy in a given UTM mapping projection.

The following paragraphs outline the methods used for processing the odometer and inertial data in order to obtain the pipeline slack and horizontal chainage, client chainage, pipeline position and bending strain.

4.1 Chainage

The following types of chainages are used for referencing the Geopig data:

- slack chainage - the distance measured by the Geopig's odometers along the pipeline.
- horizontal chainage - the true distance along the pipeline projection on the horizontal plane. Not required by the client in this survey.
- client chainage - the reference system used by the pipeline operator (e.g. station number used on the as-built drawings, or KP location from the ROV survey).

4.1.1 Slack Chainage

The Geopig slack chainage is the distance measured by the Geopig's odometers along the pipeline. It starts from zero at the reducer on the pig launcher and ends at the receive trap. The odometer accuracy is 0.1 %.

The chainage from the first run is used as the baseline for all the subsequent runs. The preliminary chainage from the subsequent runs derived from the odometer data is scaled to match the distance between the girth welds from the baseline survey. Therefore any change of pipeline length between runs, e.g. elongation due to temperature differential, is disregarded.

4.1.2 Horizontal Chainage

The Geopig horizontal chainage represents the true horizontal distance of the surveyed pipeline, starting at -34 ft at the pig launcher. It is computed from the slack chainage by projecting it on the horizontal plane first, and then scaling it to match the horizontal distance based on the GPS co-ordinates (Northing and Easting). The scaling is performed between the same tie-points that are used for rotating the inertial survey data into its final position.

4.1.3 *Client Chainage*

The purpose of a client chainage is to represent any one-dimensional information used by client, that could be correlated to the slack chainage. Usually the client chainage corresponds to the chainage shown on the as-builts, or to the chainage recorded during another in-line inspection. It can be incorporated into the data at any time after the DVD is issued to the client.

4.2 Pipeline Position

The pipeline position is provided in terms of Northing, Easting and height as a function of the chainage, in a selected mapping projection (usually UTM) and a specified datum.

4.2.1 *Tie Points*

Inertial data is translated, rotated and scaled to the "tie points" with known co-ordinates. Those points are typically selected at traps, valves, welds, bends, wall thickness transitions, or any other pipeline features that can be detected directly or indirectly by the Geopig sensors. The co-ordinates of those points are usually obtained from GPS survey.

This procedure provides correction for long term drifts that can introduce an absolute position error in the inertial survey over time. By transforming the Geopig trajectory into the tie points, the Northing, Easting, and height are obtained for any point along the pipe.

The specified accuracy of the inertial survey is 1:2,000 of the distance from the tie points, therefore for the following sample distances between the tie points the following absolute accuracy is obtained:

Distance Between Tie Points [m]	Absolute Accuracy [m]
20,000	5.0
10,000	2.5
5,000	1.25
3,000	0.75

For example, if the data from two Geopig run have been tied to the points that are 3 km apart, then the allowable error in-between the ties points can reach 0.75 m, which corresponds to up to 1.5 m difference between two runs. To reduce the relative difference between two runs, a procedure described in the next section is applied, which ensures that the actual pipeline movement is measured with centimeter accuracy. There is practically no difference in the pipeline position between the runs in the areas where the pipeline did not move.

4.2.2 *Pipeline Movement*

Once preliminary processing has been completed, the data from the current and the previous Geopig surveys are compared in order to identify the areas of strain differences associated with the pipeline movement. Then the current data is reprocessed using the coordinates of the tie points extracted from the baseline Geopig survey at 100 m

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intervals, except for the previously determined pipeline movement areas. This procedure improves the accuracy of the local pipeline movement measurement by reducing the relative error between two runs. A noticeable error would result from the absolute position accumulation error when only the original tie points (from the GPS survey, at about 5 km spacing) were used for scaling and rotating the inertial survey data.

4.3 Bending Strain

The bending strain is computed directly from the curvature of the Geopig trajectory, typically averaged over the distance of three pipe diameters. The specification for the bending strain measurements from the Geopig survey is +/- 0.02% strain. When the strain difference between two runs is compared that specification is usually exceeded in the originally straight sections of the line, and the accuracy of +/- 0.005% strain is achieved. The following subsections contain the description of the bending strain measurement and general remarks on interpretation of strain data.

4.3.1 Computation Method

There are two main components of the strain tensor in a pipe wall: the longitudinal strain (in the direction of the pipe axis) and the hoop strain (in the circumferencial direction). The longitudinal strain is further separated into the axial component and the bending component that changes linearly along the pipe cross-section (see Figure 4.1).

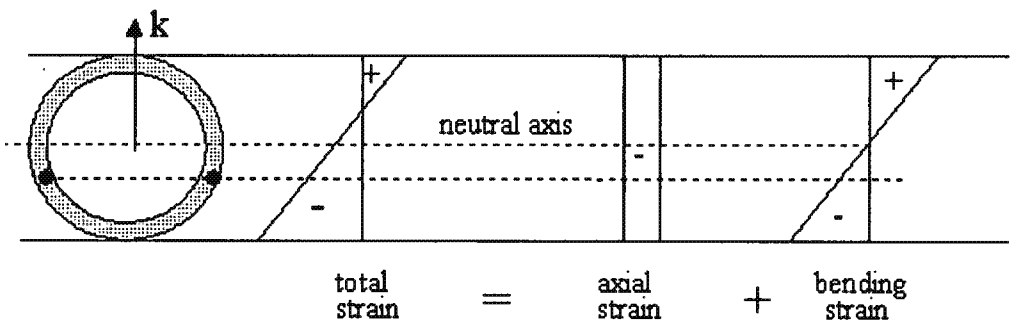


Figure 4.1 Distribution of Axial and Bending Components of Longitudinal Strain in Pipe Cross-section

The bending component of the longitudinal strain at any location in the pipe cross-section can be computed based on the bending strain at two points, e.g. at the top of the pipe (6 o'clock position) and on a right side (3 o'clock position). The bending strain at the bottom of the pipe is called the vertical strain ε_v, because it is induced by bending in the vertical plane (the bending strain at the top of the pipe has the same absolute value, but the opposite sign, i.e. $-\varepsilon_v$). For a similar reason the bending strain on the right side of the pipe is called the horizontal bending strain ε_H (the bending strain on the left side is equal to $-\varepsilon_H$). The maximum bending strain ε in the entire pipe-cross-section is equal to:

$$\varepsilon = \sqrt{\varepsilon_v^2 + \varepsilon_h^2} \,. \qquad (4.1)$$

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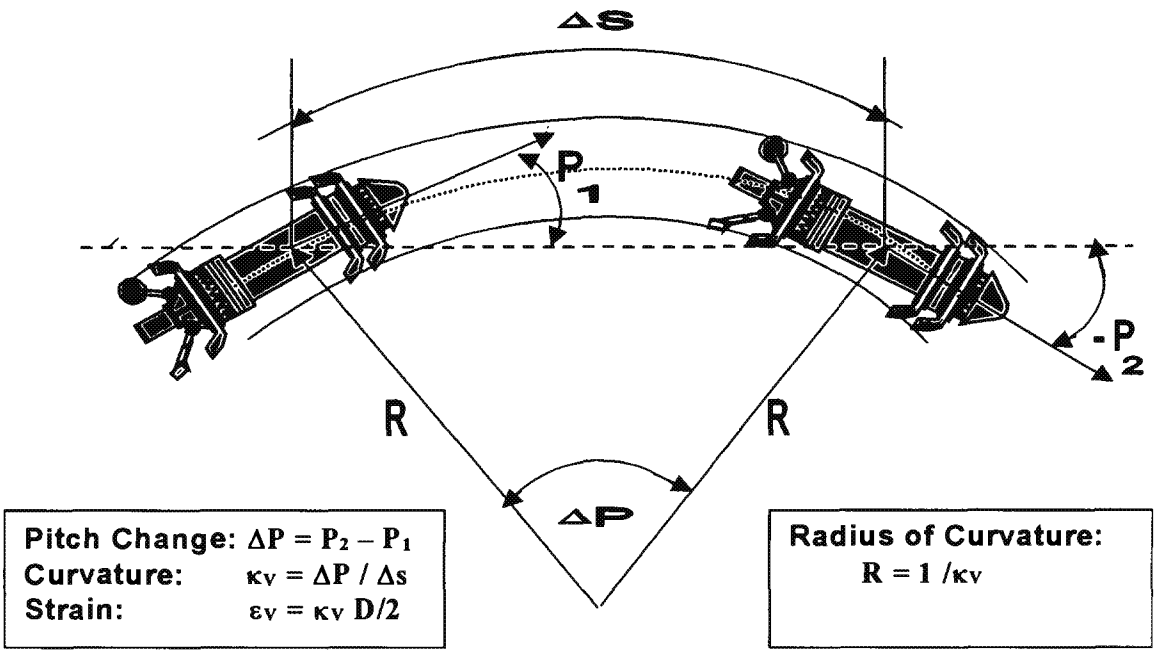


Figure 4.2 Computation of Pipeline Vertical Curvature and Strain from Geopig Pitch

Both the vertical and horizontal bending strains are computed from the Geopig survey using the measurements of the pipe centerline curvature. The curvature of a line in a 3-D space is defined as the change of direction (in radians) over the distance. The distance is measured by the odometers, and the direction of the pipe centerline is computed from the inertial system in terms of azimuth and pitch. The pitch P(s) describes the pipeline tilt with respect to the horizontal plane at chainage s, while the azimuth A(s) specifies the angle between the pipe direction and the north. The horizontal component of the curvature is proportional to the change of the azimuth, and the vertical component is proportional to the change of pitch. The following formulas are used for computation of the pipeline total curvature κ and its vertical κ_v and horizontal κ_h components based on the changes ΔP and ΔA of pitch and azimuth over a distance Δs along the pipe centerline:

$$\kappa = \sqrt{\kappa_v^2 + \kappa_h^2}, \qquad \kappa_v = \frac{\Delta P}{\Delta s}, \qquad \kappa_h = -\frac{\Delta A}{\Delta s}\cos(P) \qquad (4.2)$$

The relationship between curvature and bending strain is as follows:

$$\varepsilon = \frac{D}{2}\kappa \qquad \varepsilon_v = \frac{D}{2}\kappa_v \qquad \varepsilon_h = \frac{D}{2}\kappa_h \qquad (4.3)$$

where D is the pipe outside diameter.

The curvature radius is the inverse of the curvature. The BJ software reports strain in percents and the radius of curvature in pipe diameters. Strain is a unitless value that can be expressed in percents by multiplying it by 100%; e.g. 0.45% corresponds to 0.0045 strain.

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4.3.2 *Smoothing Curvature Data*

The curvature can be computed according to formula (4.2) using the change of azimuth or pitch over the chainage increment as small as the distance between two inertial samples. The inertial data is collected at the rate of 100 samples per second. If the tool travels at the speed of 2 m/s then the distance between two samples is only 2 cm. The raw curvature computed this way would exhibit a significant level of noise, e.g. due to tool vibrations. In order to reduce that noise the curvature is typically averaged over a distance of 3 – 5 pipe diameters, i.e. 3 m for 36" diameter pipe. For computational efficiency, instead of calculating the actual average, the curvature is computed using formula (4.2), where the increments ΔP and ΔA of pitch and azimuth are taken over a distance of 2 m. This is practically equivalent to averaging curvature over the same distance - if the data are equally spaced, i.e. when the tool velocity is stable. The longer is the averaging length the smoother are the results.

Another smoothing technique is a regression line fit to the pitch or azimuth considered as functions of chainage. That method fits a line to all of the pitch values (or azimuth) over a specified length. This is practically equivalent to fitting a circle to all of the points along the Geopig trajectory over the specified length, but again much more computationally efficient than actually doing it. The radius of that circle is equal to the radius of curvature of the pipeline. The regression line fit produces smoother results than a regular moving average applied over the same length.

When estimating the bending strain induced by pipe-soil interaction the curvature can be smoothed out over a length longer than 5 pipe diameters, usually over 5 - 10 m. This approach significantly reduces the effect of weld misalignment, pipe wall imperfections and tool dynamics on the computed curvature, and at the same time it doesn't underestimate the bending strain induced by pipeline movement. This approach is particularly suited for calculation of strain difference between two runs. However, averaging over too long distance is not proper for computation of curvature of short features, such as bends or buckles. The bending strain of a feature would be underestimated if the feature was shorter than the effective averaging distance, which includes both the length used in curvature computation and the tool length, i.e. the distance between the cups supporting the pig body (i.e. the inertial canister in case of multi-body tools).

4.3.3 *Interpretation of Bending Strain Data*

The Geopig measures the total pipeline bending strain at the time of inspection, which includes strain induced during manufacturing, construction and operation. While pipeline is in operation the strain may be caused by the operating conditions (temperature and pressure differential) or by the external forces affecting the pipeline as the results of sea-bottom scouring, sub-sea currents, slope instability, soil settlement and erosion, etc. As the Geopig measures the total bending strain, including the plastic component induced during the whole history of loading, the current shape of the pipe and its bending strain can not be fully explained by taking into consideration only the forces acting on the pipe during the inspection, e.g. the gravity, buoyancy and support reaction.

The Geopig measures the curvature of the pipe centerline with all its imperfections, including the out-of-straightness at welds that is theoretically described by infinite curvature, although it does not correspond to any bending strain in the pipe wall. When

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such curvature is measured by the Geopig is obviously not infinite due to the finite length of the tool and some additional smoothing applied during data processing, but it may still show up as spikes of significant amplitude in the curvature data.

When analyzing the bending strain induced during operation the high residual plastic strain present in the field bends should be disregarded. The main features distinguishing the bending strain induced during operation from the field bends are briefly discussed below. The bending strain in the field bends is usually in the range from 1 to 2 % strain, is confined to one pipe joint and is characterized by an abrupt change of strain at the beginning and the end of a bend. The bending strain induced during operation is usually of smaller amplitude, spans more than one pipe joint and undergoes gradual change over longer transition sections.

4.4 Pipewall Anomaly Calculation

The caliper information is processed to provide the internal shape and diameter of the pipeline.

The anomaly size D (depth) is calculated as follows:

$$D = D_{Rstr} - O_V$$

$$D_{Rstr} = D_{Nom} - D_{Min}$$

$$O_V = (D_{Max} - D_{Nom})/2$$

where:

D_{Rstr} - total diameter restriction
O_V - pipe ovality
D_{Nom} - inner nominal pipe diameter
D_{Min} - inner pipe diameter at the feature
D_{Max} - inner pipe diameter 90° from the feature

The anomaly length is calculated as the axial distance over which the feature depth exceeds 50% of its peak value.

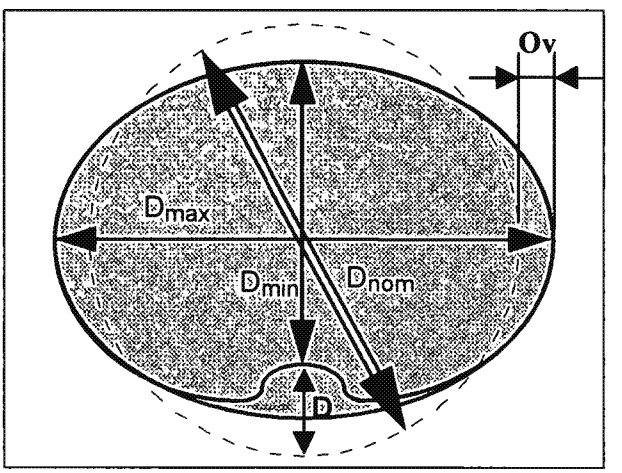
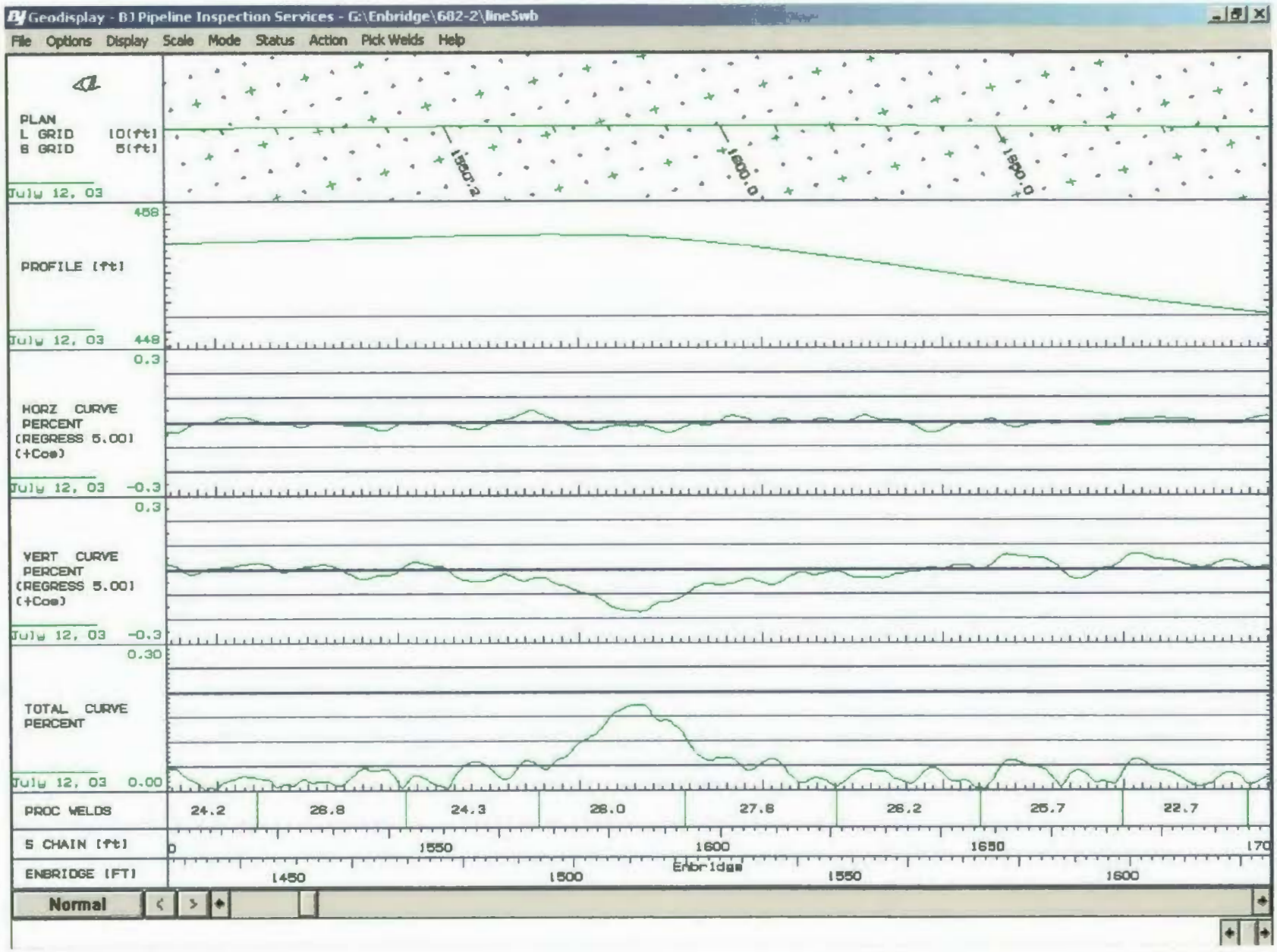


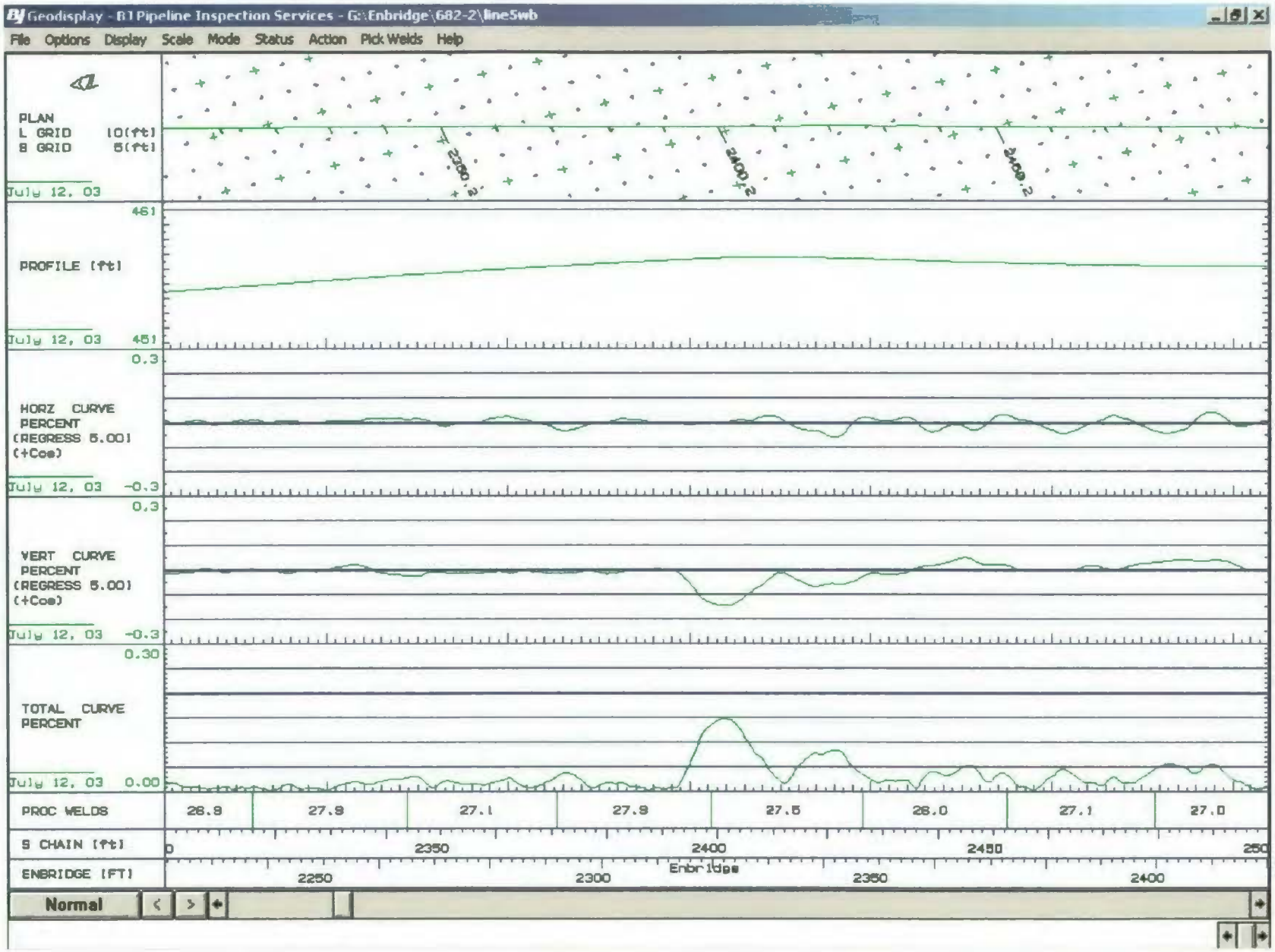
Figure 4.3 Anomaly Sizing

ENBDNR0006930

Appendix 7. Plots of Pipeline Plan, Profile, Internal Diameter and Features

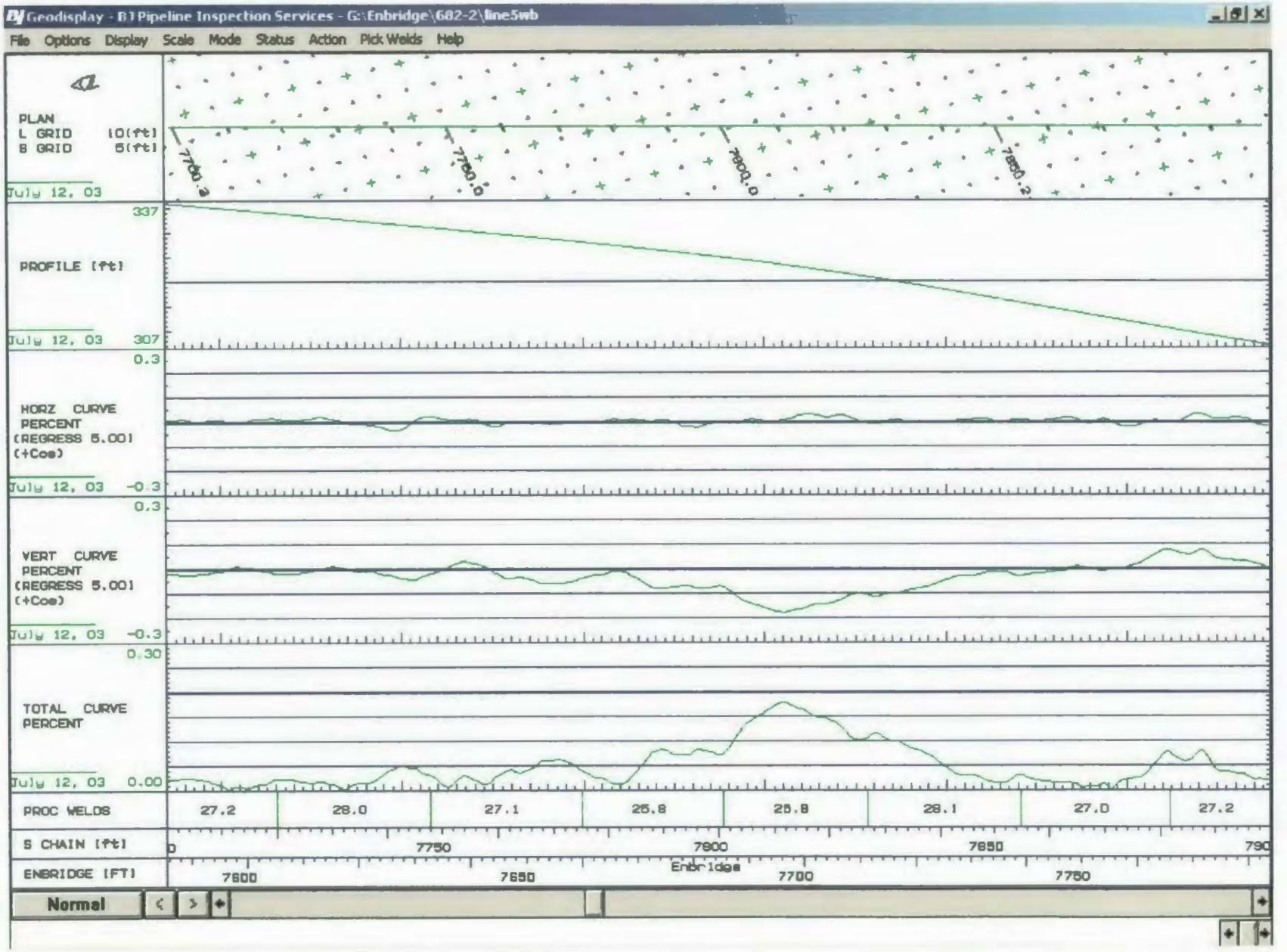


Appendix 7. Plots of Pipeline Plan, Profile, Internal Diameter and Features

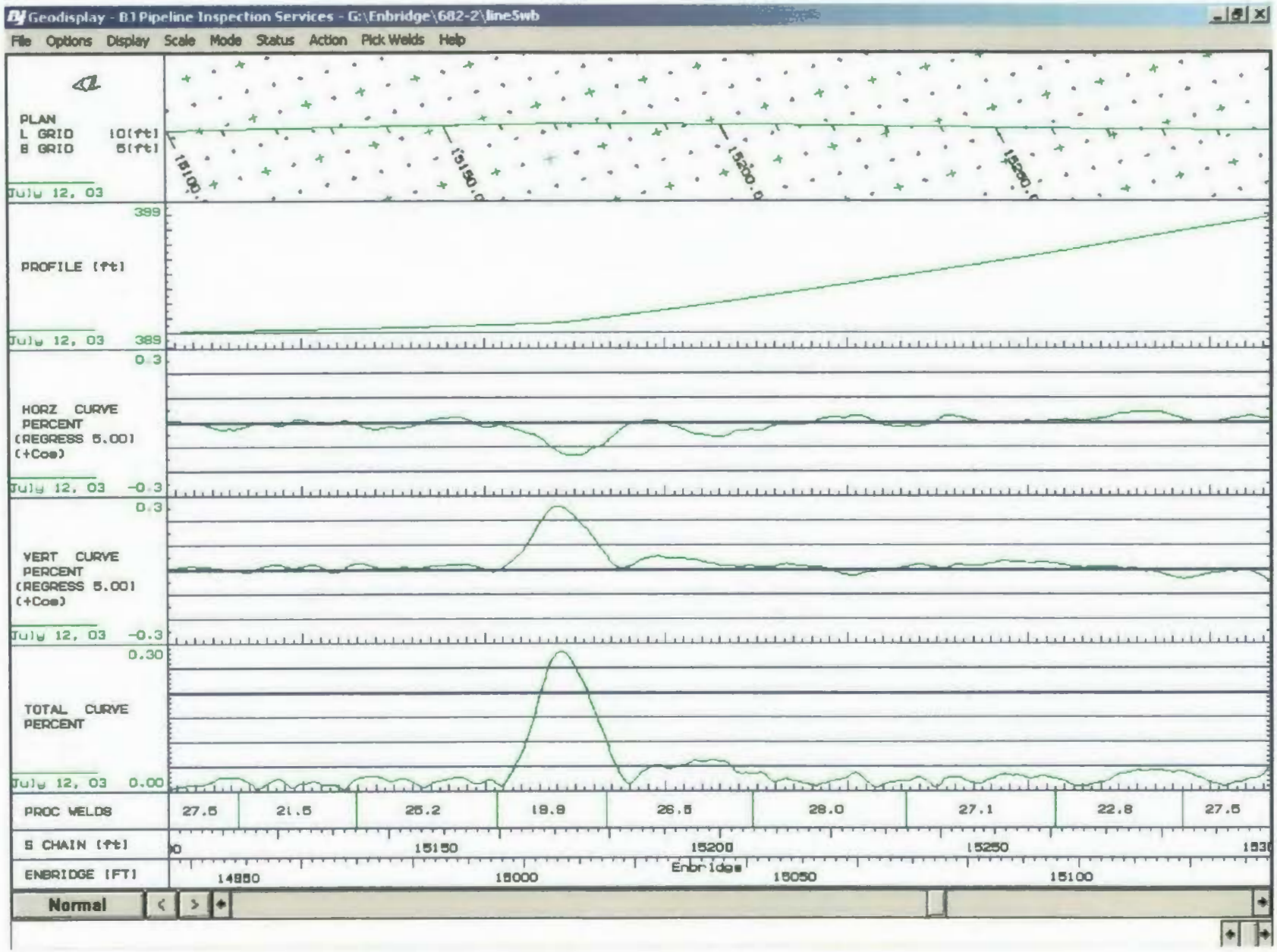


ENBDNR0006932

Appendix 7. Plots of Pipeline Plan, Profile, Internal Diameter and Features

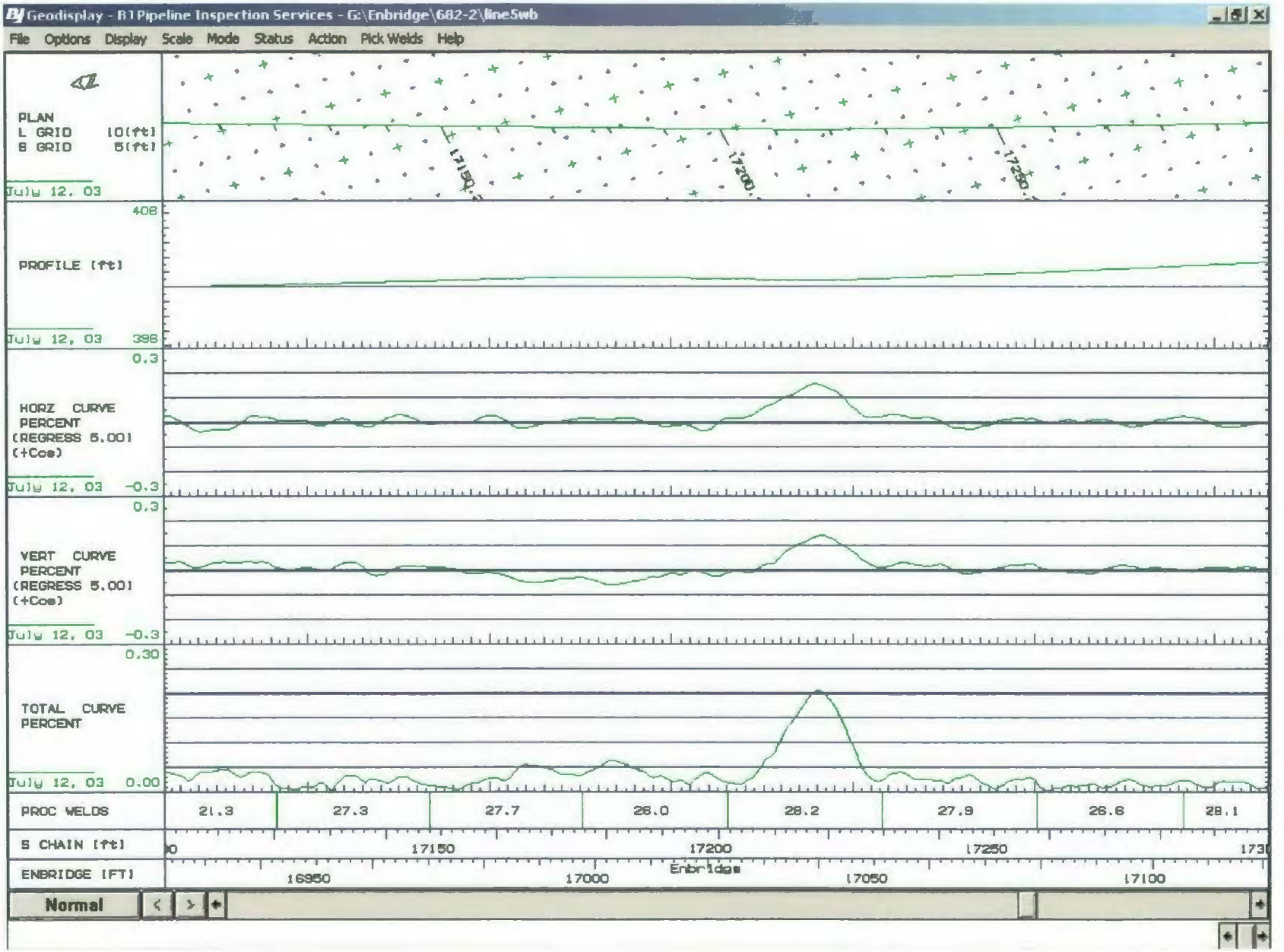


Appendix 7. Plots of Pipeline Plan, Profile, Internal Diameter and Features



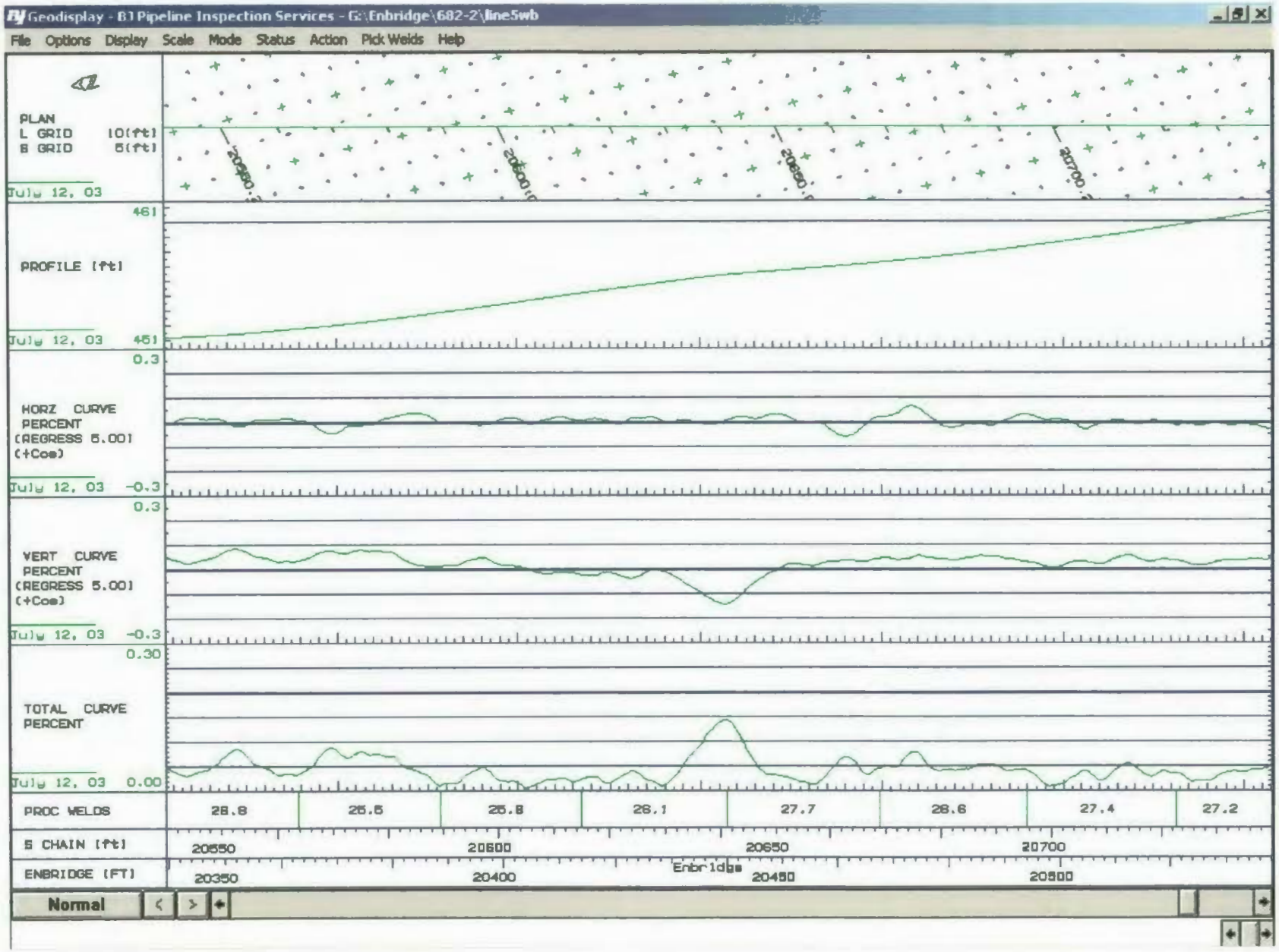
ENBDNR0006934

Appendix 7. Plots of Pipeline Plan, Profile, Internal Diameter and Features



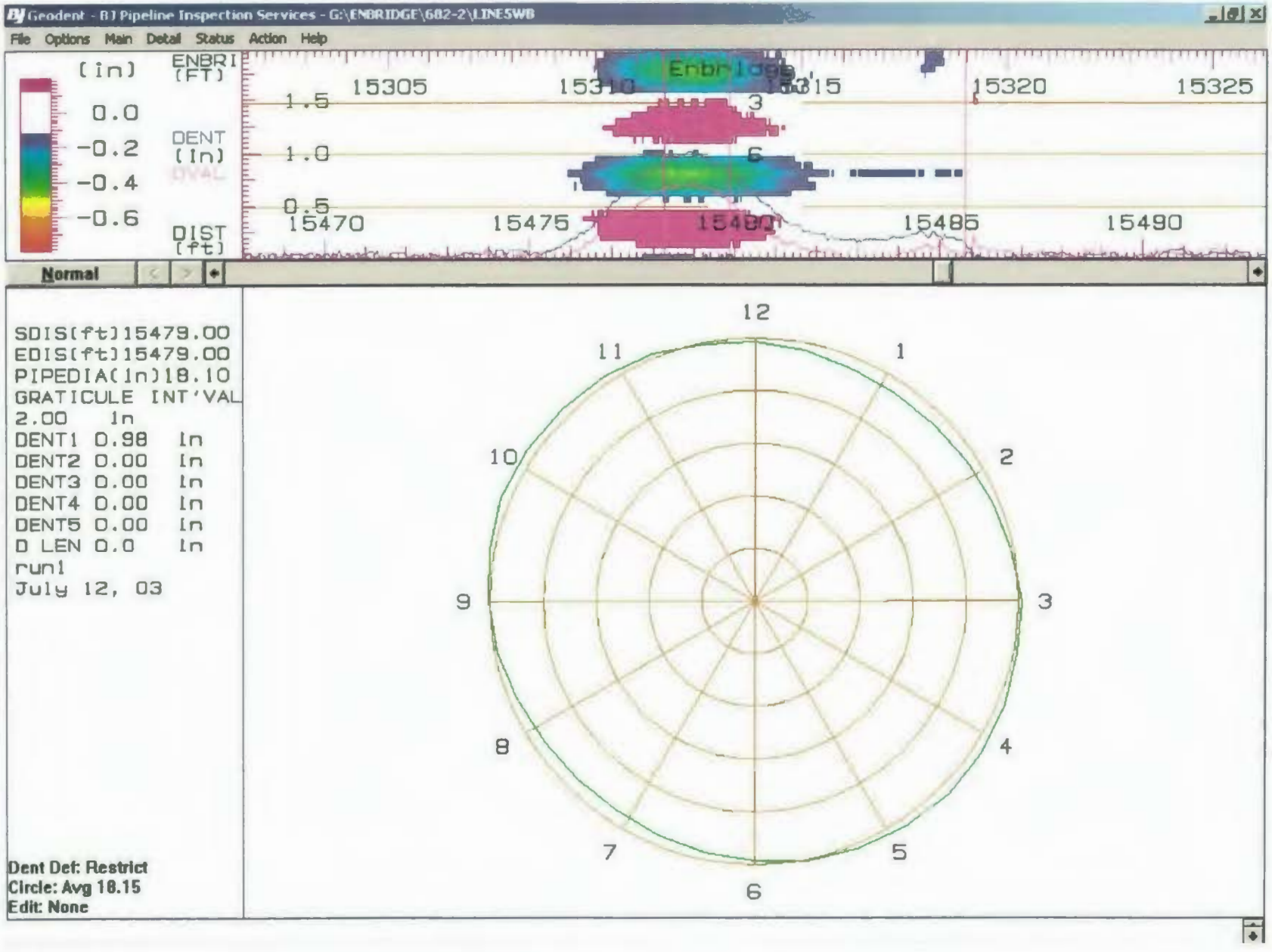
ENBDNR0006935

Appendix 7. Plots of Pipeline Plan, Profile, Internal Diameter and Features

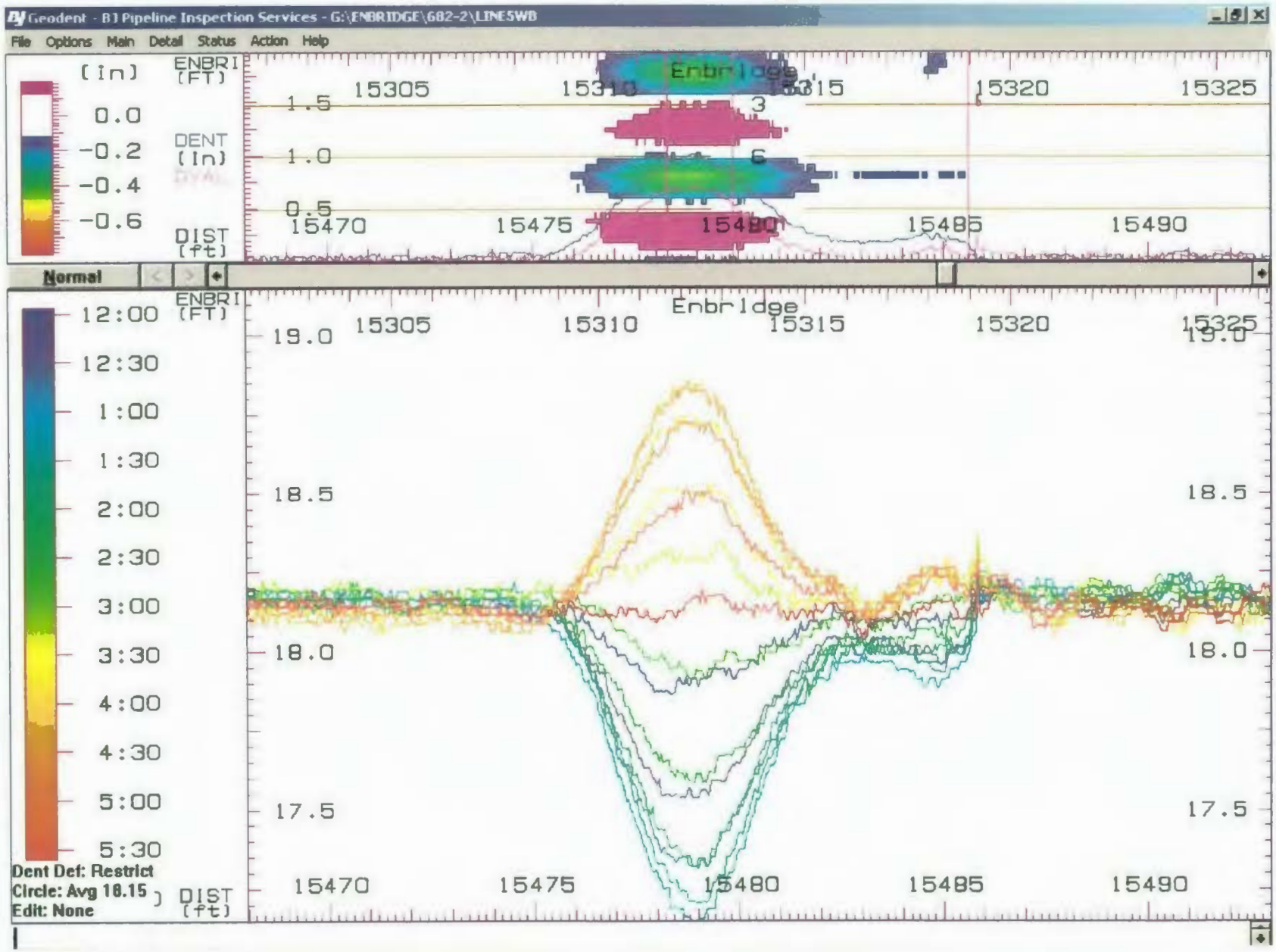


ENBDNR0006936

Appendix 8. Plots of Pipewall Features Greater than 1% OD

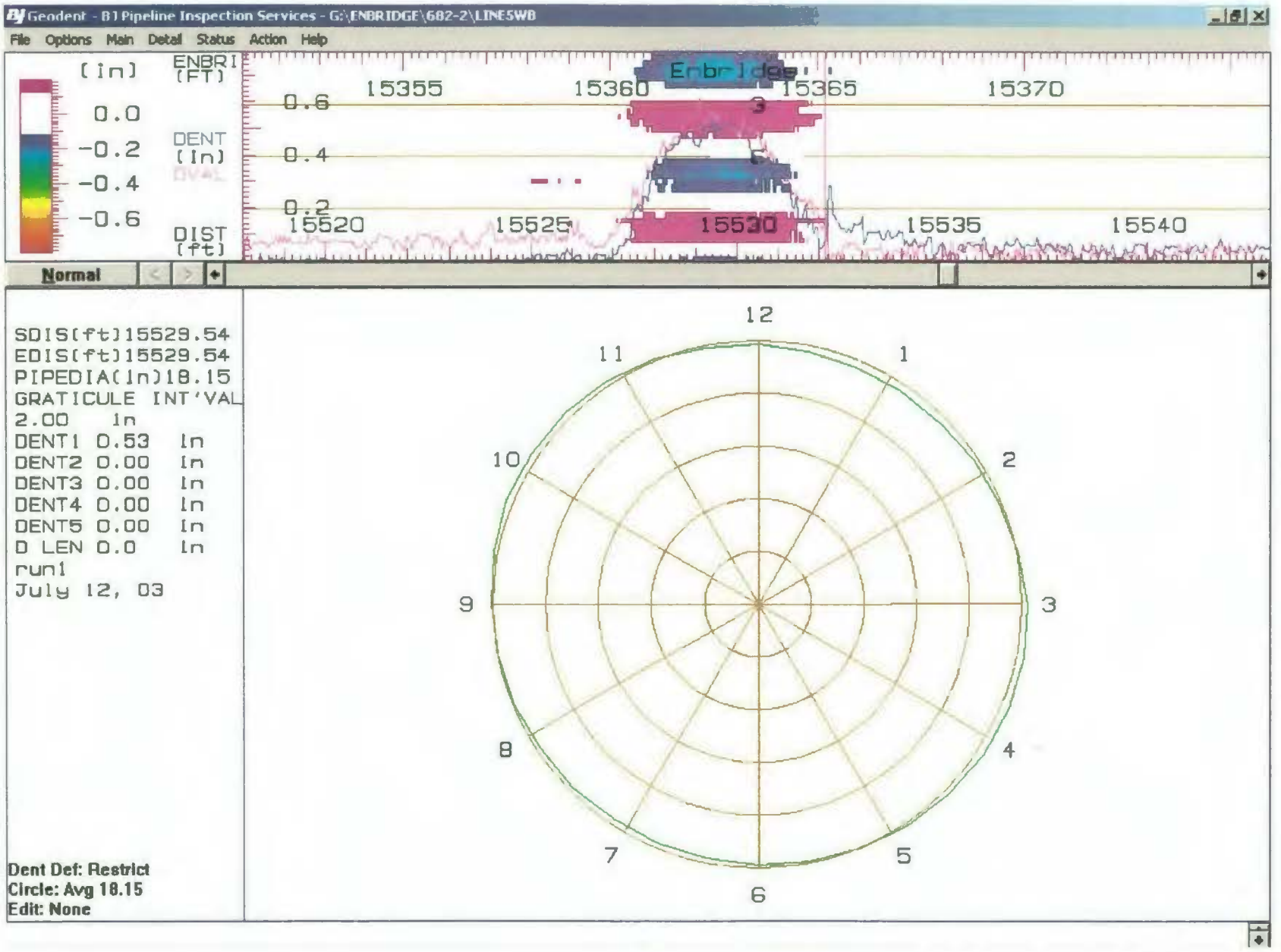


Appendix 8. Plots of Pipewall Features Greater than 1% OD

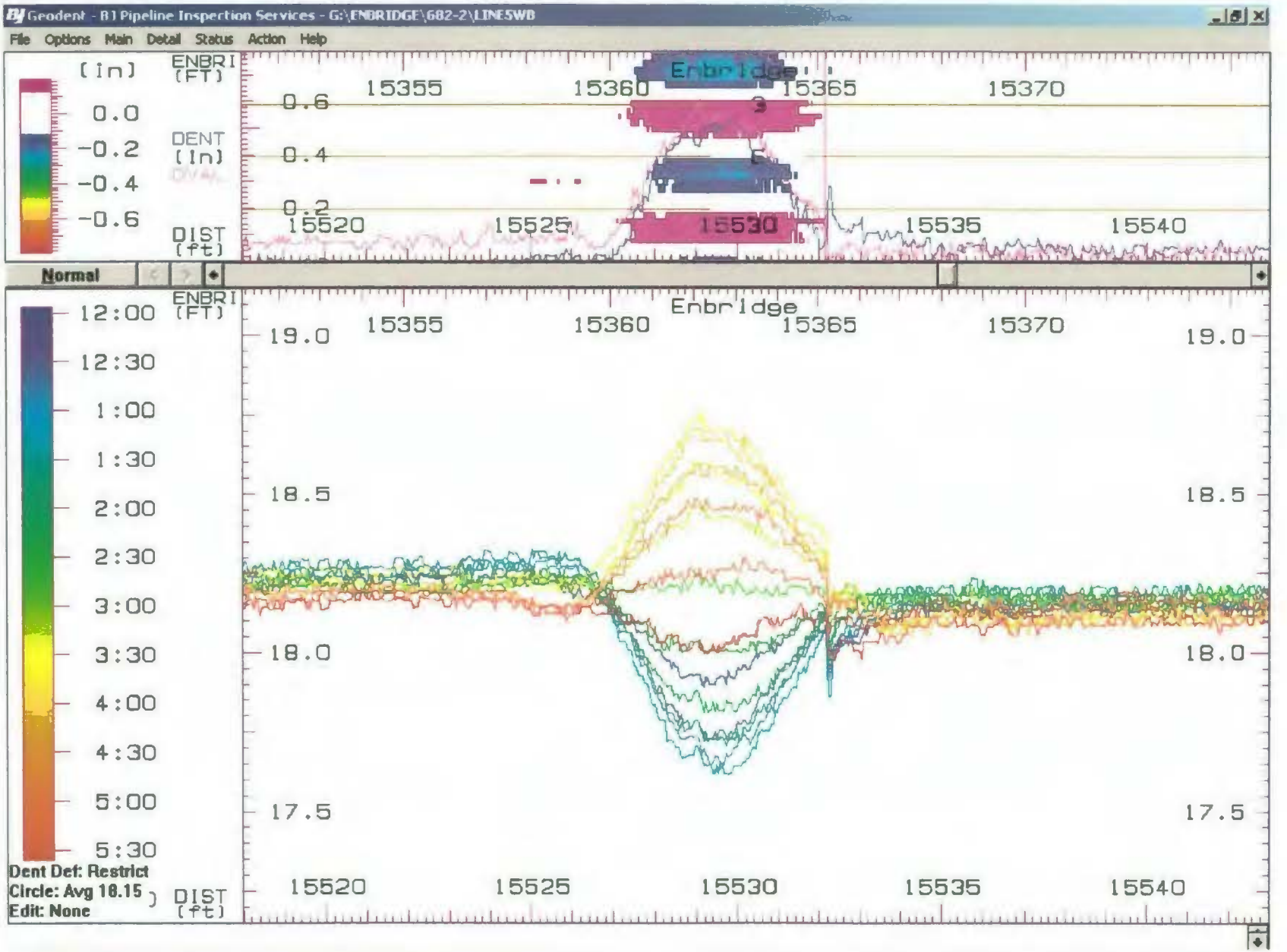


ENBDNR0006938

Appendix 8. Plots of Pipewall Features Greater than 1% OD

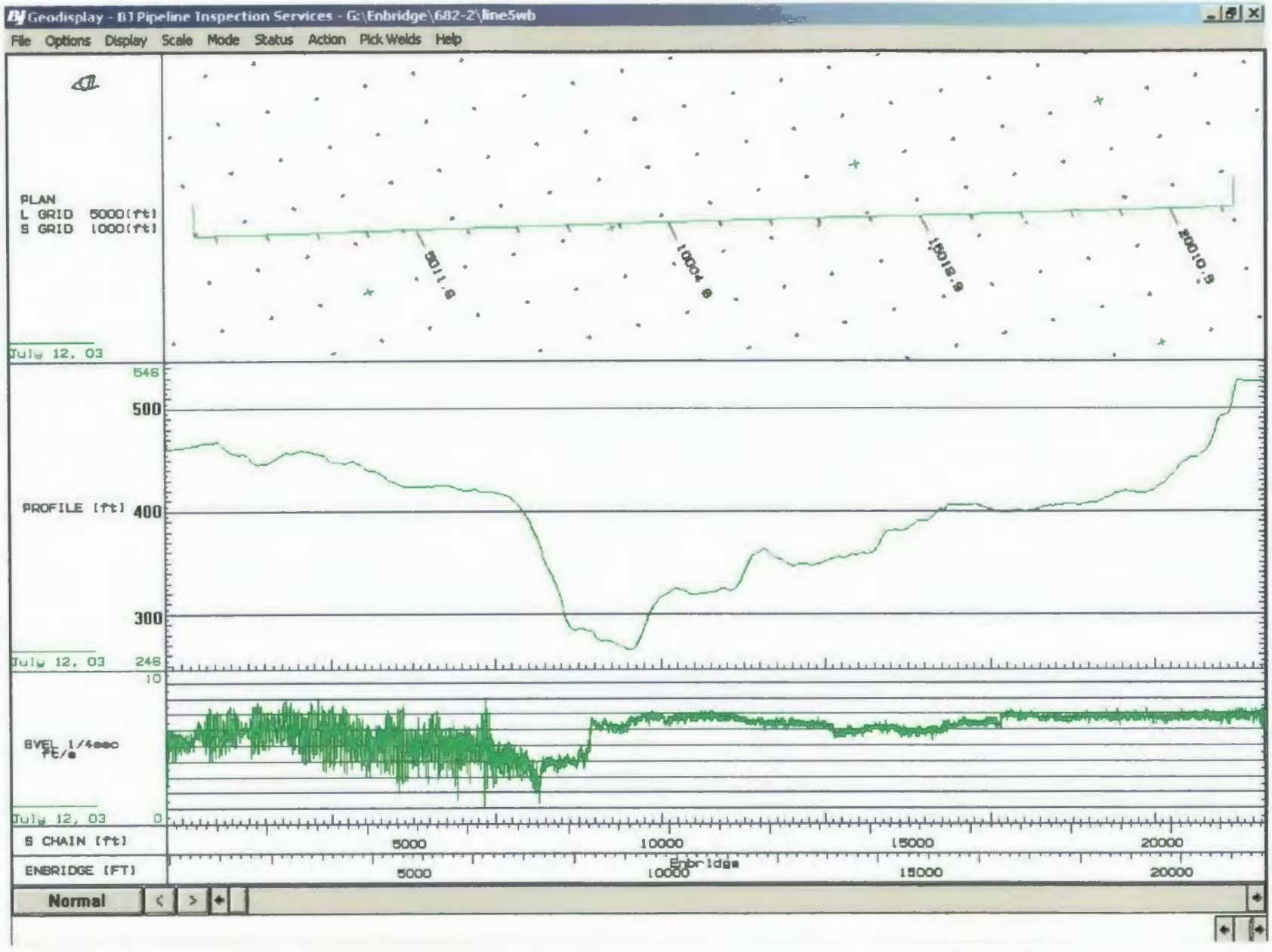


Appendix 8. Plots of Pipewall Features Greater than 1% OD

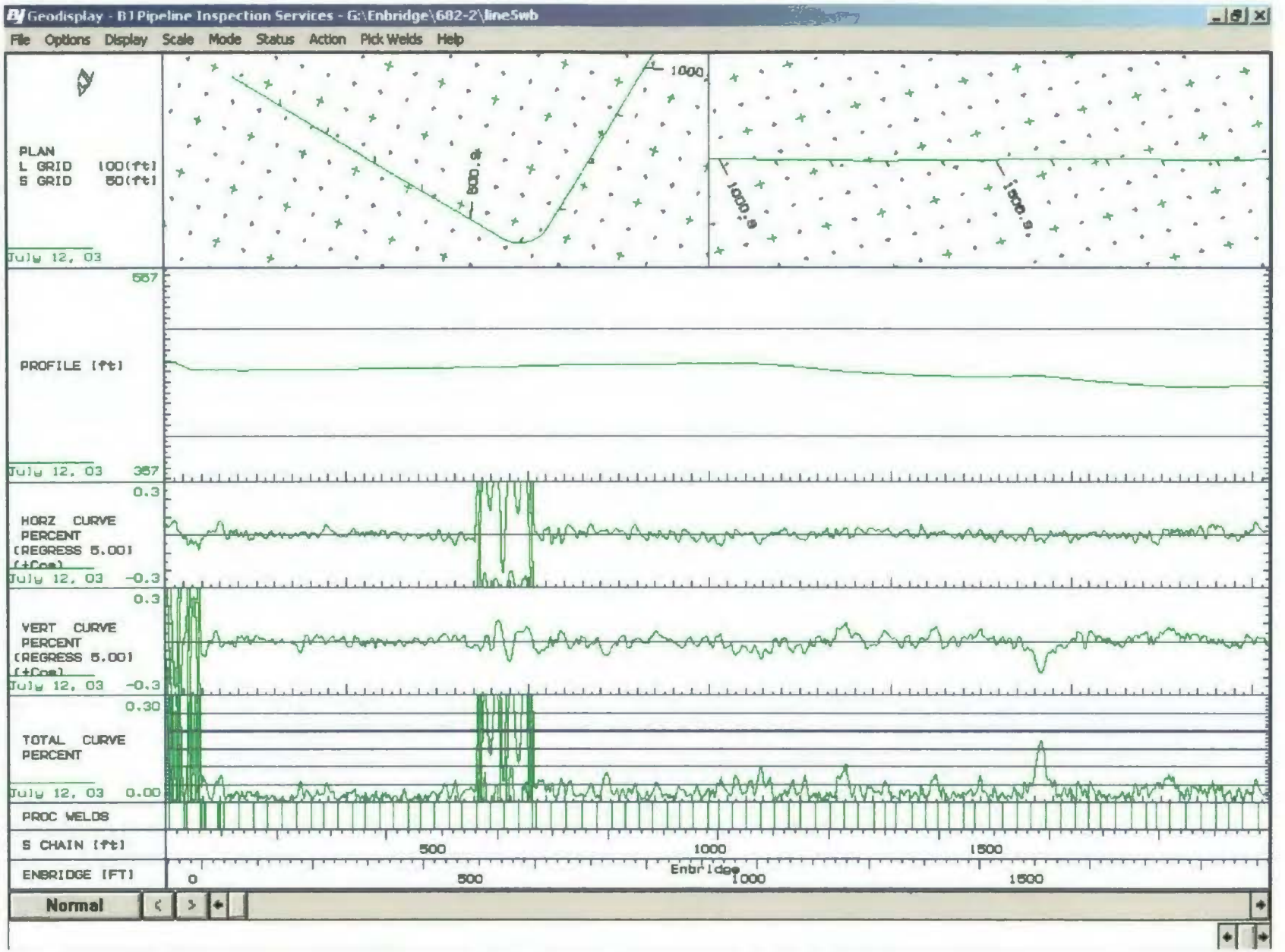


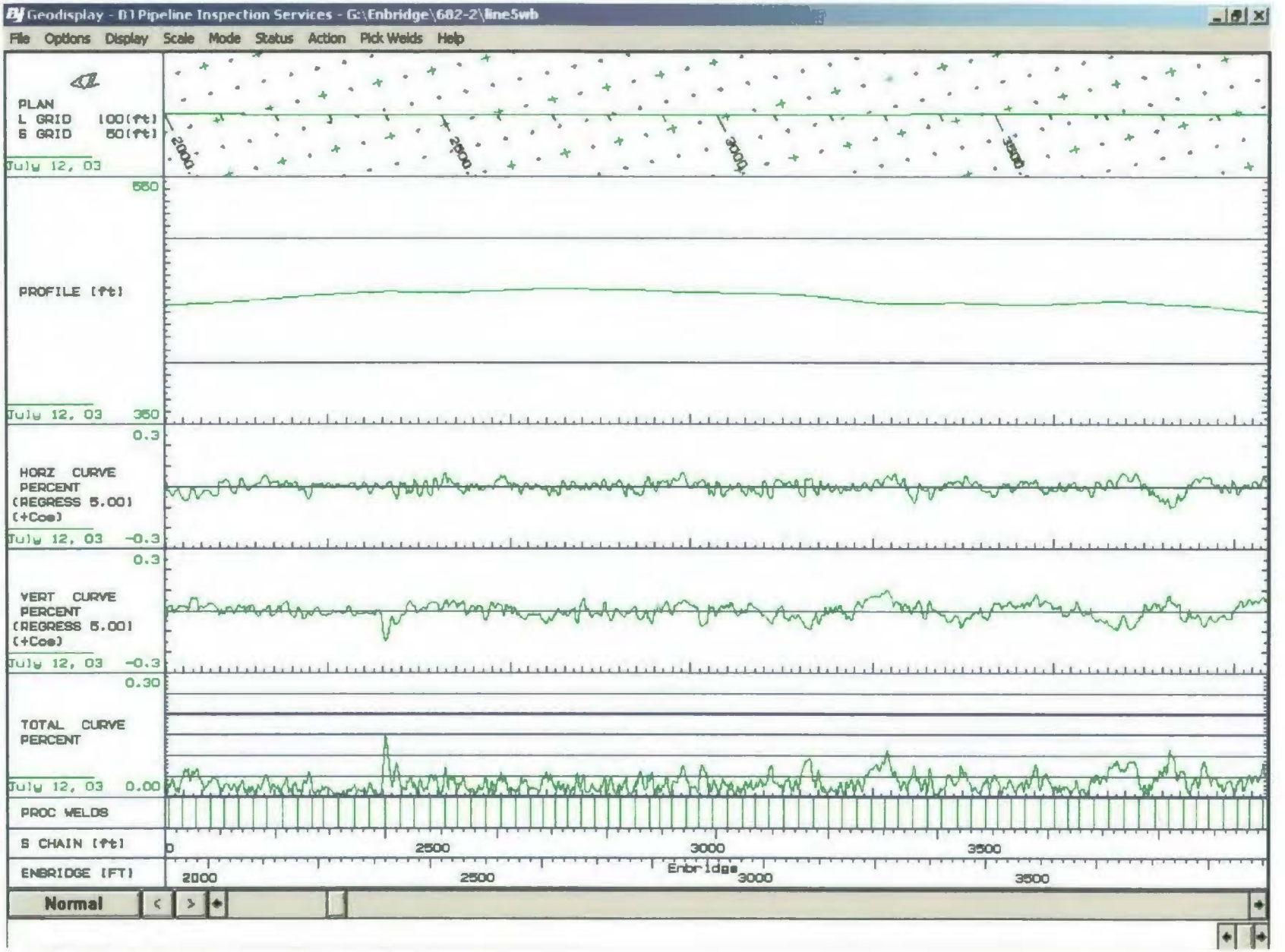
ENBDNR0006940

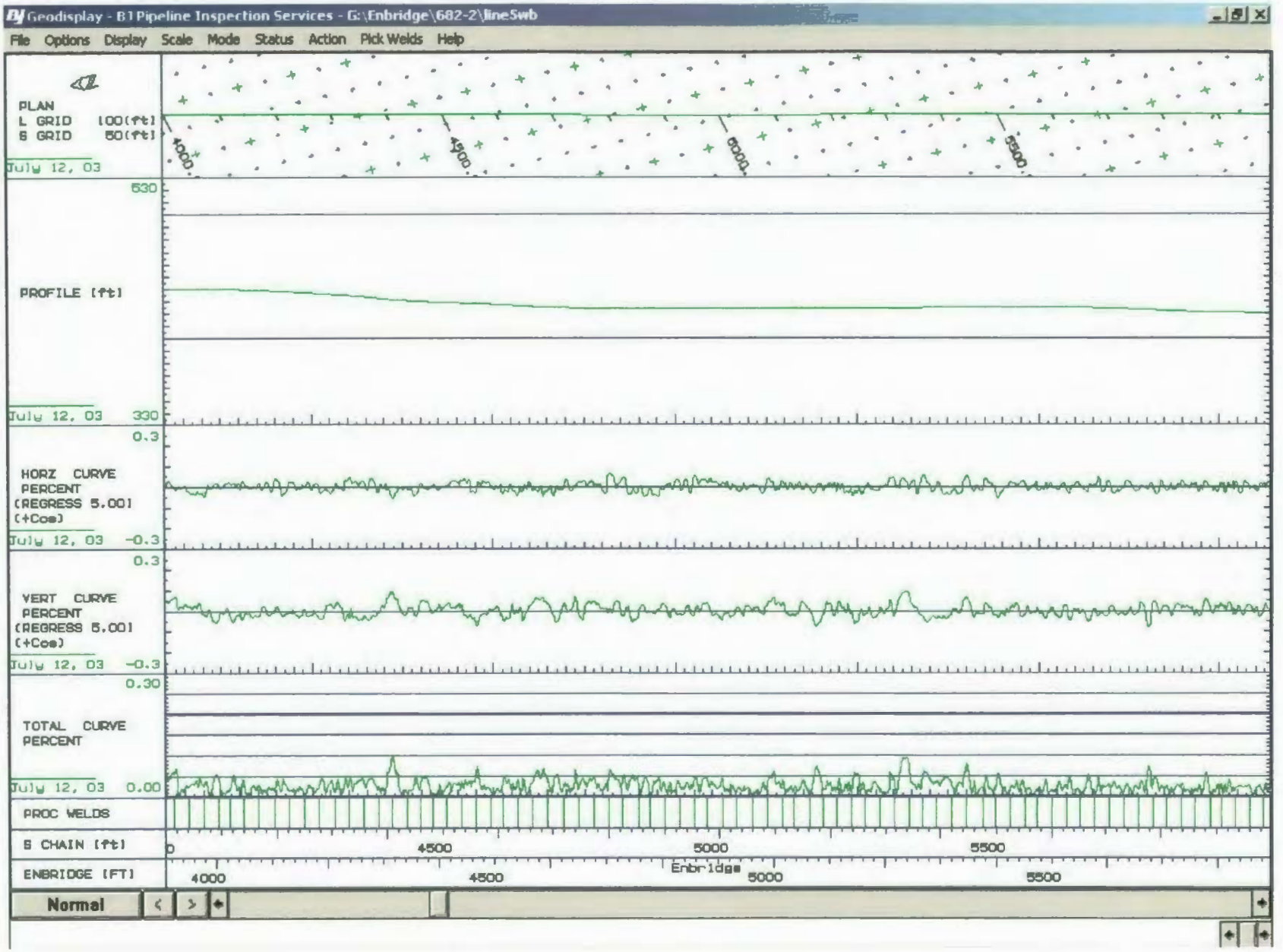
Appendix 9. Plots of Pipeline Plan, Profile and Strain

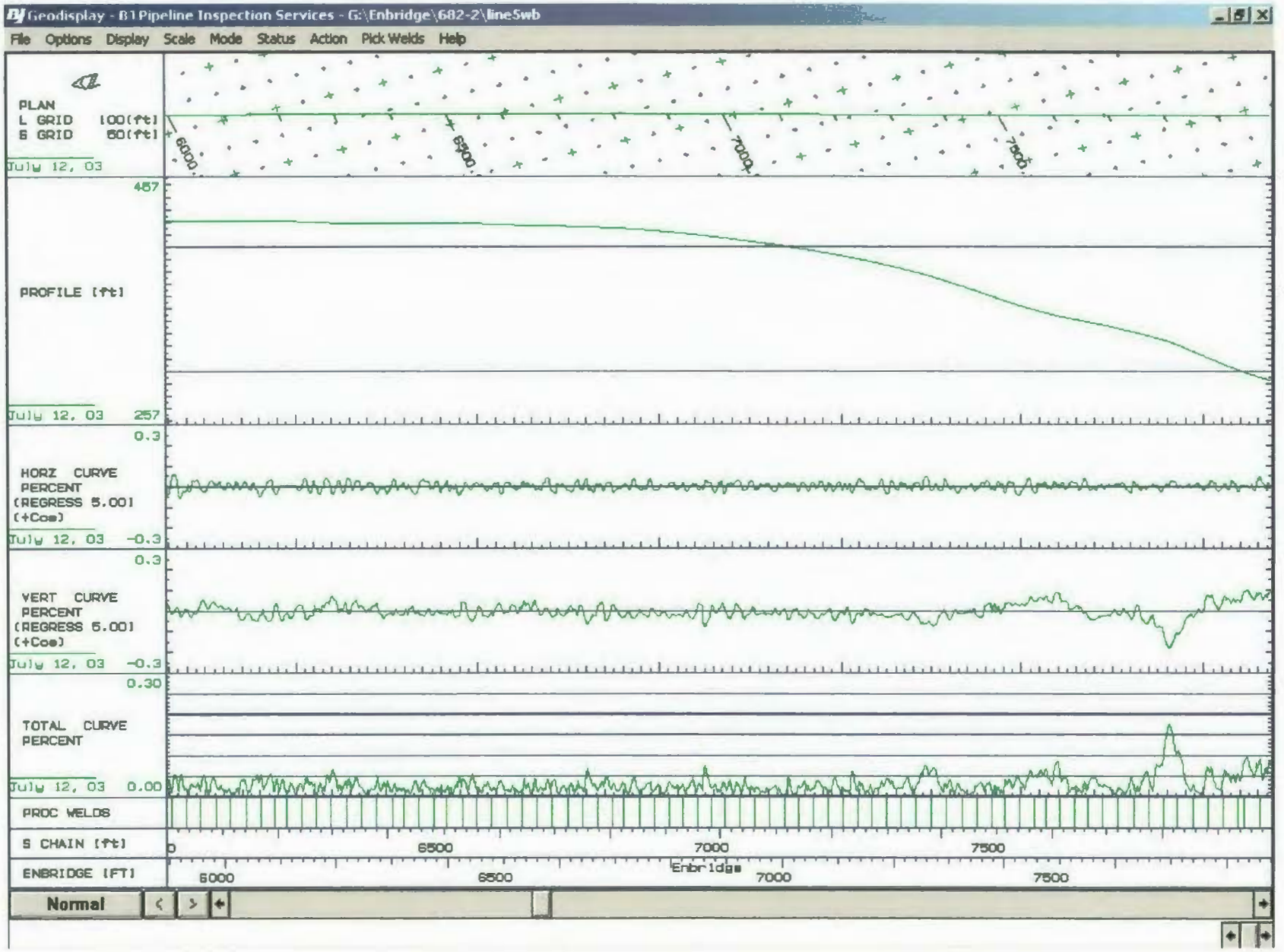


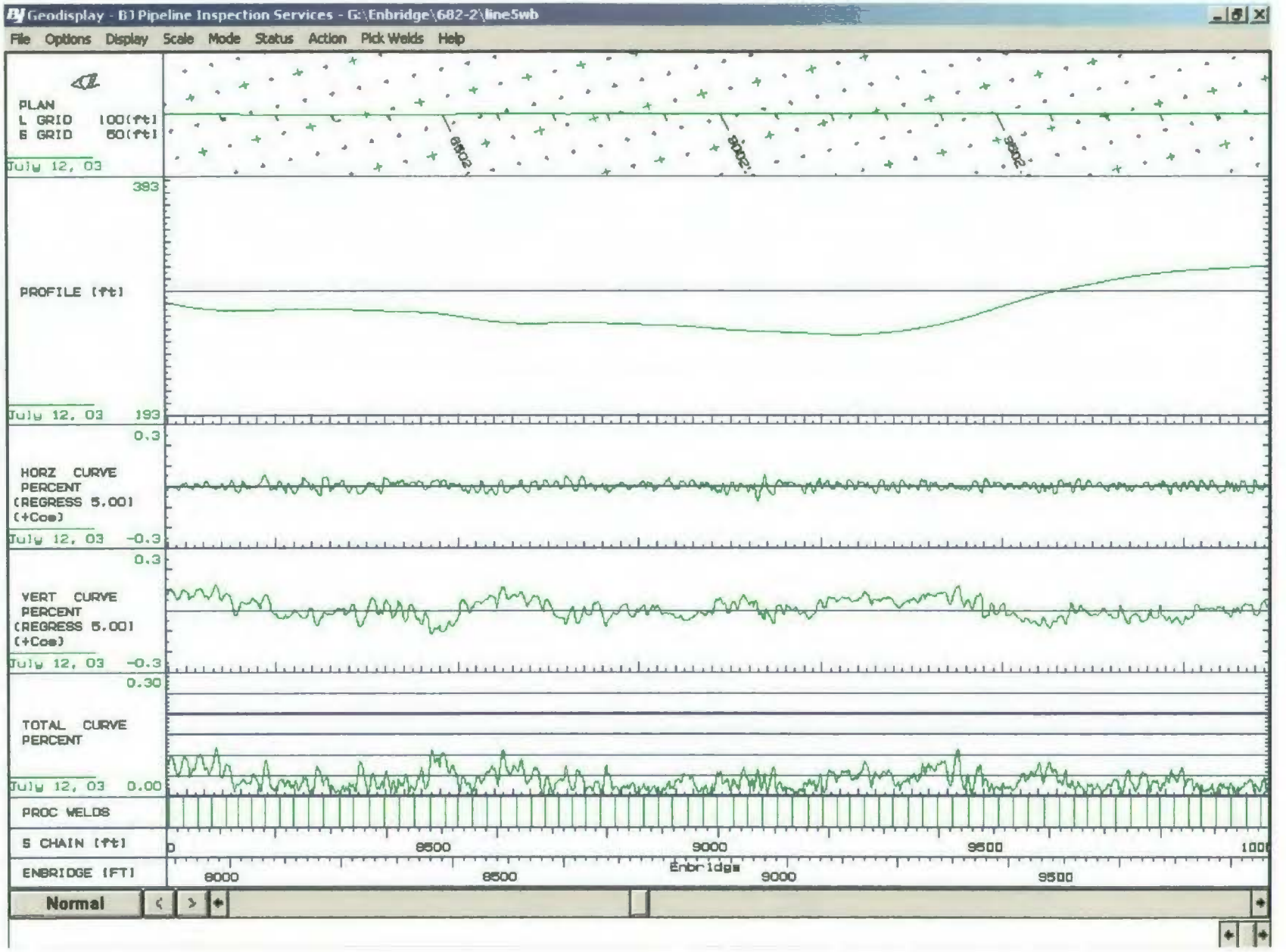
ENBDNR0006941

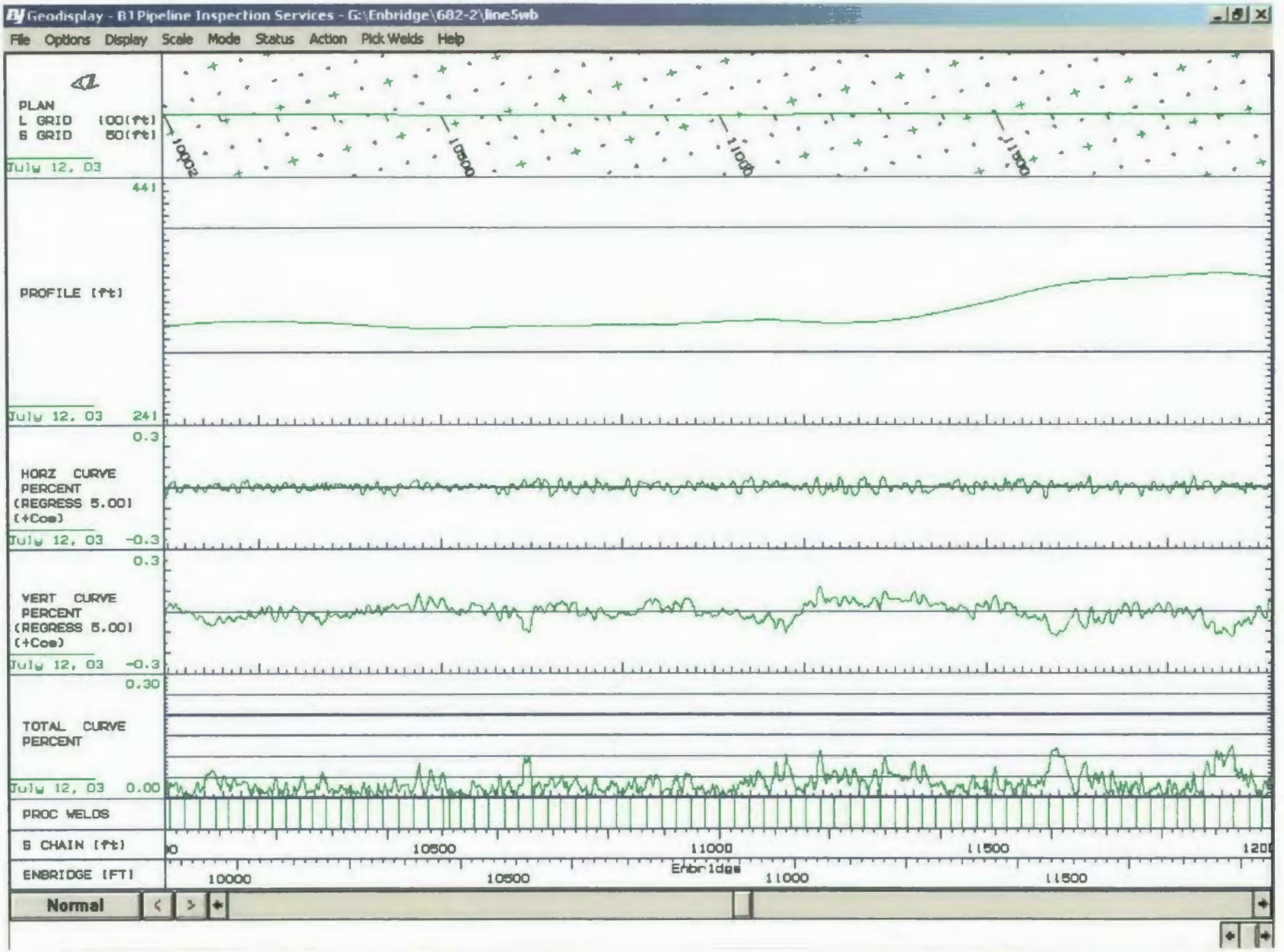

Geodisplay - BJ Pipeline Inspection Services - G:\Enbridge\682-2\lineSwb
File Options Display Scale Mode Status Action Pick Welds Help
PLAN
L GRID 100(ft)
S GRID 50(ft)
July 12, 03
1000
800.0
1000.0
1500.0
567
PROFILE (ft)
July 12, 03 367
0.3
HORZ CURVE
PERCENT
(REGRESS 5.00)
(+Cos)
July 12, 03 -0.3
0.3
VERT CURVE
PERCENT
(REGRESS 5.00)
(+Cos)
July 12, 03 -0.3
0.30
TOTAL CURVE
PERCENT
July 12, 03 0.00
PROC WELDS
S CHAIN (ft)
500
1000
1500
ENBRIDGE (FT)
0
500
Enbridge
1000
1500
Normal

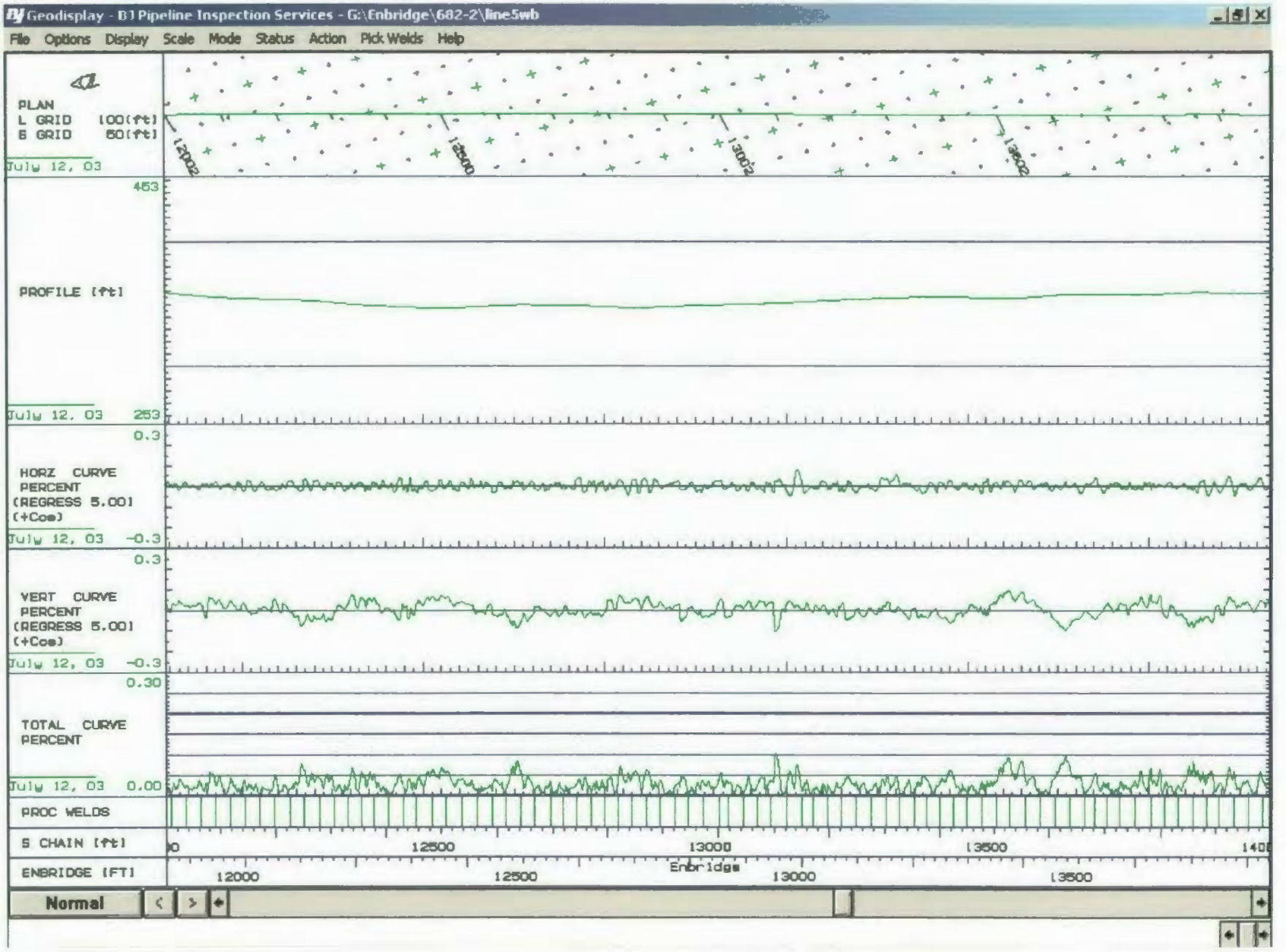

Geodisplay - BJ Pipeline Inspection Services - G:\Enbridge\602-2\lineSwb
File Options Display Scale Mode Status Action Pick Welds Help
PLAN
L GRID 100(ft)
S GRID 50(ft)
July 12, 03
2000
2500
3000
3500
660
PROFILE (ft)
July 12, 03 360
0.3
HORZ CURVE PERCENT
(REGRESS 5.00)
(+Cce)
July 12, 03 -0.3
0.3
VERT CURVE PERCENT
(REGRESS 5.00)
(+Cce)
July 12, 03 -0.3
0.30
TOTAL CURVE PERCENT
July 12, 03 0.00
PROC WELDS
S CHAIN (ft)
0
2500
3000
3500
ENBRIDGE (FT)
2000
2500
Enbridge
3000
3500
Normal

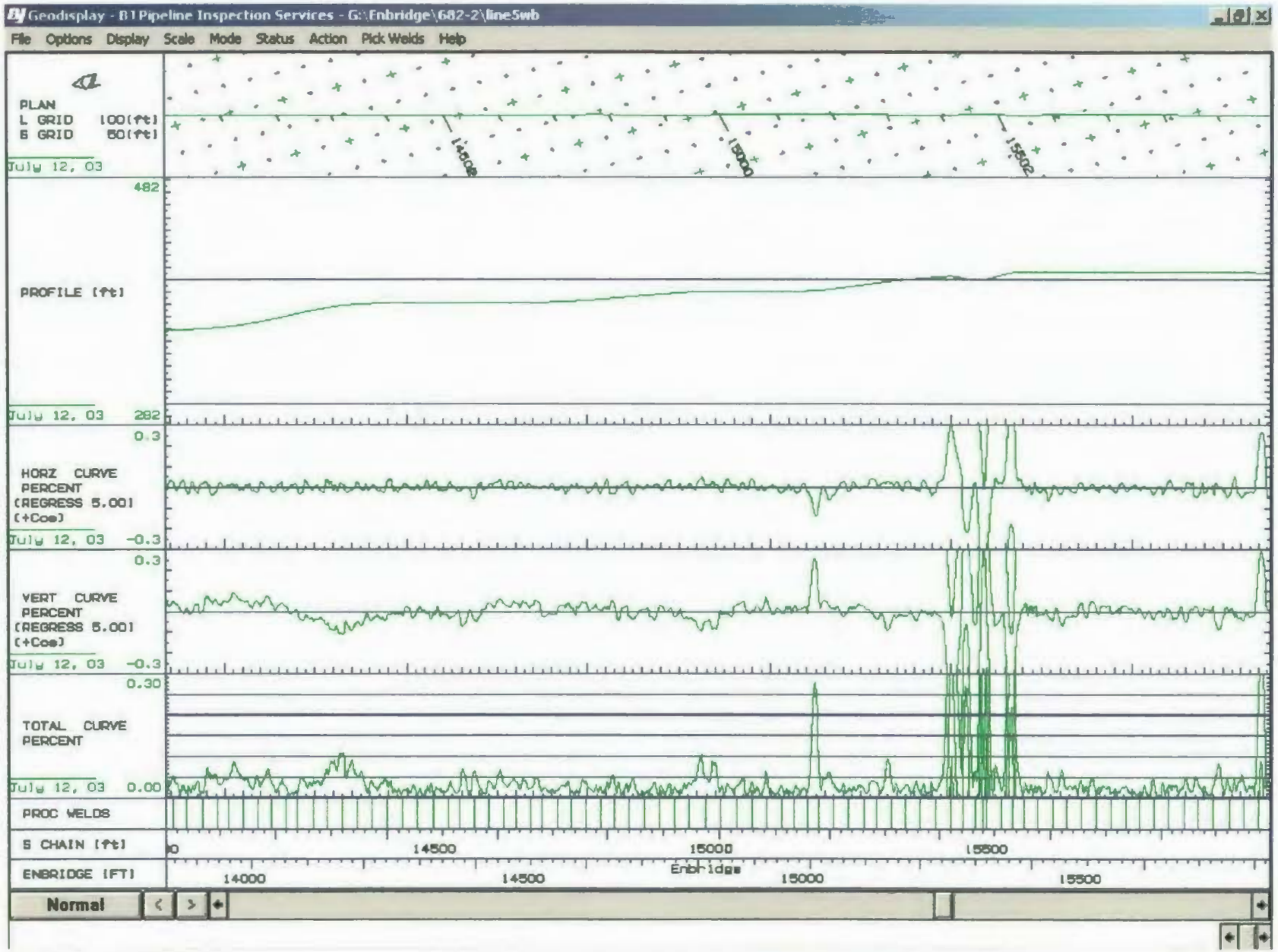

Geodisplay - B1 Pipeline Inspection Services - G:\Enbridge\682-2\lineSwb
File Options Display Scale Mode Status Action Pick Welds Help
PLAN
L GRID 100(ft)
S GRID 50(ft)
July 12, 03
4000
4500
5000
5500
630
PROFILE (ft)
July 12, 03 330
0.3
HORZ CURVE PERCENT
(REGRESS 5.00)
(+Cos)
July 12, 03 -0.3
0.3
VERT CURVE PERCENT
(REGRESS 5.00)
(+Cos)
July 12, 03 -0.3
0.30
TOTAL CURVE PERCENT
July 12, 03 0.00
PROC WELDS
S CHAIN (ft)
0
4500
5000
5500
ENBRIDGE (FT)
4000
4500
Enbridge
5000
5500
Normal

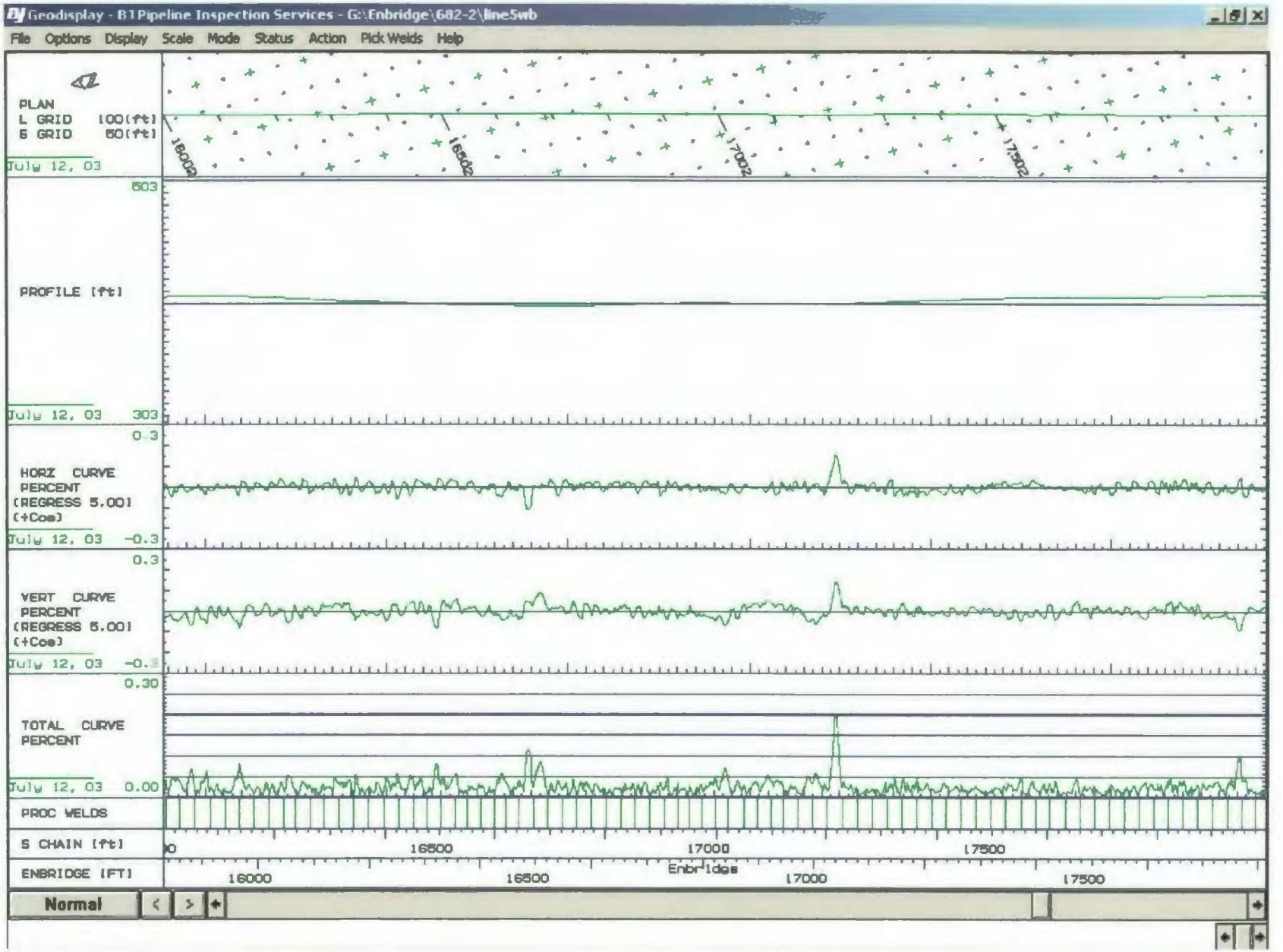

Geodisplay - BJ Pipeline Inspection Services - G:\Enbridge\682-2\lineSwb
File Options Display Scale Mode Status Action Pick Welds Help
PLAN
L GRID 100(ft)
S GRID 50(ft)
July 12, 03
6000
6500
7000
7500
457
PROFILE (ft)
July 12, 03 257
0.3
HORZ CURVE PERCENT
(REGRESS 5.00)
(+Cos)
July 12, 03 -0.3
0.3
VERT CURVE PERCENT
(REGRESS 5.00)
(+Cos)
July 12, 03 -0.3
0.30
TOTAL CURVE PERCENT
July 12, 03 0.00
PROC WELDS
S CHAIN (ft)
0
6500
7000
7500
ENBRIDGE (FT)
6000
6500
Enbridge
7000
7500
Normal

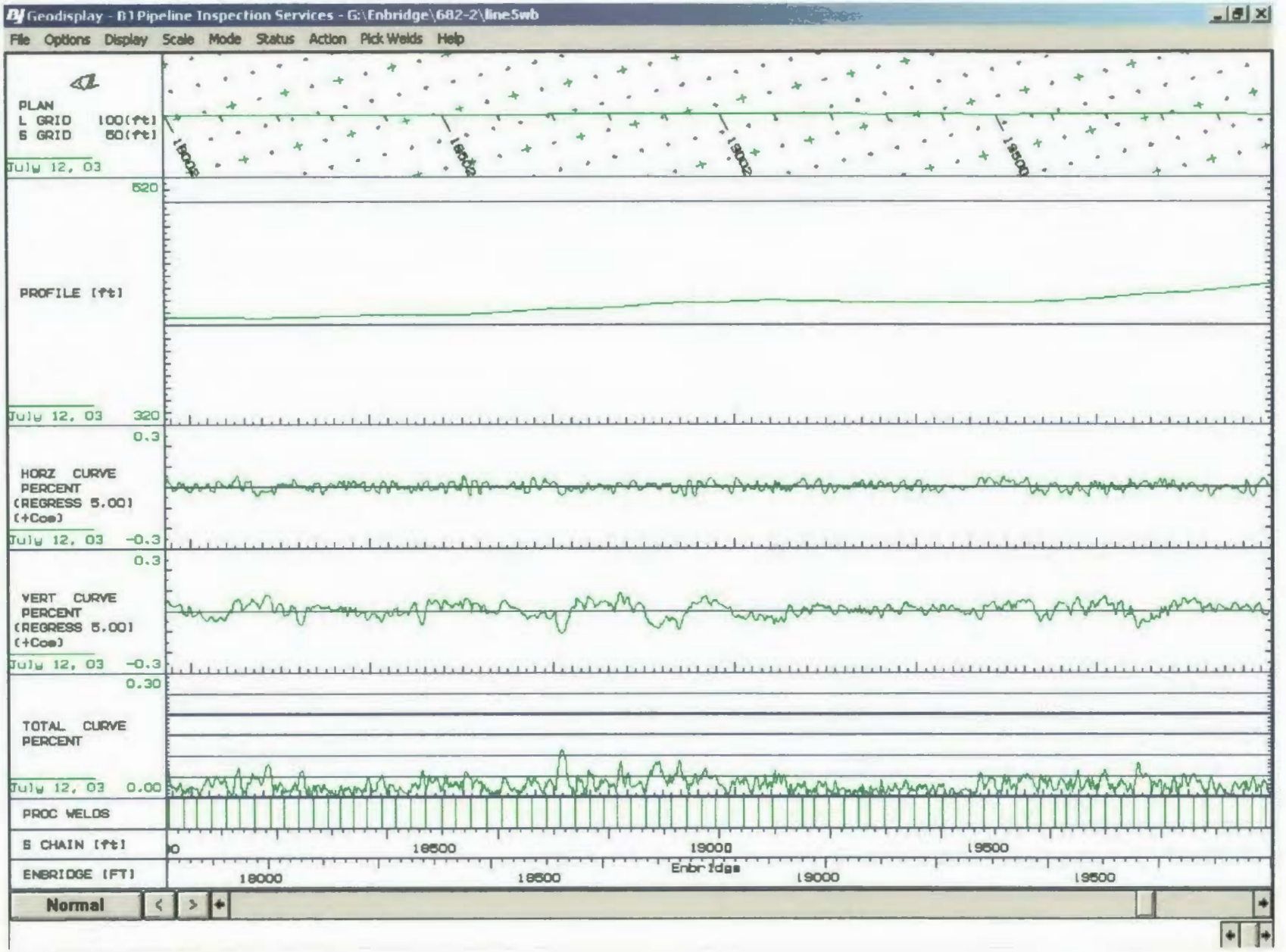

Geodisplay - BJ Pipeline Inspection Services - G:\Enbridge\682-2\line5wb
File Options Display Scale Mode Status Action Pick Welds Help
PLAN
L GRID 100(ft)
S GRID 50(ft)
July 12, 03
8502
8502
8502
393
PROFILE (ft)
July 12, 03 193
0.3
HORZ CURVE
PERCENT
(REGRESS 5.00)
(+Cos)
July 12, 03 -0.3
0.3
VERT CURVE
PERCENT
(REGRESS 5.00)
(+Cos)
July 12, 03 -0.3
0.30
TOTAL CURVE
PERCENT
July 12, 03 0.00
PROC WELDS
S CHAIN (ft)
8500
9000
9500
ENBRIDGE (FT)
8000
8500
Enbridge
9000
9500
Normal


Geodisplay - B1 Pipeline Inspection Services - G:\Enbridge\682-2\lineSwb
File Options Display Scale Mode Status Action Pick Welds Help
PLAN
L GRID 100(ft)
S GRID 50(ft)
July 12, 03
10000
10500
11000
11500
441
PROFILE (ft)
July 12, 03 241
0.3
HORZ CURVE PERCENT
(REGRESS 5.00)
(+Cos)
July 12, 03 -0.3
0.3
VERT CURVE PERCENT
(REGRESS 5.00)
(+Cos)
July 12, 03 -0.3
0.30
TOTAL CURVE PERCENT
July 12, 03 0.00
PROC WELDS
S CHAIN (ft)
10500
11000
11500
ENBRIDGE (FT)
10000
10500
Enbridge
11000
11500
Normal


Geodisplay - BJ Pipeline Inspection Services - G:\Enbridge\682-2\line5wb
File Options Display Scale Mode Status Action Pick Welds Help
PLAN
L GRID 100(ft)
B GRID 50(ft)
July 12, 03
12002
12500
13002
13502
453
PROFILE (ft)
July 12, 03 253
0.3
HORZ CURVE PERCENT (REGRESS 5.00) (+Cos)
July 12, 03 -0.3
0.3
VERT CURVE PERCENT (REGRESS 5.00) (+Cos)
July 12, 03 -0.3
0.30
TOTAL CURVE PERCENT
July 12, 03 0.00
PROC WELDS
S CHAIN (ft)
12500
13000
13500
ENBRIDGE (FT)
12000
12500
Enbridge
13000
13500
Normal


Geodisplay - BJ Pipeline Inspection Services - G:\Enbridge\682-2\lineSwb
File Options Display Scale Mode Status Action Pick Welds Help
PLAN
L GRID 100(ft)
S GRID 50(ft)
July 12, 03
14500
15000
15500
482
PROFILE (ft)
July 12, 03 282
0.3
HORZ CURVE PERCENT (REGRESS 5.00) (+Cos)
July 12, 03 -0.3
0.3
VERT CURVE PERCENT (REGRESS 5.00) (+Cos)
July 12, 03 -0.3
0.30
TOTAL CURVE PERCENT
July 12, 03 0.00
PROC WELDS
S CHAIN (ft)
14500
15000
15500
ENBRIDGE (FT)
14000
14500
Enbridge
15000
15500
Normal


Geodisplay - BJ Pipeline Inspection Services - G:\Enbridge\682-2\line5wb
File Options Display Scale Mode Status Action Pick Welds Help
PLAN
L GRID 100(ft)
S GRID 50(ft)
July 12, 03
16002
16502
17002
17502
503
PROFILE (ft)
July 12, 03 303
0.3
HORZ CURVE PERCENT (REGRESS 5.00) (+Cos)
July 12, 03 -0.3
0.3
VERT CURVE PERCENT (REGRESS 5.00) (+Cos)
July 12, 03 -0.3
0.30
TOTAL CURVE PERCENT
July 12, 03 0.00
PROC WELDS
S CHAIN (ft)
16000 16500 17000 17500
ENBRIDGE (FT)
16000 16500 Enbridge 17000 17500
Normal


Geodisplay - BJ Pipeline Inspection Services - G:\Enbridge\682-2\lineSwb
File Options Display Scale Mode Status Action Pick Welds Help
PLAN
L GRID 100(ft)
S GRID 50(ft)
July 12, 03
620
PROFILE (ft)
July 12, 03 320
0.3
HORZ CURVE PERCENT (REGRESS 5.00) (+Cos)
July 12, 03 -0.3
0.3
VERT CURVE PERCENT (REGRESS 5.00) (+Cos)
July 12, 03 -0.3
0.30
TOTAL CURVE PERCENT
July 12, 03 0.00
PROC WELDS
S CHAIN (ft)
ENBRIDGE (FT)
19500
19000
19500
Enbridge
19000
19500
Normal


Geodisplay - BJ Pipeline Inspection Services - G:\Enbridge\682-2\lineSwb
File Options Display Scale Mode Status Action Pick Welds Help
PLAN
L GRID 100(ft)
S GRID 50(ft)
July 12, 03
581
PROFILE (ft)
July 12, 03 381
0.3
HORZ CURVE PERCENT (REGRESS 5.00)
(+Cos)
July 12, 03 -0.3
0.3
VERT CURVE PERCENT (REGRESS 5.00)
(+Cos)
July 12, 03 -0.3
0.30
TOTAL CURVE PERCENT
July 12, 03 0.00
PROC WELDS
S CHAIN (ft)
20000
20500
21000
21500
ENBRIDGE (FT)
Enbridge
20000
20500
21000
21500
Normal



Don L Engen
07/23/2003 04:47 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: RE: Line 5 (20") West Leg of Straits - Weld Tally<PRG.LINE05.straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/23/2003 04:47 PM -----



jon.wharf@og.ge.com
07/23/2003 11:53 AM

To: jfalk@bjservices.ca
cc: Adam.Erickson@enbridge.com, Don.Engen@enbridge.com, pidms@cnpl.enbridge.com, Garrett.Wilkie@enbridge.com, jczyz@bjservices.ca, michel.hoyeck@og.ge.com, jason.fisk@og.ge.com
Subject: RE: Line 5 (20") West Leg of Straits - Weld Tally
Expire On:

Joel

We are assessing the welds in this line and wish to focus additional attention on the areas of high curvature in the line. For the previous Straits line we were able to do this from coordinate information you supplied. Distance information alone will not allow this analysis (although it may help to correlate the inspections).

Can you supply suitable coordinate information to us for this line?

Regards

Jon Wharf
Mgr Reporting & Analysis Apps
PII Pipeline Solutions
GE Power Systems Oil & Gas
Direct 403 806 0266
Mobile 403 512 7442

-----Original Message-----
From: jfalk@bjservices.ca [mailto:jfalk@bjservices.ca]
Sent: Tuesday, 22 July, 2003 16:40
To: Wharf, Jon (PS, OG, PII)
Cc: Adam.Erickson@enbridge.com; Don.Engen@enbridge.com; pidms@cnpl.enbridge.com; Garrett.Wilkie@enbridge.com; jczyz@bjservices.ca
Subject: Line 5 (20") West Leg of Straits - Weld Tally

Attached is the weld tally listing BJ Slack chainage in feet and Enbridge Mile Post for each weld, along with joint length in feet.
If you have any questions please don't hesitate to contact me.

(See attached file: Line 5 West Mackinaw Straits weldlog.xls)

==========

Joel Falk
BJ Pipeline Inspection Services
Calgary, AB
ph. 403-531-5469



Don L Engen
07/23/2003 04:56 PM

To: Garrett Wilkie/CNPL/Enbridge,
cc: Pipeline Integrity DMS
cc:
Subject: questions<PRG.LINE05.20".straits.geo-03>
Expire On:

What is your preference Garrett? I think we would want measurements in feet.
----- Forwarded by Don L Engen/CNPL/Enbridge on 07/23/2003 04:56 PM -----



jfalk@bjservices.ca
07/23/2003 02:56 PM

To: Don.Engen@enbridge.com
cc:
Subject: questions
Expire On:

A couple questions:

In the weld log I sent yesterday, I had the Enbridge chainage in miles. Would you like it in feet instead? Also, would you like Northings and Eastings in meters or feet?

Thanks.

==========

Joel Falk
BJ Pipeline Inspection Services
Calgary, AB
ph. 403-531-5469

July 21, 2003

Enbridge Pipelines Inc.
10201 Jasper Ave
Edmonton, Alberta
T5J 2J9

PIPELINE INTEGRITY

JUL 23 2003

ATTENTION: Don Engen, Project Engineer

Dear Don

Please find enclosed my invoice for the recently completed work on the 20 West Loop line across the Straits of Mackinac. I have also attached the daily time tickets and copies of the original receipts for expenses.

Thanks for the opportunity to work with you on this project and look forward to working with you again.

Yours truly,

PWI Consultants Ltd.
Don Demich, President

INVOICE # L5-2003-07

PWI Consultants Ltd

WO # 91002-00013 -03

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley,MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
E-Mail: pwicons@earthlink.net
Tax # EIN 41-1924824

INVOICE DATE: July 21,2003

PERIOD: July 10-12,2003

PIPELINE INTEGRITY

JUL 23 2003

TO:
Enbridge Pipelines Inc.
10201 Jasper Ave
Edmonton, Alberta Canada
T5J 2J9

Attention: Don Engen,
Project Engineer

APPROVED
BY
EMP # 3176 DATE 07/25/03 MM/DD/YY
TOTALS CHECKED ORDER # WO-91002-00013-03
PROJECT CHARGE

PROJECT	TASK	EXP TYPE	COST CTR
91204S00093	04	6210-01	91204

OPERATING COST

LOB	CONT. SEG.	COST CTR.	ACCOUNT	SUBACCOUNT	INTER-LOB

TO SUPPLY THE FOLLOWING:

To provide supervisory and consulting services for C-tool, BJ Geopig and PII MFL tool runs on the West Loop 20 inch sections at the Straits of Mackinac. Worked performed between July 10th - July 12th, 2003

LABOR:

		Days	Rate/Day	Total
Manager	D.S.Demich	3	$ 600.00	$ 1,800.00
			Sub Total	**$ 1,800.00**

PER DIEM:

		Days	Rate/Day	Total
Manager	D.S.Demich	3	$ 120.00	$ 360.00
			Sub Total	**$ 360.00**

EXPENSES COST + 10%	
Airfare	$ 914.00
Rental Car	$ 79.35
Rental Car Fuel	$ 22.00
Mackinac Bridge Tolls	$ 15.00
Sub Total	$ 1,030.35

Mark Up		**10%**	
Labor	$ 1,800.00		$ 1,800.00
Per Diem	$ 360.00		$ 360.00
Expenses	$ 1,030.35	$ 103.04	$ 1,133.39

TOTAL INVOICE **US Dollars** **$ 3,293.39**

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
St. Ignace to Mackinaw (20" West Loop)

Work Description
Fly from Chicago to Detroit and then Bay City, drive to St. Ignace.

Date
10-Jul-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program (West Loop)

Weather
Cool, Overcast, Raining and Foggy

Ticket #
27

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00
		Sub Total (1)	**$600.00**

Miscellaneous	Cost	Mark Up	Total
Airfare	$430.00	$43.00	$473.00
		Sub Total (2)	**$473.00**

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	0	$0.50	$0.00
			Sub Total (3)	**$0.00**

* S B indicates Stand-By

Per Diem	Days	Rate	Special	Total
Don Demich	1	$120.00		$120.00
				$0.00
			Sub Total (4)	**$120.00**

Don Demich
PWI Company Rep:

Signature

Customer Rep.

Signature

Daily Totals (Sub totals 1 - 4) >>>>: $1,193.00

Daily Grand Total >>>>> $1,193.00

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Date
11-Jul-03

W.O. Number:
91002-000013-03

Location
St. Ignace to Mackinaw (20" West Loop)

Customer Project #
Line # 5 Inspection Program (West Loop)

Work Description
Met with crew and prepare the straits to run the C-Tool
The tool was lauched at 07:04 and received @ 07:48MST
The tool was pulled and the data confirm the run was good

Weather
Cool, Overcast, and Raining

Ticket #
28

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
St. Ignace to Mackinaw (20" West Loop)

Work Description
Run the BJ & PII tools in the west loop, crews travelled back to Escanaba to down load data.The BJ run was confirmed good. I travelled to Bay City and Flew to MSP.

Date
12-Jul-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program (West Loop)

Weather
Sunny and Warm

Ticket #
29

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00

Sub Total (1) **$600.00**

Miscellaneous	Cost	Mark Up	Total
Airfare	$484.00	$48.40	$532.40
Car Rental	$79.35	$7.94	$87.29
Rental Car Fuel	$22.00	$2.20	$24.20
Mackinac Bridge Toll	$7.50	$0.75	$8.25

Sub Total (2) **$652.14**

Don Demich
PWI Company Rep. Signature

Customer Rep. Signature

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	0	$0.50	$0.00

* S.B indicates Stand-By

Sub Total (3) **$0.00**

Per Diem	Days	Rate	Special	Total
Don Demich	1	$120.00		$120.00
				$0.00

Sub Total (4) **$120.00**

Daily Totals (Sub totals 1 - 4) >>>>: $1,372.14

Daily Grand Total >>>>> $1,372.14

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00013 -03

LOCATION: Edmonton, Alberta

TO: PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Attention: Don Demich

DATE: March 13, 2003

COMMENCEMENT DATE: March 13, 2003

COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To provide supervisory and consulting services for GPS surveys, AGM deployment, cleaning, caliper, Geopig and MFL in-line inspections on Line 5, two-20-inch sections at the Straits of Mackinac. Each Section is approximately 4.2 miles in length and Line 5 – 30-inch between Superior, WI and Iron River, MI – 173 miles and between Iron River and the Straits of Mackinac – 206 miles. Per 2003 rate schedule.

Company Information Only
Estimate
91204SC0092 – US $25,000
91204SC0093 – US $10,000

Rest to Houston Cipriel 3/03

Estimated Value $

Capital Cost	Project #		Task #		Exp Type #	Exp. Organization #
	91204SC0092		04		62010-01	91204
	91204SC0093		04		62010-01	91204
Operating Costs	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: _____ IT'S AGENT

APPROVAL _____ 3176 2444

Name of Contractor: _____

By: _____ Data _____
SIGNATURE

RIGHT-TO-AUDIT

THE COMPANY SHALL BE GRANTED THE RIGHT-TO-AUDIT CONTRACTORS AND SUB-CONTRACTORS RECORDS UPON REASONABLE NOTICE FOR ALL COST-PLUS WORK ORDER BILLINGS.

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00013 -03

LOCATION: Edmonton, Alberta

TO: PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Attention: Don Demich

DATE: March 13, 2003

COMMENCEMENT DATE: March 13, 2003

COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To provide supervisory and consulting services for GPS surveys, AGM deployment, cleaning, caliper, Geopig and MFL in-line inspections on Line 5, two-20-inch sections at the Straits of Mackinac. Each Section is approximately 4.2 miles in length and Line 5 – 30-inch between Superior, WI and Iron River, MI – 173 miles and between Iron River and the Straits of Mackinac – 206 miles. Per 2003 rate schedule.

Estimated Value $

	Project #	Task #	Exp Type #	Exp. Organization #
Capital Cost	91204SC0092	04	62010-01	91204
	91204SC0093	04	62010-01	91204

	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #
Operating Costs						

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

Name of Contractor: PWI Consultants Ltd

BY: 3176
IT'S AGENT

APPROVAL 2944

By: _____ Date: 03-28-03
SIGNATURE

RIGHT-TO-AUDIT

THE COMPANY SHALL BE GRANTED THE RIGHT-TO-AUDIT CONTRACTORS AND SUB-CONTRACTORS RECORDS UPON REASONABLE NOTICE FOR ALL COST-PLUS WORK ORDER BILLINGS.

MACKINAC BRIDGE

Customer Fare Receipt

Lane 2N Coll #15

Tran#	Desc	Paid w/
6307:	AUTO, 2 axles	2.50

Total CASH Fare: $2.50

Date 07-11-2003 Time 12:30

Buckle Up!

MACKINAC BRIDGE

Customer Fare Receipt

Lane 7S Coll #18

Tran#	Desc	Paid w/
1401:	AUTO, 2 axles	2.50

Total CASH Fare: $2.50

Date 07-11-2003 Time 10:12

Buckle Up!

MACKINAC BRIDGE

Customer Fare Receipt

Lane 2N Coll #46

Tran#	Desc	Paid w/
4898:	AUTO, 2 axles	2.50

Total CASH Fare: $2.50

Date 07-11-2003 Time 01:03

Buckle Up!

MACKINAC BRIDGE

Customer Fare Receipt

Lane 9S Coll #15

Tran#	Desc	Paid w/
5312:	AUTO, 2 axles	2.50

Total CASH Fare: $2.50

Date 07-12-2003 Time 10:08

Buckle Up!

QUICK SHOP NORTH
8534 OLD 27 NORTH
VANDERBILT, MI
PH. 989 983-2174
QUICK SHOP NO
VANDERBL, MI
DEALER: 9634254-L3H

DUPLICATE OUTDOOR RECEIPT

#XXXXXXXXXXXX2832
CARD # 283
INV # L3H6906
AUTH # 013411
07/12/03 16:24
DEALER # 9634254
QUICK SHOP NO
VANDERBL MI

PUMP # 05 UNLD
GALLONS 13.671
PRICE/GAL $ 1.609
FUEL SALE $ 22.00

TOTAL (C) $ 22.00

THANKS, COME AGAIN

MACKINAC BRIDGE

Customer Fare Receipt

Lane 9S Coll #15

Tran#	Desc	Paid w/
6092:	AUTO, 2 axles	2.50

Total CASH Fare: $2.50

Date 07-12-2003 Time 13:15

Buckle Up!

MACKINAC BRIDGE

Customer Fare Receipt

Lane 2N Coll #10

Tran#	Desc	Paid w/
9957:	AUTO, 2 axles	2.50

Total CASH Fare: $2.50

Date 07-12-2003 Time 11:27

Buckle Up!

ALL CHARGES SUBJECT TO FINAL AUDIT

LICENSEE:

THRIFTY CAR RENTAL
966 BRIDGEVIEW SOUTH SAG 48604
MBS INTERNATIONAL AIRPORT
(989)695-5308 231001 MBS

Thrifty

CUSTOMER INFORMATION

Open/Emp. 0163 Close/Emp. 0090

JEMICH DON CUST NO:95260
4325 TYROL CREST GOLDEN VALLEY MN 55416
D520149777800 MN 10/17/05 (763)381-8245
N/A (1) - 1

ADD'L RENTER:

RESERVATION NO: 114210

I understand that if I decline PDW, I am responsible for all loss regardless of fault. Only an authorized renter may drive the car. Rates are subject to change if the vehicle is not returned as stated above. Minimum one day rental charge. All the information provided to you in connection with this rental is true.

Car To Be Returned To Above Unless Stated	Rental Expires On	Rental Agreement Number
RA OUT: 231001 MBS RA IN: 231001 MBS	22:00 07/12/03	S05653813

Vehicle Information

VEH.#: 307001
LIC.#: ULX-604 STALL#:
4 CHRY 300 M
Fuel out 8/8 Mileage o 18830
Fuel in 6/8 Mileage i 19272
EXCH
LIC.#: STALL#:

Fuel out Mileage o
Fuel in Mileage i

MILES DRIVEN: 442

CREDIT CARD EXP. DATE 11/03
AUTH # 027709 AMT 70.00
SOURCE: 100 10

	TIME OUT	TIME IN
	07/10/03 22:00	07/12/03 18:16
Per Mile		
Per Hour	18.66	
Per Day	55.10	
Per Week		
Per Mnth		
Wknd Day 2	25.10	50.20
** NET T & M		50.20
Fuel	3.75 P/G	18.75
Drop Fee		
Airport Fee	10.00 %	5.02
Veh Lic Fee	.62/day	1.24
Sales Tax 1	6.000%	4.14
* LESS PAID DEPOSITS *		
* TOTAL CHARGES		79.35
CREDITS/PAYMENTS		
VI	ORIGINAL	79.35

By signature below, I acknowledge that I have read and agree to the terms and conditions, both printed and written, including Physical Damage Waiver, that appear on this rental statement and on the separate rental jacket which is incorporated herein. All the information provided by Me is true. I know that if I decline the option PDW, I am responsible for all loss regardless of fault. **I AUTHORIZE THRIFTY TO PROCESS OR SUBMIT A CHARGE TO MY CREDIT, DEBIT OR CHARGE CARD FOR THE ESTIMATED CHARGES FOR THIS RENTAL UPON MY SIGNING THIS RENTAL STATEMENT AND FOR ALL ADDITIONAL CHARGES UPON RETURN OF THE VEHICLE.**

X _____ RENTER SIGNATURE X _____ ADDITIONAL AUTHORIZED RENTER

ENBDNR0006965

NORTHWEST AIRLINES

Flight Purchase Confirmation

Bay City/Midland/Saginaw 7/10/03
nwa.com Reservations Confirmation #: MY8SUA

Total Trip Cost: $430.00
Total Airfare: $430.00

Traveler(s)	Frequent Flyer Details
Mr Donald S Demich	Northwest WorldPerks 495146433

Departing Flight(s)

Thursday, July 10, 2003
Northwest Airlines Flight #1416

depart **6:00pm** evening — **Chicago Midway (MDW)**
Chicago

arrive **8:17pm** evening — **Detroit Wayne County Metropolitan Airport (DTW)**
Detroit

Seat(s): 6B
Meal: none
On Time: 90%
Cabin: Economy
Equipment: McDonnell Douglas DC-9-30/ 40/ 50 (D9S)
Duration: 1hr 17min
Approximate Distance: 237 miles

Plane Change
(1hr 8min - ground time)

Northwest Airlines Flight #472

depart **9:25pm** evening — **Detroit Wayne County Metropolitan Airport (DTW)**
Detroit

arrive **10:09pm** evening — **Saginaw Bay City/Midland/Tri City (MBS)**
Bay City/Midland/Saginaw

Seat(s): Not Assigned
Meal: none
On Time: 90%
Cabin: Economy
Equipment: McDonnell Douglas DC-9-40 (D94)
Duration: 44min
Approximate Distance: 96 miles

Total Duration: 3hr 9min
Total Distance: 333 miles

Ticket Information

Ticket type: electronic (E-Tickets)

- Check-in and print your boarding pass online at nwa.com Check-In, E-Service Centers (located at most airports in the U.S.), Airline ticket counters, or Curbside at most airports.
- Check-in Advice: **Northwest recommends that passengers arrive at the**

NORTHWEST AIRLINES

Flight Purchase Confirmation

Minneapolis/St. Paul 7/13/03
nwa.com Reservations Confirmation #: MYQZRB

Total Trip Cost: $484.00
Total Airfare: $484.00

Traveler(s)	**Frequent Flyer Details**	
Mr Donald S Demich	Northwest WorldPerks	495146433

Departing Flight(s)

Sunday, July 13, 2003
Northwest Airlines Flight #3429

operated by
MESABA AVIATION-JET SERV/NW AIRLINK

depart 7:40am morning **Saginaw Bay City/Midland/Tri City (MBS)**
Bay City/Midland/Saginaw

arrive 8:15am morning **Minneapolis/St. Paul International Airport (MSP)**
Minneapolis/St. Paul

Seat(s): 6B
Meal: none
On Time: N/A
Cabin: Economy
Equipment: Avro RJ85 Avroliner (AR8)
Duration: 1hr 35min
Approximate Distance: 462 miles

Total Duration: 1hr 35min
Total Distance: 462 miles

Ticket Information

Ticket type: electronic (E-Tickets)

- Check-in and print your boarding pass online at nwa.com Check-In, E-Service Centers (located at most airports in the U.S.), Airline ticket counters, or Curbside at most airports.

- Check-in Advice: **Northwest recommends that passengers arrive at the airport at least 75 minutes prior to departure for domestic flights and 2 hours prior to departure for international flights.**

  Customers traveling within the United States (including Hawaii), must **check in at least 30 minutes prior to departure and board the aircraft at least 15 minutes prior to departure.** Customers traveling from Atlanta, Denver or Las Vegas must **check in at least 45 minutes prior to departure.**

  Customers traveling internationally (including Canada, Mexico and the Caribbean) must **check in at least 60 minutes prior to departure and board the aircraft at least 30 minutes prior to departure.**

X CLOSE WINDOW

ENBDNR0006967

ORIGINAL

GE Power Systems
Oil & Gas

PII Pipeline Solutions

INVOICE

Enbridge Energy, Limited Partnership
Suite 3300, 1100 Louisiana
Houston, TX 77002

Attention: Mr. Don Engen

INVOICE NO.:	**CAN2308**
DATE:	July 14, 2003
TERMS:	Thirty (30) Days Upon Receipt
GST NO.:	872167978RP
LAUNCHING PROVINCE:	Michigan USA

Any questions concerning your invoice? **Call Maureen Miller (403) 298- 0240**

Name of Job:	20" Strait of Mackinac - Mackinaw B	**Inspection Length:**	20G - 6.7km
Contract No:	C2001-25	**Work Order No.**	91002-00009-03
PII Ref. No.:	101211_20G **Technology:** MFL	**Date of Service:**	July 12, 2003

This invoice is for the following services performed under the contract between Enbridge Energy Limited Partnership and PII (Canada) Limited:

US Dollars

Total Line Contract Price:

Inspection: 75,000.00X0.97		72,750.00
PipeImage=		7,000.00
	Total	$79,750.00

PIPELINE INTEGRITY
JUL 16 2003

Invoicing Schedule:

Mobilization (10%)		7,975.00
Inspection (65%)		51,837.50
Final Report (25%)		19,937.50
	Total	$79,750.00

Previously Invoiced:

None

Current Charges:

Mobilization	7,975.00
Inspection	51,837.50

07-22-03 3/7

APPROVED
BY
AdMP # DATE $59,812.50
TOTALS CHECKED ORDER # W02-91002-00009-03 MM / DD / YY
PROJECT CHARGE
PROJECT TASK EXP TYPE COST CTR
91204/SC00931 01 16200-01 91204
OPERATING COST
LOB CONT. SEG. COST CTR. ACCOUNT SUBACCOUNT INTER-LOB

PLEASE WIRE PAYMENT TO:

The Toronto-Dominion Bank
Calgary, Alberta
Account of PII (Canada) Limited
Account No: 0805 0338152

Overdue accounts are subject to a 1.5% interest charge per month

1003 - 11th Street S.W., Calgary AB Canada T2R 1G2 • Phone 403 252-7447 • Fax 403 237 9693

Should the Company fail to pay the Vendor any amount due under the Contract at the due date of payment the Company shall be liable to pay interest on the unpaid amount from the due date of payment to the actual date of payment at a rate of interest two percentage points above the prime rate at Morgan Guaranty Trust Company in New York from time to time in force.

All payments made by the Company under this Agreement shall be paid in United States dollars. All payments to the Vendor shall be made by wire transfer or cheque into the following bank account:

The Toronto-Dominion Bank

Calgary, Alberta, Canada

Account of PII (Canada) Limited

Canadian Account No. 0805 0338152

Payment Stages

Payment of the Contract Sums shall be as follows:

For MagneScan, TranScan, UltraScan WM Inspections

Mobilization	10% of fee
Inspection	65% of fee
Report	25% of fee

For UltraScan CD and EW Inspection

Upon Mobilization	25%
Upon Inspection	50%
Upon Final Report	25%

ENBDNR0006969

Exhibit C
Pricing and Payments

Enbridge 2001- 2004 Inspection Program Pricing

Pricing can be extended to all Enbridge Inc. wholly owned subsidiaries without exclusivity terms.

Pricing for Exclusive arrangement with PII (All prices in US $)

UltraScan WM	
Minimum Line Segment Inspection Price	$125,000
For every km inspected	$ 1,525
Rerun Fees + applicable Standby and consumables charge	$ 45,000
Stand-By Charges (per day rate)	
Crew	$ 3,333
Tool	$ 3,333
UltraScan WM + Scoutscan Solo	
Minimum Line Segment Inspection Price	$200,000
For every km inspected	$ 1,955
Rerun Fees for UltraScan + applicable Standby and consumables charge	$ 45,000
Rerun Fees for ScoutScan Solo	$ 25,000
Stand-By Charges (per day rate)	
Each Crew	$ 3,333
Each Tool	$ 3,333
MagneScan	
Minimum Line Segment Inspection Price	$ 75,000
For every km inspected	$ 1,170
Rerun Fees	$ 30,000
Stand-By Charges (per day rate)	
Crew	$ 3,333
Tool	$ 3,333

ENBDNR0006970

Tool mobilization charges do not apply for the first mobilization of any inspection project. These fees are built in to the inspection fees. These mobilization charges only apply to re-run situations.

Miscellaneous/Optional Charges

LAPA	$5000.00 per line segment
PipeImage	$7000.00 per line segment

Cleaning Services

Quote provided on an as needed basis. Prices and program will designed by Vendor cleaning experts. If a Vendor cleaning program is accepted by the Company, the Vendor assumes full responsibility for the success of the inspection due to line cleanliness.

Tracking Services

Quote provided on an as needed basis.

Discount Opportunities

Discounts apply to all previous and subsequent inspections upon reaching the $5 million annual target.

Assuming inspection revenue to the Vendor as per pricing matrix attached, the Vendor would build the following discounts in to pricing from day 1 of any year.

UltraScan CD – 4%

UltraScan WM – 0%

Magnescan – 3% (Additional 5% reduction for first quarter inspections)

Elastic Wave – 0

TranScan – 5%

ENBDNR0006971

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00009 -03

LOCATION: Edmonton, Alberta

TO: PII (Canada) Limited
1003 – 11th Street SW
Calgary, Alberta
T2R 1G2
Attention: Daryl Ronsky

DATE: March 10, 2003

COMMENCEMENT DATE: March 10, 2003

COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To supply a 20-inch MagneScan 020 MFL tool, personnel, material and equipment to inspect two 20-inch sections of Line 5 at the Straits of Mackinac in Michigan. Each section is approximately 4.2 miles (6.7 km) long. A preliminary report of the inspection is due within one calendar month of the data being received at the Vendor's facility. A final report is due 60 working days from when the data is received at the Vendor's facility.
Terms and conditions of Agreement C2001-25 take precedence over the Work Order Contract General Conditions

Company Information Only
Estimate US $155,000

Duly executed copy to Houston, March 27

Estimated Value $

Capital Cost	Project # 91204SC0093		Task # 01		Exp Type # 62010-01	Exp. Organization # 91204
Operating Costs	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc. 3/26 2944
IT'S AGENT

APPROVAL W. Kresin 2879

Name of Contractor: PII (Canada) Limited

By: _____ Date: _____
SIGNATURE

RIGHT-TO-AUDIT

THE COMPANY SHALL BE GRANTED THE RIGHT-TO-AUDIT CONTRACTORS AND SUB-CONTRACTORS RECORDS UPON REASONABLE NOTICE FOR ALL COST-PLUS WORK ORDER BILLINGS.

WORK ORDER CONTRACT

,dge Energy, Limited Partnership
, Enbridge Pipelines Inc.
,0201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00009 -03

LOCATION: Edmonton, Alberta

TO: PII (Canada) Limited
1003 – 11th Street SW
Calgary, Alberta
T2R 1G2
Attention: Daryl Ronsky

DATE: March 10, 2003
COMMENCEMENT DATE: March 10, 2003
COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To supply a 20-inch MagneScan 020 MFL tool, personnel, material and equipment to inspect two 20-inch sections of Line 5 at the Straits of Mackinac in Michigan. Each section is approximately 4.2 miles (6.7 km) long. A preliminary report of the inspection is due within one calendar month of the data being received at the Vendor's facility. A final report is due 60 working days from when the data is received at the Vendor's facility.
Terms and conditions of Agreement C2001-25 take precedence over the Work Order Contract General Conditions

Estimated Value $

Capital Cost	Project # 91204SC0093		Task # 01		Exp Type # 62010-01	Exp. Organization # 91204
Operating Costs	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc
IT'S AGENT

APPROVAL W. Kresin 2879

Name of Contractor: PII (Canada) Limited

By: _____ Date: MARCH 20, 2003
SIGNATURE

RIGHT-TO-AUDIT

COMPANY SHALL BE GRANTED THE RIGHT-TO-AUDIT CONTRACTORS AND SUB-CONTRACTORS RECORDS UPON REASONABLE NOTICE FOR ALL COST-PLUS WORK ORDER BILLINGS.

ENBRIDGE

Garrett Wilkie

07/22/2003 03:23 PM

To: jfalk@bjservices.ca
cc: Don L Engen/CNPL/Enbridge@IPL, Adam J Erickson/LPL@LPL, pidms
Subject: Re: Line 5 (20") West Leg of Straits<PRG.LINE05.20".straits.geo-03>
Expire On:

Joel, could we please get the Geopig report for the Line 5 (20") Straits of Mackinac West leg in NAD 83 rather than WGS 84 as we discussed.

As per the details below.

Thank you.

Garrett Wilkie
Pipeline Integrity - Senior Engineer
Enbridge Pipelines Inc.
(780)420-8428
----- Forwarded by Garrett Wilkie/CNPL/Enbridge on 07/22/2003 03:21 PM -----

Adam J Erickson@LPL

07/22/2003 02:25 PM

To: Garrett Wilkie/CNPL/Enbridge@IPL
cc:
Subject: Re: Line 5 (20") West Leg of Straits<PRG.LINE05.20".straits.geo-03>
Expire On:

I have never heard of WGS84... Our work has been done, and I would like to continue to do in NAD 83 State Plane (english) michigan central zone (I believe it is 2102). Thanks

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

Garrett Wilkie@IPL

Garrett Wilkie@IPL

07/22/2003 02:50 PM

To: Adam J Erickson/LPL@LPL
cc: Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, pidms
Subject: Line 5 (20") West Leg of Straits<PRG.LINE05.20".straits.geo-03>

Adam, just to confirm, for the East leg of the Straits there was some issue with the GPS coordinate system that JP Kenny and BJ were working through. I don't know if this was ever resolved.

The Geopig report for the West leg will be issued with a WGS84 GPS Coordinate System. This meets our requirements, but if it does not meet yours we need to know what you need before tomorrow to advise BJ as they will be issuing the final report on Thursday.

Let me know.

Thanks,

Garrett Wilkie
Pipeline Integrity - Senior Engineer
Enbridge Pipelines Inc.

(780)420-8428

Don L Engen
07/22/2003 11:16 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: BJ inspection of Line 5 Mackinac Straits<PRG.LINE05.20".straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/22/2003 11:16 AM -----

jfalk@bjservices.ca
07/21/2003 04:42 PM

To: Don.Engen@enbridge.com
cc: pwicons@earthlink.net, jczyz@bjservices.ca, GHurd@bjservices.ca
Subject: BJ inspection of Line 5 Mackinac Straits
Expire On:

A couple questions:

1. On the East line, we tied our welds to PII's, so the chainages of ours and theirs would be the same. As per our discussion this morning, we will be sending our weld log to PII for the West line. Will they be able to tie the two weld logs together? If not, that is something we could do once their weld log is ready.

2. When preparing the report for the east line, we had difficulty finding out exactly which co-ordinate system Enbridge wanted used for the final coordinates. Geoff Hurd sent a revised CD and pipe tally out on June 6 based on the 1983 US State Plane and Zone 2112 Michigan Central LLC, but hasn't been able to find out if this is what is desired. We will be preparing the report for the West Line by the end of this week, and if possible we would like to confirm the co-ordinate system desired before then.

Thanks

==========

Joel Falk
BJ Pipeline Inspection Services
Calgary, AB
ph. 403-531-5469

1. BJ to send Pipe Tally c/w chainage to PII today.
   Final report to come at the end of the week.

2. Coordinate System - From Axiom WGS84
   This is what the final report will issued as.
   Chainage to be in feet.

From: Don L Engen on 06/23/2003 04:49 PM

To: GHurd@bjservices.ca
cc: Garrett Wilkie/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, Pipeline Integrity DMS@IPL
Subject: Re: Enbridge Straits of Mackinac Crossing Coordinates<PRG.LINE05.20".straits.geo-03>

Thanks, Geoff. I'll follow up in our Line 5 meeting tomorrow.

Regards,

Don Engen
Corrosion Control Analyst
Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234
GHurd@bjservices.ca

GHurd@bjservices.ca
06/23/2003 04:15 PM

To: don.engen@enbridge.com
cc: jczyz@bjservices.ca, dlatto@bjservices.ca
Subject: Re: Enbridge Straits of Mackinac Crossing Coordinates
Expire On:

Don,

I never received a reply to the message below and I just wanted to confirm that the problems have been resolved.

Regards,

Geoff Hurd
Data Analyst
BJ Pipeline Inspection Services
403 531 5332
ghurd@bjservices.ca

----- Forwarded by Geoffrey Hurd/BJSCAN/BJSERVICES on 23/06/2003 04:13 PM -----

Geoffrey Hurd
06/06/2003 11:13 AM

To: "Kilmer, Craig" <Craig.Kilmer@jpkhouston.com>

cc: "Smith, Derek" <derek.smith@jpkhouston.com>, "Fellers, Gary" <Gary.Fellers@jpkhouston.com>, "Kvist, Orjan" <orjan.kvist@jpkhouston.com>, Jarek Czyz/BJSCAN/BJSERVICES@BJSERVICES, jackie.mccoy@cnpl.enbridge.com, vanessa.co@enbridge.com

Subject: Re: Enbridge Straits of Mackinac Crossing Coordinates(Document link: Geoffrey Hurd)

Craig,

Hopefully these answers help resolve the problems:

1) Why does this second data not seem to agree with the original data? i.e. the total length, the curve % values, the curve radii, the heights.

There are two reasons why the final data has changed since the preliminary data delivered at our meeting in Calgary:

a) the chainage was matched to the weld log provided by Enbridge, which changed the chainage and coordinates

b) the curve data was averaged over 5m in the final data as opposed to 1m in the original data, as agreed on during the meeting. If you would like the data averaged over a different moving average length let me know and I can provide a text file with that data. Our display software (GeoDisplay) also allows you to change this moving average value interactively in the program.

2) What is the starting point and/or matching points of both situations? I assume the second set of data starts at the pig trap valve.

The starting point of both data sets was the reducer on the north side.

3) I have been using a conversion program downloaded from the internet called Corpscon. It is free to download and was created by the Army Corp of Engineers. When converting the UTM lats and longs of previous repairs on the line to NAD 83 State Plane Michigan Central coordinates the results check exact. When I do a similar conversion of the original BJ centerline pipe data, or when I compare the latest BJ centerline pipe data you have furnished, to the earlier repair location data neither agrees. The differences vary in some locations of the crossing by 50' +/-, 70'+/-, etc.

The problem may be the type of feet being used (international, or US survey). The previous file I gave you was using international feet, but when I downloaded Corpscon I noticed that it defaults to US survey feet. This would account for ~40' error, but it should be fairly consistent over the length of the line. Attached

is a file giving the coordinates in US survey feet.

(See attached file: pipe_centerline_1m_SPC_USSurveyFeet.txt)

If this is not the problem, it would help me if you could send me the coordinates you have (in both systems - lat/long and north/east) to confirm my transformations. As well if you could send me some information on the data you have. For example, how these coordinates were surveyed, what their accuracy is, and their locations.

Once we have the problem resolved, if you would like a new CD with the final data on it let me know and I can send one to you.

Regards,

Geoff Hurd
Data Analyst
BJ Pipeline Inspection Services
403 531 5332
ghurd@bjservices.ca

"Kilmer, Craig" <Craig.Kilmer@jpkhouston.com>

05/06/2003 05:00 PM

To: "'ghurd@bjservices.ca'" <ghurd@bjservices.ca>

cc: "Smith, Derek" <derek.smith@jpkhouston.com>, "Fellers, Gary" <Gary.Fellers@jpkhouston.com>, "Kvist, Orjan" <orjan.kvist@jpkhouston.com>

Subject: Enbridge Straits of Mackinac Crossing Coordinates

Geoff,

Thank you for providing the revised centerline of the pipeline co-ordinate data. I am, however, continuing to have problems correlating the data with

other data sources. My questions/comments are these -

1) Why does this second data not seem to agree with the original data? i.e. the total length, the curve % values, the curve radii, the heights.

2) What is the starting point and/or matching points of both situations? I assume the second set of data starts at the pig trap valve.

3) I have been using a conversion program downloaded from the internet called Corpscon. It is free to download and was created by the Army Corp of Engineers. When converting the UTM lats and longs of previous repairs on the line to NAD 83 State Plane Michigan Central coordinates the results check exact. When I do a similar conversion of the original BJ centerline pipe data, or when I compare the latest BJ centerline pipe data you have furnished, to the earlier repair location data neither agrees. The differences vary in some locations of the crossing by 50' +/-, 70'+/-, etc.

Can you please do some checking of the data and help me try to resolve the matter.

Thanks,

Craig



pipe centerline 1m SPC USSurveyFe

AFE No.	Page of
File No.	Date 07-22-03
Designed by	Checked by

ENBRIDGE
Enbridge Pipelines Inc.

Subject: LN 5 (20") STRAITS

Marika Newman, Brad Hennigar, Mike Doman, Onysa, Adam Erickson
- Calgary - Dale, Brian Walbaum
- Edmonton - Christine Neff, Janet Wilkie, D.

- Pig Run Status -
- BJ - July 24th/25th
- PII - July 31st
- BJ - Scoping - July 24th electronic copy to Adam.

Mike Doman - schedule -
- Wet NG (across Strait
- Repairs - ≥150' - 2/days
  ≥150' - 1/days

- Repair Techniques -

Scoping - J. P. Kenney - changed position of pipeline?
- Use Kiefner and associates.

- Difference between, ROV, BJ coordinates

- Common point for BJ / PII - ie: anchor
- Can we see if anchors were recorded on PII logs.
- Old 1" cables wrapped around pipe? from original construction.

July 30th - Wed - next week - meeting.

ENG 02/09/98



Don L Engen

07/21/2003 04:32 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Tuesday Meeting-Straits of Mackinac<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/21/2003 04:32 PM -----

Adam J Erickson@LPL

07/21/2003 01:54 PM

To: Al V Aleknavicius/LPL@LPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, Dave S Lawson/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Grant P Henningsen/LPL@LPL, Jill M Schubert/LPL@LPL, Larry Mersnick/US/Enbridge@LPL, Mark S Sitek/LPL@LPL, Mike D Goman/LPL@LPL, Walter J Kresic/CNPL/Enbridge@IPL
cc: Mark F Newman/LPL@LPL, Tom Fiddler/CNPL/Enbridge@IPL, Dave S Lawson/CNPL/Enbridge@IPL
Subject: Tuesday Meeting-Straits of Mackinac
Expire On:

We will be having a meeting in regards to the Straits of Mackinac tomorrow at 10:00 central as well as next week (Wednesday, July 30 10:00). Please attend as you see fit. Phone1800-503-2899 access code 7250548.

Agenda:
Pig Run Status
- Appears as though PI can get data first week of August

Update of Technical Criteria
- No Change

Schedule
- July 23rd - Mobilize Survey Crew to Mackinac
- July 24th - Reconfigure equipment from the barge onto survey boat
- July 25th thru 28th - Recover, download, re-format, and re-deploy the current profilers.
- July 29th thru August 1st - ROV survey of the West Line
- August 2nd - Reconfigure equipment from the boat onto the barge spread
- August 3rd - Mobilize Dive Crews
- August 4th - Setup Dive spread for anchor installations
- August 5th thru ??? - Install anchors

Repair Technique
- Possible displacement of the pipeline

Adam

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405



Don L Engen

07/18/2003 03:23 PM

To: michel.hoyeck@og.ge.com
cc: Vanessa Co/CNPL/Enbridge, Dave B McNeill/CNPL/Enbridge, Garrett Wilkie/CNPL/Enbridge, Pipeline Integrity DMS
cc: vanessa.co@enbridge.com, don.engen@cnpl.enbridge.com, abdiwahid.abdirahman@og.ge.com, jason.fisk@og.ge.com, jon.wharf@og.ge.com, david.cammack@og.ge.com
Subject: Re: Vendor list Update 030717
Expire On:

Hi Michel,

It would be our preference to not receive a preliminary report. We will wait for the UK GW assessment to be completed and await that report July 31.

Don Engen
Pipeline Integrity
Office: (780) 420-8715
Cell: (780) 982-2032
fax: (780) 420-5234
michel.hoyeck@og.ge.com



michel.hoyeck@og.ge.com

07/18/2003 02:11 PM

To: vanessa.co@enbridge.com, don.engen@cnpl.enbridge.com
cc: abdiwahid.abdirahman@og.ge.com, jason.fisk@og.ge.com, jon.wharf@og.ge.com, david.cammack@og.ge.com
Subject: Vendor list Update 030717
Expire On:

Hi Don/Vanessa,

Please find attached the vendor list updated with the delivery schedule of the pending issues.

We tried to best fit these issues within the workload we have currently in our hands, if you think the priority should change due to any particular reason please let us know and we can re-work these dates accordingly.

As for line 5: 20" Strait of Mackinac - Mackinaw B, the line analysis must be finalized by the end of next week. By latest Friday 25th we should issue an extensive preliminary report on the findings. By the 31st July we should have received from UK & completed the GW assessment comparison and an official note should be issued on this. Finally during the first week of August we should be able to dispatch the whole package including the hard copy & CD's as usual.
I hope this is to your satisfaction, on the contrary please feel free to let me know and again we can together work out a more suitable schedule.

Best regards,

> g GE Power Systems
> Oil & Gas
> _____
> Michel Hoyeck
> Project Manager
>
> PII (Canada) Ltd
> 1003 - 11th Street S.W.
> Calgary, Alberta, Canada, T2R 1G2
> Direct ++ 1 (403) 806-0265
> Fax ++ 1 (403) 237-9693



Don L Engen
07/18/2003 03:19 PM

To: Dave B McNeill/CNPL/Enbridge
cc: Garrett Wilkie/CNPL/Enbridge, Pipeline Integrity DMS
cc:
Subject: Vendor list Update 030717<PRG.LINE05.20".straits.ml-03>
Expire On:

For your info, as discussed.
----- Forwarded by Don L Engen/CNPL/Enbridge on 07/18/2003 03:19 PM -----



michel.hoyeck@og.ge .com
07/18/2003 02:11 PM

To: vanessa.co@enbridge.com, don.engen@cnpl.enbridge.com
cc: abdiwahid.abdirahman@og.ge.com, jason.fisk@og.ge.com, jon.wharf@og.ge.com, david.cammack@og.ge.com
Subject: Vendor list Update 030717
Expire On:

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We tried to best fit these issues within the workload we have currently in our hands, if you think the priority should change due to any particular reason please let us know and we can re-work these dates accordingly.

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I hope this is to your satisfaction, on the contrary please feel free to let me know and again we can together work out a more suitable schedule.

Best regards,

> g GE Power Systems
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> Oil & Gas
>
> _____
> Michel Hoyeck
> Project Manager
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> PII (Canada) Ltd
> 1003 - 11th Street S.W.
> Calgary, Alberta, Canada, T2R 1G2
> Direct ++ 1 (403) 806-0265
> Fax ++ 1 (403) 237-9693
> Cell ++ 1 (403) 650-4300
> Email michel.hoyeck@og.ge.com
Web www.gepower.com

<<030717_Update_PII_Interpretation_ Vendor Issues1.xls>>



030717 Update PII Interpretation Vendor Issue:

> Cell ++ 1 (403) 650-4300
> Email michel.hoyeck@og.ge.com
Web www.gepower.com

<<030717_Update_PII_Interpretation_ Vendor Issues1.xls>>



030717 Update PII Interpretation Vendor Issue:



Don L Engen
07/18/2003 03:32 PM

To: Adam J Erickson/LPL,
cc: Mike D Goman/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, Pipeline Integrity DMS@IPL
cc:
Subject: Re: ROV Survey - Week of July 28?<PRG.LINE05.20".straits.ml-03>
Expire On:

Adam,

It looks like the earliest PII will be able to give us a report with girth weld assessment will be July 31. I'll check for any changes on Monday and let you know at Tuesday's meeting.

Don

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/18/2003 03:32 PM -----

From: Don L Engen on 07/17/2003 04:14 PM

To: Adam J Erickson/LPL@LPL
cc: Mike D Goman/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, Pipeline Integrity DMS@IPL
Subject: Re: ROV Survey - Week of July 28?<PRG.LINE05.20".straits.ml-03>

PII received the MFL data on Tuesday, July 15. They are currently assessing the data and will let me know the earliest they can have a report to us. They will likely have their UK office perform some checks with regards to the circ welds the same as they did last time. This may be where things get delayed. I hope to have an answer for you on Friday the 18th.

Don Engen
Pipeline Integrity
Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234

Adam J Erickson@LPL

Adam J Erickson@LPL
07/17/2003 11:14 AM

To: Mike D Goman/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL
cc:
Subject: Re: ROV Survey - Week of July 28?
Expire On:

This schedule works for me, the only significant question that I see is whether PI can get the data back in an appropriate timeframe... What do you think Don?

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

----- Forwarded by Adam J Erickson/LPL on 07/17/2003 12:10 PM -----



Trent J Nedens <TJNedens@onyxsp.com>
07/17/2003 12:05 PM

To: Mike_D_Goman <Mike_D_Goman/LPL@Enbridge-US.com>
cc: Mark G Berge <MGBerge@onyxsp.com>, adam.erickson@enbridge.com
Subject: Re: ROV Survey - Week of July 28?

Lance Birdsall will not be able to attend this meeting.

As far as the survey goes, we will need 4 days minimum for the ROV survey of the West Line. We also need 2 days total to reconfigure the equipment from the barge spread onto the boat and back again once the surveying is complete.

In addition, we still need address the current profilers. I estimate it will take 3 to 4 days to recover the four profilers, download the collected data, re-format the profiler settings, and re-deploy them on the bottom.

Given the dates you have laid out, we would like to suggest the following schedule:

July 23rd - Mobilize Survey Crew to Mackinac
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August 3rd - Mobilize Dive Crews
August 4th - Setup Dive spread for anchor installations
August 5th thru ??? - Install anchors

Both Mark and I will be available to discuss the schedule today and tomorrow. If either of us are not in the office, we can be reach via cell at (920) 960-6072 (mark) & (920) 960-6053 (trent). Thanks...



Don L Engen

07/17/2003 03:42 PM

To: Adam J Erickson/LPL@LPL
cc: Mike D Goman/LPL@LPL, Dave B McNeill/CNPL/Enbridge, Garrett Wilkie/CNPL/Enbridge, Christine L Neff/CNPL/Enbridge, Pipeline Integrity DMS
cc: Mike D Goman/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL
Subject: Re: ROV Survey - Week of July 28?
Expire On:

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Don Engen
Pipeline Integrity
Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234

Adam J Erickson@LPL

Adam J Erickson@LPL

07/17/2003 11:14 AM

To: Mike D Goman/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL
cc:
Subject: Re: ROV Survey - Week of July 28?
Expire On:

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Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

----- Forwarded by Adam J Erickson/LPL on 07/17/2003 12:10 PM -----



Trent J Nedens <TJNedens@onyxsp.com>

07/17/2003 12:05 PM

To: Mike_D_Goman <Mike_D_Goman/LPL@Enbridge-US.com>
cc: Mark G Berge <MGBerge@onyxsp.com>, adam.erickson@enbridge.com
Subject: Re: ROV Survey - Week of July 28?

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August 4th - Setup Dive spread for anchor installations
August 5th thru ??? - Install anchors

Both Mark and I will be available to discuss the schedule today and tomorrow. If either of us are not in the office, we can be reach via cell at (920) 960-6072 (mark) & (920) 960-6053 (trent). Thanks...

Don L Engen
07/17/2003 12:15 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Mackinaw Station Pig Run Density<PRG.LINE05.20".straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/17/2003 12:15 PM -----

Blake C Olson@LPL
07/16/2003 08:39 AM

To: Adam J Erickson/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL
cc:
Subject: Mackinaw Station Pig Run Density
Expire On:

Immediately before the Geopig was launched from mile post 1475 on 7/12 into the west 20 inch line the density at Mackinaw Station was 856.5 with a temperature of 15 degrees C. The time was about 06:00 MST.

I hope this was what you requested. The line operator thought the density was needed at Mackinaw to make sure he didn't lock in NGL in the east 20" leg when he isolated it before the launch into the west 20 inch.

Thanks,
Blake

Don L Engen
07/17/2003 12:08 PM

To: Dave B McNeill/CNPL/Enbridge, Garrett Wilkie/CNPL/Enbridge,
cc: Pipeline Integrity DMS
cc:
Subject: Line 5 (20") Geopig Field Report<PRG.LINE05.20".straits.geo-03>
Expire On:

BJ Field Report for West Strait.
----- Forwarded by Don L Engen/CNPL/Enbridge on 07/17/2003 12:08 PM -----

jfalk@bjservices.ca
07/15/2003 05:33 PM

To: Don.Engen@enbridge.com
cc: pwicons@earthlink.net
Subject: Line 5 (20") Geopig Field Report
Expire On:

Attached is the field letter from the successful GEOPIG inspection. If you have any questions please don't hesitate to contact me.

Thank you for your help with this inspection.

(See attached file: Enbridge Mackinac West Geopig Field Report.doc)
==========

Joel Falk
BJ Pipeline Inspection Services
Calgary, AB
ph. 403-531-5469

Enbridge Mackinac West Geopig Field Report

Pipeline Inspection Services

Field Operations Report

Enbridge Pipelines Inc.
10201 Jasper Ave
Edmonton, AB
T5J 3N7

July 12, 2003

Attention: Don Engen

Re: Field Operations Report for Mechanical Caliper Inspection of Enbridge NPS 20 Pipeline (Line 5 Straits of Mackinac - West)

Dear Mr. Engen,

The following field report describes the preliminary analysis of the data collected by the BJ Geopig tool during the inspection of Enbridge Pipelines' NPS 20 Line 5 – Straits of Mackinac (West) on July 12, 2003.

The Geopig was launched at 06:57 MST on July 12 and arrived at the receive trap about 1 hour later. After removal from the receive trap the data was downloaded and analyzed.

The Geopig collected good quality data from all sensors (caliper, inertial, odometer, pressure and temperature) for the entire run, which will allow contract contract specifications to be met. Preliminary analysis of the caliper data revealed no pipe wall anomalies larger than 5% O.D

We would like to take this opportunity to thank Enbridge Pipelines for their outstanding support during this job. If you have any comments or questions please feel free to contact us at your convenience.

Sincerely,
Per. BJ Pipeline Inspection Services

Joel Falk
Project Leader



Don L Engen
07/17/2003 09:15 AM

To: Pipelilne Integrity DMS
cc:
cc:
Subject: Re: Straits of Mackinac Meeting<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/17/2003 09:15 AM -----

Adam J Erickson@LPL
07/15/2003 10:15 AM

To: Al V Aleknavicius/LPL@LPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, Dave S Lawson/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Grant P Henningsen/LPL@LPL, Jill M Schubert/LPL@LPL, Larry Mersnick/US/Enbridge@LPL, Mark S Sitek/LPL@LPL, Mike D Goman/LPL@LPL, Walter J Kresic/CNPL/Enbridge@IPL
cc:
Subject: Re: Straits of Mackinac Meeting
Expire On:

As discussed in our meeting today (Mike, you missed it).
Pig runs were completed successfully, with PI's estimate of August 1st for return of data.
140'/195' criteria will be used for the West Line
Adam suggested advancing ROV inspection possibly to the week of July 28th. Before this can be considered a few hurdles would have to be overcome

1. Do we have enough rate left in July to shutdown the west leg if necessary? Christine Neff examine.
2. Can we get the pig data back in time with adequate time to review it. Don Engen to follow up.
3. Can operations arrange the work to happen in this timeframe. Mike Goman to follow up.

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

Adam J Erickson
07/14/2003 04:37 PM

To: Al V Aleknavicius/LPL@LPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Grant P Henningsen/LPL@LPL, Jill M Schubert/LPL@LPL, Larry Mersnick/US/Enbridge@LPL, Mark S Sitek/LPL@LPL, Mike D Goman/LPL@LPL, Dave S Lawson/CNPL/Enbridge, Walter J Kresic/CNPL/Enbridge@IPL
cc:
Subject: Re: Straits of Mackinac Meeting
File Database: File:
Would you like the recipient to view the FILING info? ○ Yes ● No

We will be having our weekly Tuesday 10:00 Central Straits of Mackinac meeting tomorrow. Please attend as you see fit. I expect 30 minutes or less.

Agenda Items:
Pig Run Status
Update of Technical Criteria
Schedule

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

Adam J Erickson
07/08/2003 08:35 AM

To: Larry Mersnick/US/Enbridge, Don L Engen/CNPL/Enbridge, Grant P Henningsen/LPL, Al V Aleknavicius/LPL, Dave B McNeill/CNPL/Enbridge, Jill M Schubert/LPL, Mike D Goman/LPL, Garrett Wilkie/CNPL/Enbridge, Dale D Wascherol/CNPL/Enbridge, Christine L Neff/CNPL/Enbridge
cc: Walter J Kresic/CNPL/Enbridge@IPL, Scott A McEachern/LPL@LPL, Mark S Sitek/LPL@LPL
Subject: Straits of Mackinac Meeting
File Database: File:
Would you like the recipient to view the FILING info? ○ Yes ● No

In light of the cancelled meeting last week, this note serves to re-confirm this mornings weekly 10:00 Central Straits of Mackinac Meeting. The dial in number will be 18005032899 access code 7250548. The subject of this meeting will be a wrap up of the first round of repairs, and discussion on scheduling of the West line activities.

Adam

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

Don L Engen
07/17/2003 09:17 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Re: Straits of Mackinac Meeting<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/17/2003 09:17 AM -----

Christine L Neff
07/15/2003 10:20 AM

To: Adam J Erickson/LPL@LPL
cc: Al V Aleknavicius/LPL@LPL, Dale D Wascherol/CNPL/Enbridge@ipl, Dave B McNeill/CNPL/Enbridge@ipl, Dave S Lawson/CNPL/Enbridge@ipl, Don L Engen/CNPL/Enbridge@ipl, Garrett Wilkie/CNPL/Enbridge@ipl, Grant P Henningsen/LPL@LPL, Jill M Schubert/LPL@LPL, Larry Mersnick/US/Enbridge@LPL, Mark S Sitek/LPL@LPL, Mike D Goman/LPL@LPL, Walter J Kresic/CNPL/Enbridge@ipl, Helen J Loo/CNPL/Enbridge@IPL, Judy C Kalian/CNPL/Enbridge@IPL, Bryan J Walbauer/CNPL/Enbridge@IPL, David W Bryson/CNPL/Enbridge@IPL
Subject: Re: Straits of Mackinac Meeting
Expire On:

I have confirmed that we could accommodate operation through one leg beginning July 28, if required.

Christine
Adam J Erickson@LPL

Adam J Erickson@LPL
07/15/2003 10:15 AM

To: Al V Aleknavicius/LPL@LPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, Dave S Lawson/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Grant P Henningsen/LPL@LPL, Jill M Schubert/LPL@LPL, Larry Mersnick/US/Enbridge@LPL, Mark S Sitek/LPL@LPL, Mike D Goman/LPL@LPL, Walter J Kresic/CNPL/Enbridge@IPL
cc:
Subject: Re: Straits of Mackinac Meeting
Expire On:

As discussed in our meeting today (Mike, you missed it).
Pig runs were completed successfully, with PI's estimate of August 1st for return of data.
140'/195' criteria will be used for the West Line
Adam suggested advancing ROV inspection possibly to the week of July 28th. Before this can be considered a few hurdles would have to be overcome

1. Do we have enough rate left in July to shutdown the west leg if necessary? Christine Neff examine.
2. Can we get the pig data back in time with adequate time to review it. Don Engen to follow up.
3. Can operations arrange the work to happen in this timeframe. Mike Goman to follow up.

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

Adam J Erickson

07/14/2003 04:37 PM

To: Al V Aleknavicius/LPL@LPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Grant P Henningsen/LPL@LPL, Jill M Schubert/LPL@LPL, Larry Mersnick/US/Enbridge@LPL, Mark S Sitek/LPL@LPL, Mike D Goman/LPL@LPL, Dave S Lawson/CNPL/Enbridge, Walter J Kresic/CNPL/Enbridge@IPL

cc:

Subject: Re: Straits of Mackinac Meeting

File Database: File:

Would you like the recipient to view the FILING info? ○ Yes ● No

We will be having our weekly Tuesday 10:00 Central Straits of Mackinac meeting tomorrow. Please attend as you see fit. I expect 30 minutes or less.

Agenda Items:
Pig Run Status
Update of Technical Criteria
Schedule

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

Adam J Erickson

07/08/2003 08:35 AM

To: Larry Mersnick/US/Enbridge, Don L Engen/CNPL/Enbridge, Grant P Henningsen/LPL, Al V Aleknavicius/LPL, Dave B McNeill/CNPL/Enbridge, Jill M Schubert/LPL, Mike D Goman/LPL, Garrett Wilkie/CNPL/Enbridge, Dale D Wascherol/CNPL/Enbridge, Christine L Neff/CNPL/Enbridge

cc: Walter J Kresic/CNPL/Enbridge@IPL, Scott A McEachern/LPL@LPL, Mark S Sitek/LPL@LPL

Subject: Straits of Mackinac Meeting

File Database: File:

Would you like the recipient to view the FILING info? ○ Yes ● No

In light of the cancelled meeting last week, this note serves to re-confirm this mornings weekly 10:00 Central Straits of Mackinac Meeting. The dial in number will be 18005032899 access code 7250548. The subject of this meeting will be a wrap up of the first round of repairs, and discussion on scheduling of the West line activities.

Adam

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

Adam J Erickson@LPL

07/14/2003 03:37 PM

To: Al V Aleknavicius/LPL@LPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Grant P Henningsen/LPL@LPL, Jill M Schubert/LPL@LPL, Larry Mersnick/US/Enbridge@LPL, Mark S Sitek/LPL@LPL, Mike D Goman/LPL@LPL, Dave S Lawson/CNPL/Enbridge@IPL, Walter J Kresic/CNPL/Enbridge@IPL

cc:

Subject: Re: Straits of Mackinac Meeting

Expire On:

We will be having our weekly Tuesday 10:00 Central Straits of Mackinac meeting tomorrow. Please attend as you see fit. I expect 30 minutes or less.

Agenda Items:
Pig Run Status
Update of Technical Criteria
Schedule

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

Adam J Erickson

07/08/2003 08:35 AM

To: Larry Mersnick/US/Enbridge, Don L Engen/CNPL/Enbridge, Grant P Henningsen/LPL, Al V Aleknavicius/LPL, Dave B McNeill/CNPL/Enbridge, Jill M Schubert/LPL, Mike D Goman/LPL, Garrett Wilkie/CNPL/Enbridge, Dale D Wascherol/CNPL/Enbridge, Christine L Neff/CNPL/Enbridge

cc: Walter J Kresic/CNPL/Enbridge@IPL, Scott A McEachern/LPL@LPL, Mark S Sitek/LPL@LPL

Subject: Straits of Mackinac Meeting

File Database: File:

Would you like the recipient to view the FILING info? ○ Yes ● No

In light of the cancelled meeting last week, this note serves to re-confirm this mornings weekly 10:00 Central Straits of Mackinac Meeting. The dial in number will be 18005032899 access code 7250548. The subject of this meeting will be a wrap up of the first round of repairs, and discussion on scheduling of the West line activities.

Adam

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405



Don L Engen
07/10/2003 11:02 AM

To: pwicons@earthlink.net, jfalk@bjservices.ca, frank.buchanan@og.ge.com, dlatto@bjservices.ca, djungwirth@bjservices.ca, bryan.pinkerton@og.ge.com, brian@axiompipe.com
cc: Pipeline Integrity DMS
cc:
Subject: Line 5 (20")Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg * Rev. 3<PRG.LINE05.20".straits.ml-03>
Expire On:

Revised message to clarify isolation of piping. No changes to launch or receive times.

Don
----- Forwarded by Don L Engen/CNPL/Enbridge on 07/10/2003 11:02 AM -----

Christine L Neff
07/10/2003 10:33 AM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL, Grant P Henningsen/LPL@LPL, Donald Tennant/US/Enbridge@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Peter T Olson/LPL@LPL, MBS Support
cc:
Subject: Line 5 (20")Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg <5>* Rev. 3
Expire On:

*Revision 3 - issued to clarify isolation
*Revision 2 - issued to update procedure and times
*Revision 1 - issued to change date

ed CCO Coordinator
Line 5 Operator

Line 5 (20") Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - **West** leg
{0600 MST July 11 to 0800 MST July 11}
~~~~~~~~~~~~~~~~~~~~~~~~~~

Proceed with plans to run a caliper tool in the 20" Line 5 **West** leg of the straits crossing to MA. The run is in preparation for the upcoming MFL/geopig tool run. The caliper run does require continuous flow. In order to maintain a consistent, predictable flow rate on the tools, the east leg will be isolated immediately prior to the tool launch and will be returned to service following the landing of the tool. In order to avoid contamination or degradation, this run is batch dependent. The tool will be launched in SLE-962-0. The tool must be launched at least 2000m3 from the head of the batch to ensure that there is SLE through the straits prior to the east leg isolation. The tool must be launched no closer than 2500m3 upstream of the tail of to batch to ensure that the de-isolation can occur prior to the SLE clearing the straits. The run will be completed while SLE is across both straits.

The Line 5 Operator is requested to shutdown the line to isolate the east strait, when batches are in position. The line can be re-started with the strait isolated and then the tool launched. Line 5 Operator is requested to page MBS Support prior to start up. CMT changes should not be required.

The caliper tool (5MA1) will be launched from MP 1475 at 0500/11. The tools cannot be launched in an NGL or buffer batch. As of 1400MST July 9, SLE-962-0 is scheduled across the straits from 0500/11 to 1000/11.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction
~~~~~~~~~~~~~~~~~~~~~~~~~~

transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

The East leg of the Straits will be isolated during this run, so the flow will be completely in the west leg.

Field personnel shall report to the Edmonton Control Center the location of the pig upon launching and prior to the pig landing.

Provided below is the estimated schedule for the run.

			5MA1 - Caliper Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time
	1475		0600/11	
MA	1479	1650 m3	0730/11	

*All times are listed in MST.

Please contact me with any questions.

Christine Neff (780)420-5204.



Don L Engen
07/10/2003 11:21 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Line 5 - Straits of Mackinac West Loop Activation<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/10/2003 11:21 AM -----

Christine L Neff
07/10/2003 10:45 AM

To: CCO Field Work, Mike D Goman/LPL@LPL, Dan W Klarner/LPL@LPL, Adam J Erickson/LPL@LPL, Grant P Henningsen/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, MBS Support, CMT Support
cc: Allan D Baumgartner/CNPL/Enbridge@IPL, David W Bryson/CNPL/Enbridge@IPL, Paul F Bagnall/CNPL/Enbridge@IPL
Subject: Line 5 - Straits of Mackinac West Loop Activation<5>
Expire On:

ed CCO Coordinator
Line 5 Operator

Line 5 - Straits of Mackinac West Loop Activation
{1000 MST July 10 to 1100 MST July 10}

This message outlines the procedure for activating the west loop of the Straights of Mackinac crossing.

As NGL is currently isolated within the west loop, the loop must be activated once another batch of NGL is across the Straits. The head of NGL-717-0 is scheduled to arrive at MA station at approximately 0200 MST July 10.

Once NGL is fully across the straits, the Line 5 operator is requested to shut down the line. The Line 5 operator is requested to open valves such that normal operations can resume through both the east and west loop of the Straits of Mackinac crossing. CMT and MBS support should be contacted to reflect this change. Any local valves (pig trap, etc) that were closed as part of the deactivation should be confirmed open by field personnel prior to restarting pipeline. Line 5 can then be re-started once CMT, MBS changes and field confirmations have been completed.

Once the line has been restarted, the Operating Capacity will return to 76,400 m3 as quoted in the, Monthly Capacity Calculations memo issued by Facilities Management.

Please contact me with any questions.

Christine Neff (780)420-5204.

ECC Checklist
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Notification received from field personnel:

Time:
Contact:

NGL in position:

Time:

MBS notified:
~~~~~~~~~~

Time:

CMT changes completed and volume has returned to 3250 m3:

Time:
Operator



Don L Engen
07/10/2003 11:02 AM

To: pwicons@earthlink.net, jfalk@bjservices.ca, frank.buchanan@og.ge.com, dlatto@bjservices.ca, djungwirth@bjservices.ca, bryan.pinkerton@og.ge.com, brian@axiompipe.com
cc: Pipeline Integrity DMS
cc:
Subject: Line 5 (20")Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg * Rev. 3<PRG.LINE05.20".straits.ml-03>
Expire On:

Revised message to clarify isolation of piping. No changes to launch or receive times.

Don
----- Forwarded by Don L Engen/CNPL/Enbridge on 07/10/2003 11:02 AM -----

Christine L Neff
07/10/2003 10:33 AM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL, Grant P Henningsen/LPL@LPL, Donald Tennant/US/Enbridge@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Peter T Olson/LPL@LPL, MBS Support
cc:
Subject: Line 5 (20")Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg <5>* Rev. 3
Expire On:

*Revision 3 - issued to clarify isolation
*Revision 2 - issued to update procedure and times
*Revision 1 - issued to change date

ed CCO Coordinator
Line 5 Operator

Line 5 (20") Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - **West** leg
{0600 MST July 11 to 0800 MST July 11}
~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Proceed with plans to run a caliper tool in the 20" Line 5 **West** leg of the straits crossing to MA. The run is in preparation for the upcoming MFL/geopig tool run. The caliper run does require continuous flow. In order to maintain a consistent, predictable flow rate on the tools, the east leg will be isolated immediately prior to the tool launch and will be returned to service following the landing of the tool. In order to avoid contamination or degradation, this run is batch dependent. The tool will be launched in SLE-962-0. The tool must be launched at least 2000m3 from the head of the batch to ensure that there is SLE through the straits prior to the east leg isolation. The tool must be launched no closer than 2500m3 upstream of the tail of to batch to ensure that the de-isolation can occur prior to the SLE clearing the straits. The run will be completed while SLE is across both straits.

The Line 5 Operator is requested to shutdown the line to isolate the east strait, when batches are in position. The line can be re-started with the strait isolated and then the tool launched. Line 5 Operator is requested to page MBS Support prior to start up. CMT changes should not be required.

The caliper tool (5MA1) will be launched from MP 1475 at 0500/11. The tools cannot be launched in an NGL or buffer batch. As of 1400MST July 9, SLE-962-0 is scheduled across the straits from 0500/11 to 1000/11.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction
~~~~~~~~~~~~~~~~~~~~~~~~~~~~

transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

The East leg of the Straits will be isolated during this run, so the flow will be completely in the west leg.

Field personnel shall report to the Edmonton Control Center the location of the pig upon launching and prior to the pig landing.

Provided below is the estimated schedule for the run.

			5MA1 - Caliper Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time
	1475		0600/11	
MA	1479	1650 m3	0730/11	

*All times are listed in MST.

Please contact me with any questions.

Christine Neff (780)420-5204.



Don L Engen
07/09/2003 04:27 PM

To: pwicons@earthlink.net, jfalk@bjservices.ca, frank.buchanan@og.ge.com, dlatto@bjservices.ca, djungwirth@bjservices.ca, bryan.pinkerton@og.ge.com, brian@axiompipe.com
cc: Pipeline Integrity DMS
cc:
Subject: Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinac - MP 1075 to MA - West leg <5>*Rev. 3
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/09/2003 04:27 PM -----

Christine L Neff
07/09/2003 03:31 PM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL, Grant P Henningsen/LPL@LPL, Donald Tennant/US/Enbridge@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Peter T Olson/LPL@LPL, MBS Support
cc:
Subject: Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinac - MP 1075 to MA - West leg <5>*Rev. 3
Expire On:

*Revision 3 - issued to update times and method
*Revision 2 - issued to update times and method

ed CCO Coordinator
Line 5 Operator

Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinac - MP 1075 to MA - **West** leg
{0500 MST July 12 to 1000 MST July 12}
~~~~~~~~~~~~~~~~~~~~~~~~~~

Proceed with plans to run a Geopig tool and an MFL tool in the 20" Line 5 **West** leg of the straits crossing to MA. This run does require continuous flow. In order to maintain a consistent, predictable flow rate on the tools, the east leg will be isolated immediately prior to the first tool launch and will be returned to service following the landing of the second tool. In order to avoid contamination or degradation, this run is batch dependent. Both tools will be launched in HSB, batches HSB-854-0 and HSB-855-0. The first tool must be launched at least 2000m3 from the head of HSB-854-0 to ensure that there is HSB through the straits prior to the east leg isolation. The second tool must be launched no closer than 2500m3 upstream of the tail of HSB-855-0. The run will be completed while HSB is across both straits.

The Line 5 Operator is requested to shutdown the line to isolate the east strait, when batches are in position. The line can be re-started with the strait isolated and then the tool launched. Line 5 Operator is requested to page MBS Support prior to start up. CMT changes should not be required.

The MFL tool (5MA2) will be launched from MP 1475 at 0500/12. The Geopig tool (5MA3) will be launched as soon at the MFL tool has landed. The tools cannot be launched in an NGL or buffer batch.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

These tools are highly sensitive to line rate. In order to preserve data quality, the line 5 operator is requested to slow the line to minimum rate (1200m3/hr) prior to the tool launch and return to scheduled
~~~~~~~~~~~~~~~~~~~~~~~~~~

rate when the tool lands.

Field personnel shall report to the Edmonton Control Center the location of the pigs upon launching and prior to the pig landing.

Provided below is the estimated schedule for the run.

			5MA2 - Geopig Tool		5MA3 - MFL Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time	Estimated Time	Actual Time
	1475		0500/12		0800/12	
MA	1479	1650 m3	0630/12		0930/12	

*All times are listed in MST.

Please contact me with any questions.

Christine Neff (780)420-5204.

Don L Engen
07/09/2003 04:25 PM

To: pwicons@earthlink.net, jfalk@bjservices.ca, frank.buchanan@og.ge.com, dlatto@bjservices.ca, djungwirth@bjservices.ca, bryan.pinkerton@og.ge.com, brian@axiompipe.com
cc: Pipeline Integrity DMS
cc:
Subject: Line 5 (20")Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg * Rev. 2<PRG.LINE05.20".straits.ml-03>
Expire On:

Latest update for launch \ receive times for the CTool.

Don
----- Forwarded by Don L Engen/CNPL/Enbridge on 07/09/2003 04:25 PM -----

Christine L Neff
07/09/2003 03:31 PM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL, Grant P Henningsen/LPL@LPL, Donald Tennant/US/Enbridge@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Peter T Olson/LPL@LPL, MBS Support
cc:
Subject: Line 5 (20")Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg <5>* Rev. 2
Expire On:

*Revision 2 - issued to update procedure and times
*Revision 1 - issued to change date

ed CCO Coordinator
Line 5 Operator

Line 5 (20") Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - **West** leg
{0600 MST July 11 to 0800 MST July 11}
~~~~~~~~~~~~~~~~~~~~~~~~~~

Proceed with plans to run a caliper tool in the 20" Line 5 **West** leg of the straits crossing to MA. The run is in preparation for the upcoming MFL/geopig tool run. The caliper run does require continuous flow. In order to maintain a consistent, predictable flow rate on the tools, the east leg will be isolated immediately prior to the tool launch and will be returned to service following the landing of the tool. In order to avoid contamination or degradation, this run is batch dependent. The tool will be launched in SLE-962-0. The tool must be launched at least 2000m3 from the head of the batch to ensure that there is SLE through the straits prior to the east leg isolation. The tool must be launched no closer than 2500m3 upstream of the tail of to batch to ensure that the de-isolation can occur prior to the SLE clearing the straits. The run will be completed while SLE is across both straits.

The Line 5 Operator is requested to shutdown the line to isolate the east strait, when batches are in position. The line can be re-started with the strait isolated and then the tool launched. Line 5 Operator is requested to page MBS Support prior to start up. CMT changes should not be required.

The caliper tool (5MA1) will be launched from MP 1475 at 0500/11. The tools cannot be launched in an NGL or buffer batch. As of 1400MST July 9, SLE-962-0 is scheduled across the straits from 0500/11 to 1000/11.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting
~~~~~~~~~~~~~~~~~~~~~~~~~~

valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

The East leg of the Straits will be in service during this run, so the flow will be split through both legs and the speed in the west leg may be slower.

Field personnel shall report to the Edmonton Control Center the location of the pig upon launching and prior to the pig landing.

Provided below is the estimated schedule for the run.

			5MA1 - Caliper Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time
	1475		0600/11	
MA	1479	1650 m3	0730/11	

*All times are listed in MST.

Please contact me with any questions.

Christine Neff (780)420-5204.

Don L Engen
07/08/2003 10:01 AM

To: Dave B McNeill/CNPL/Enbridge,
cc: Pipeline Integrity DMS
cc:
Subject: West Leg Tentative Schedule<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/08/2003 10:01 AM -----

Mike D Goman@LPL
07/08/2003 09:56 AM

To: "Mark Berge" <MGBERGE@onyxsp.com>, tnedens@onyxsp.com
cc: Adam J Erickson/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Al V Aleknavicius/LPL@LPL, Mark S Sitek/LPL@LPL
Subject: West Leg Tentative Schedule
Expire On:

Hey guys.

Just to keep you in the loop, we're running the smart tools this week (caliper for dents, geopig to get positioning, and MFL for corrosion). We hope to have the data compiled and back to us by the end of July. Based on the results of the East leg, we don't anticipate any corrosion related repairs. The only other repairable defects we're looking for are dents, and we should get a good handle on that this week when we run the caliper tool.

Based on this schedule, we're looking at starting the ROV survey the week of August 4, with repairs commencing immediately after the completion of the survey (or in parallel if the leg is shut in due to the discovery of spans >195'). Our marching orders are still to install anchors on any spans > 140'. Let me know if you have any questions, otherwise we'll talk further on the 22nd. I'll continue to communicate progress/changes so we're all on the same page. Thanks.

Mike Goman
Region Engineer
Enbridge (U.S.) Inc.
Office: 218-759-6622
Cell: 218-766-0608
Fax: 218-751-0344



Don L Engen
07/08/2003 10:43 AM

To: dlatto@bjservices.ca
cc: Pipeline Integrity DMS, Dave B McNeill/CNPL/Enbridge,
cc: Don.Engen@enbridge.com
Subject: Re: Mackinaw Straits
Expire On:

Hi Dave,

Yes, I was aware standby would be in effect. At this time Saturday is still looking good.

Regards,

Don Engen
Pipeline Integrity
Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234
dlatto@bjservices.ca



dlatto@bjservices.ca
07/08/2003 10:23 AM

To: Don.Engen@enbridge.com
cc:
Subject: Mackinaw Straits
Expire On:

Don

I received the revised schedule and as per the contract, we will be on 'standby' as of Wednesday morning (24 hours after initial start time). The contract rates for standby will apply.

Hopefully everything will be okay for Saturday.

Regards,

Dave Latto
Technical Sales Representative
BJ Pipeline Inspection Services
Tel: 403-531-7625
Cell: 403-815-4463
Fax: 403-236-8740

AFE No.	Page of
File No.	Date 07-08-03
Designed by	Checked by

ENBRIDGE
Enbridge Pipelines Inc.

Subject: LINE 5 (20") STRAITS.

ADAM ERICKSON, CHRISTINE NEFF, D.E., MIKE GORMAN
AL ALEKNAVICIUS.

- Repairs are all complete. 7 supports installed. Looking at about the same # on the West side.
- Going with span length based repairs.
- After runs are done, plan on ROV work week of August 4th.
- Reports - BJ, PII have 3 weeks to deliver. Criteria - 195' span. requires repair. unless there is corrosion or a dent.
- Take crude samples at launch and receive for density / temp - for stresses and strains. Do on site - Bob Pollock, Superior -
- Blake Olson, - may be equipment at Rapid River. - for pigging.

ENG 02/09/98

Adam J Erickson@LPL

07/08/2003 07:35 AM

To: Larry Mersnick/US/Enbridge@LPL, Don L Engen/CNPL/Enbridge@IPL, Grant P Henningsen/LPL@LPL, Al V Aleknavicius/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Jill M Schubert/LPL@LPL, Mike D Goman/LPL@LPL, Garrett Wilkie/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL
cc: Walter J Kresic/CNPL/Enbridge@IPL, Scott A McEachern/LPL@LPL, Mark S Sitek/LPL@LPL
Subject: Straits of Mackinac Meeting
Expire On:

In light of the cancelled meeting last week, this note serves to re-confirm this mornings weekly 10:00 Central Straits of Mackinac Meeting. The dial in number will be 18005032899 access code 7250548. The subject of this meeting will be a wrap up of the first round of repairs, and discussion on scheduling of the West line activities.

Adam

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

Don L Engen
07/08/2003 08:24 AM

To: Pipleine Integrity DMS
cc:
cc:
Subject: Line 5 - Isolation of the West Leg of the Straits of Mackinac*Rev. 1<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/08/2003 08:24 AM -----

Christine L Neff
07/07/2003 11:43 AM

To: CCO Field Work, Mike D Goman/LPL@LPL, Dan W Klarner/LPL@LPL, Adam J Erickson/LPL@LPL, Grant P Henningsen/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, MBS Support, CMT Support
cc: Allan D Baumgartner/CNPL/Enbridge@IPL, David W Bryson/CNPL/Enbridge@IPL, Paul F Bagnall/CNPL/Enbridge@IPL
Subject: Line 5 - Isolation of the West Leg of the Straits of Mackinac<5>*Rev. 1
Expire On:

*Revision 1 - issued to update times

ed CCOC
Line 5 Operator

Line 5 (20") - West Leg of the Straits of Mackinac
{0500 MST July 6 to 0100 MST July 10}

Proceed with plans to isolate the West leg of the Straits of Mackinac. This section will be isolated with NGL-716-0 and valves at both ends will be closed. This isolation is required to facilitate tool runs. The leg will remain isolated until NGL-717-0 is across the straits. A separate note will be issued to reactivate this piping.

This work will limit the rate to 2000m3/hr.

Line 5 operator is requested to page MBS Support and CMT Support to reflect the isolation of this leg in the MBS model and CMT linefill volume. The volume of NGL-716-0 will also need to be reduced in CMT by 1625m3 to reflect the section idled in the west leg.

Please contact me with any questions.

Christine Neff (780)420-5204.



Don L Engen
07/07/2003 03:53 PM

To: jfalk@bjservices.ca, frank.buchanan@og.ge.com, dlatto@bjservices.ca, djungwirth@bjservices.ca, bryan.pinkerton@og.ge.com, brian@axiompipe.com
cc: Pipeline Integrity DMS
cc:
Subject: Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinac - MP 1075 to MA - West leg *Rev. 2<PRG.LINE05.20".straits.ml-03>
Expire On:

Updated Geopig and MFL launch \ receive schedule.

Don
----- Forwarded by Don L Engen/CNPL/Enbridge on 07/07/2003 03:53 PM -----

Christine L Neff
07/07/2003 03:07 PM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL, Grant P Henningsen/LPL@LPL, Donald Tennant/US/Enbridge@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Peter T Olson/LPL@LPL
cc:
Subject: Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinac - MP 1075 to MA - West leg <5>*Rev. 2
Expire On:

*Revision 2 - issued to update times and method

ed CCO Coordinator
Line 5 Operator

Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinac - MP 1075 to MA - **West** leg
{0400 MST July 12 to 1000 MST July 12}
~~~~~~~~~~~~~~~~~~~~~~~~~~

Proceed with plans to run a Geopig tool and an MFL tool in the 20" Line 5 **West** leg of the straits crossing to MA. This run does require continuous flow. In order to maintain a consistent, predictable flow rate on the tools, the east leg will be isolated immediately prior to the first tool launch and will be returned to service following the landing of the second tool. In order to avoid contamination or degradation, this run is batch dependent. Both tools will be launched in HSB, batches HSB-854-0 and HSB-855-0. The first tool must be launched at least 2000m3 from the head of HSB-854-0 to ensure that there is HSB through the straits prior to the east leg isolation. The second tool must be launched no closer than 2500m3 upstream of the tail of HSB-855-0. The run will be completed while HSB is across both straits.

The MFL tool (5MA2) will be launched from MP 1475 at 0400/12. The Geopig tool (5MA3) will be launched as soon at the MFL tool has landed. The tools cannot be launched in an NGL or buffer batch.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

These tools are highly sensitive to line rate. In order to preserve data quality, the line 5 operator is requested to slow the line to minimum rate (1200m3/hr) prior to the tool launch and return to scheduled rate when the tool lands.

Field personnel shall report to the Edmonton Control Center the location of the pigs upon launching and prior to the pig landing.
~~~~~~~~~~~~~~~~~~~~~~~~~~

Provided below is the estimated schedule for the run.

			5MA2 - Geopig Tool		5MA3 - MFL Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time	Estimated Time	Actual Time
	1475		0400/12		0600/12	
MA	1479	1650 m3	0530/12		0730/12	

*All times are listed in MST.

Please contact me with any questions.

Christine Neff (780)420-5204.



Don L Engen
07/07/2003 04:05 PM

To: jfalk@bjservices.ca, frank.buchanan@og.ge.com, dlatto@bjservices.ca, djungwirth@bjservices.ca, bryan.pinkerton@og.ge.com, brian@axiompipe.com
cc: Pipeline Integrity DMS
cc:
Subject: Line 5 (20")Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg * Rev. 1<PRG.LINE05.20".straits.ml-03>
Expire On:

Updated CTool launch and receive schedule.

Don
----- Forwarded by Don L Engen/CNPL/Enbridge on 07/07/2003 04:05 PM -----

Christine L Neff
07/07/2003 03:13 PM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL, Grant P Henningsen/LPL@LPL, Donald Tennant/US/Enbridge@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Peter T Olson/LPL@LPL
cc:
Subject: Line 5 (20")Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg <5>* Rev. 1
Expire On:

Revision1 - issued to change date

ed CCO Coordinator
Line 5 Operator

Line 5 (20") Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - **West** leg
{0500 MST July 11 to 0700 MST July 11}
~~~~~~~~~~~~~~~~~~~~~~~~~~

Proceed with plans to run a caliper tool in the 20" Line 5 **West** leg of the straits crossing to MA. The run is in preparation for the upcoming MFL/geopig tool run. The caliper run does require continuous flow.

The caliper tool (5MA1) will be launched from MP 1475 at 0500/11. The tools cannot be launched in an NGL or buffer batch. As of 1400MST July7, there is crude scheduled accross the straits from 1930/10 to 0730/11.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

The East leg of the Straits will be in service during this run, so the flow will be split through both legs and the speed in the west leg may be slower.

Field personnel shall report to the Edmonton Control Center the location of the pig upon launching and prior to the pig landing.

Provided below is the estimated schedule for the run.

			5MA1 - Caliper Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time
~~~~~~~~~~~~~~~~~~~~~~~~~~

	1475		0500/11	
MA	1479	1650 m3	0700/11	

*All times are listed in MST.

Please contact me with any questions.

Christine Neff (780)420-5204.

AFE No.	Page of
File No.	Date 07-07-03
Designed by	Checked by

ENBRIDGE
Enbridge Pipelines Inc.

Subject: LINE 5 - WEST STRAITS. - Christine

July 10th - 1700 MST -
1800 - 2200
- land CTool @ 1830, receive

3 batches - 1800 hrs July 10th to 0500 -
July 11th. CTool - SW.

July 12th. MFL ~~and~~ Geopig
HSB - MFL land @ 01:30 MST,
1630 - option / MFL -
SYN.

July 12th
0130 - ~0500 HSB. 0130 - ~~1000~~
1630 - 2000. SYN. 1630 - ~~2400~~

Standby - PII - Crew and Tool - $6666.67/day

BJ - Tool $7500/day
Crew $ $2350/day

7 days PII - $6666.67 × 7 = $46,662
BJ - $7500 + $2350 × 7 = $69,950
~~162~~
$115,612

Orion - $700/day = $5000
$120,000

5 days - PII - $33,330
BJ - $39,850
Orion - 4 days - ~~2,800~~
~~$76,180~~ $75,980
$76,000

4 days Orion = 8000 US × 4 = $3200.
BJ = 9850 US/day × 4 = $39,400
PII = $6,666 US/day = $26,664

ENG 02/09/98

Martha Vega-Smith

07/04/2003 12:25 PM

To: jordan@axiompipe.com, Pipeline Integrity DMS@IPL, Pipeline Integrity
cc:
Subject: Line 5-20" Straits of Mackinac East & West Leg<PRG.LINE05.20".straits.ml-03>
Expire On:

Jordan, after looking into different sources of information, I would use the following chainages:

North side of Straits (both East and West Legs):
Launching MP 1475.65
There are approximately 130 ft (measured north-south) between the valve u/s of the receiving trap for the 30" line (MLV 1475.63-5-TRV) and the alignment of the traps on the north side for both East and West 20" lines.

South side of Straits (both East and West Legs):
Receiving MP 1479.55
Approximately the same 130ft between line 20" alignment and the first valve d/s of the sending trap for the 30" line (MLV 1479.57-5-TSV).

I believe we can establish these numbers as the ones to be used for these two runs and in the future. If there is a problem with them, please let me know.

We already received the Tracking report for the East Leg. If you agree with the numbers above, this report will have to be adjusted accordingly. And now that I mentioned this report, there is a third timer box listed in between the valves, but does not have time recorded, PII does not have it in their marker list, should we be using this site or not?

Thanks and have a nice weekend!

Martha Vega-Smith
Excavation Program Assistant
Pipeline Integrity
Ph.: (780) 420-8633
Fax.: (780) 420-5234

Don L Engen
07/04/2003 01:54 PM

To: Leo M Zalaznik/LPL@LPL, John M Grotberg/LPL@LPL, Mike D Goman/LPL@LPL, Adam J Erickson/LPL@LPL, Al V Aleknavicius/LPL@LPL, Rick K Aunet/LPL@LPL, Dennis M Wedan/LPL@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Mike D Burnis/LPL@LPL, Peter T Olson/LPL@LPL, pwicons@earthlink.net, michel.hoyeck@og.ge.com, jordan@axiompipe.com, Donald Tennant/US/Enbridge@LPL, jfalk@bjservices.ca, dlatto@bjservices.ca, djungwirth@bjsevices.ca, bryan.pinkerton@og.ge.com, frank.buchanan@og.ge.com, brian@axiompipe.com
cc: Dave B McNeill/CNPL/Enbridge@IPL, Mark S Sitek/LPL@LPL, Pipeline Integrity DMS@IPL, Gary F Kosch/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, CCO Senior Operators, Doug A Barry/CNPL/Enbridge@IPL, Bryan J Walbauer/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Murray A Chudyk/CNPL/Enbridge@IPL, Doug R Newton/CNPL/Enbridge@IPL, Ashok Anand/CNPL/Enbridge@IPL, Paul W Wandzura/CNPL/Enbridge@IPL, Pipeline Integrity DMS@IPL
cc:
Subject: Line 5 (20 inch) West Straits In - Line Inspection Contact List<PRG.LINE05.20".straits.ml-03>
Expire On:

Attached is the contact list for the upcoming Line 5 (20") inspections on the West Leg of the Straits of Mackinac. Please advise of any additions or deletions required and feel free to distribute the list to any other interested parties.

Thank you.

Don Engen
Pipeline Integrity
Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234



Line 5 (20 inch) Straits of Mackinac, Contact List July 20(

Line 5 (20") Straits of Mackinac
In - Line Inspections - July 2003

Contact List

Enbridge

Edmonton Control Center - Line 5 Operator - (780) 420-8895
Christine Neff - Pipeline Control (780) 420-5204
Paul Wandzura - Pipeline Control - (780) 420-8285

Pipeline Integrity

Don Engen - ILI Coordinator (780) 420-8715 Office
(780) 982-2032 Cell

Don Demich - PWI Consultants Ltd - On Site ILI Coordinator - (763) 381-0245 Office
(612) 940-1040 Cell

Superior Terminal

Rick Aunet - Terminal Supervisor - (715) 398-8322 - Office
(218) 725-6939 - Pager

Dennis Wedan - Assisstant Terminal Supervisor - (715) 398-8323 - Office
(218) 725-21260 - Pager

Ironwood PLM

John Grotberg - Pipeline Maintenance Supervisor - (906) 932-3190 Office
(906) 630-5315 Cell
(906) 222-2086 Pager

Escanaba PLM

Don Tennant - Relief Supervisor (906) 789-1221 Ext 23 Office
(906) 630-9307 Cell

Escanaba Office

Blake Olson - Technical Supervisor - (906) 789-1221 EXT. 15 - Office
(906) 428-2656 - Home
(906) 222-1990 - Pager
(906) 630-2374 - Cell

ENBDNR0007021

Stations

North Straits - (906) 643-8212

Larry Schnurer - Electrical Technician in Charge
(906) 446-3426 - Home
(906) 222-2075 - Pager

Mechanical Coverage

Gary Kayser - Mech.
(906)341-3331 - Home
(906) 222-1979 - Pager

Mackinaw - (231) 436-5760

Peter Olson - Electrical Technician in Charge
(231) 625-9537 - Home
(906) 222-5996 - Pager

Mechanical Coverage

Gary Kayser - Mech.
(906)341-3331 - Home
(906) 222-1979 - Pager

BJ Pipeline Inspection Services - Geopig Tool

Joel Falk - Project Leader - (403) 531-5469 Office
(403) 813-4361 Cell

Mathew Russell - Data Analyst

Dan Jungwirth - (403) 531-5409 Office
(403) 852-1061 Cell

Dave Latto - Technical Sales Rep - (403) 531-7625 Office
(403) 815-4463 Cell

PII (Canada) Limited - MFL Tool

Frank Buchanan - Tech (713) 805 - 2618 Cell
Dave Bolton - Tech

Bryan Pinkerton - Project Manager - (403) 298-0241 Office
(403) 650-3129 Cell

Axiom Pipeline Solutions Inc. - C Tool, Tracking CTool, MFL Tool

Brian Powlousky - (780) 975-1323 Cell

ENBDNR0007022

Don L Engen
07/03/2003 04:08 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg *Rev. 1<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/03/2003 04:08 PM -----

Christine L Neff
07/03/2003 03:57 PM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL, Grant P Henningsen/LPL@LPL, Donald Tennant/US/Enbridge@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Peter T Olson/LPL@LPL
cc:
Subject: Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg <5>*Rev. 1
Expire On:

ed CCO Coordinator
Line 5 Operator

Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinaw - MP 1075 to MA - **West** leg
{0700 MST July 8 to 1400 MST July 8}
~~~~~~~~~~~~~~~~~~~~~~~~~

Proceed with plans to run a Geopig tool and an MFL tool in the 20" Line 5 **West** leg of the straits crossing to MA. This run does require continuous flow.

The Geopig tool (5MA2) will be launched from MP 1475 at 1400/19. The MFL tool (5MA3) will be launched 2 hours later. The tools cannot be launched in an NGL or buffer batch.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

The East leg of the Straits will be isolated prior to this tool run, so all of the flow will be through the west leg.

These tools are highly sensitive to line rate. In order to preserve data quality, the line 5 operator is requested to slow the line to minimum rate (1200m3/hr) prior to the tool launch and return to scheduled rate when the tool lands.

Field personnel shall report to the Edmonton Control Center the location of the pigs upon launching and prior to the pig landing.

Provided below is the estimated schedule for the run.

			5MA2 - Geopig Tool		5MA3 - MFL Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time	Estimated Time	Actual Time
	1475		0700/8		1300/8	
~~~~~~~~~~~~~~~~~~~~~~~~~

MA	1479	1650 m3	0800/8		1400/8	

*All times are listed in MST.

Please contact me with any questions.

Christine Neff (780)420-5204.



Don L Engen
07/03/2003 04:00 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Line 5 (20")Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg <PRG.LINE05.20".straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/03/2003 04:00 PM -----

Christine L Neff
07/03/2003 03:43 PM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL, Grant P Henningsen/LPL@LPL, Donald Tennant/US/Enbridge@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Peter T Olson/LPL@LPL
cc:
Subject: Line 5 (20")Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - West leg <5>
Expire On:

ed CCO Coordinator
Line 5 Operator

Line 5 (20") Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - **West** leg
{1300 MST July 7 to 1600 MST July 7}
~~~~~~~~~~~~~~~~~~~~~~~~~

Proceed with plans to run a caliper tool in the 20" Line 5 **West** leg of the straits crossing to MA. The run is in preparation for the upcoming MFL/geopig tool run. The caliper run does require continuous flow.

The cleaning tool (5MA1) will be launched from MP 1475 at 1300/7. The caliper tool (5MA2) will be launched 2 hours later. The tools cannot be launched in an NGL or buffer batch.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

The East leg of the Straits will be isolated prior to this tool run, so all of the flow will be through the west leg.

Field personnel shall report to the Edmonton Control Center the location of the pig upon launching and prior to the pig landing.

Provided below is the estimated schedule for the run.

			5MA1 - Caliper Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time
	1475		1300/7	
MA	1479	1650 m3	1400/7	

*All times are listed in MST.

Please contact me with any questions.
~~~~~~~~~~~~~~~~~~~~~~~~~

Christine Neff (780)420-5204.

Don L Engen
07/03/2003 03:43 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Line 5 - Isolation of the West Leg of the Straits of Mackinac<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/03/2003 03:43 PM -----

Christine L Neff
07/03/2003 03:40 PM

To: CCO Field Work, Mike D Goman/LPL@LPL, Dan W Klarner/LPL@LPL, Adam J Erickson/LPL@LPL, Grant P Henningsen/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, MBS Support, CMT Support
cc: Allan D Baumgartner/CNPL/Enbridge@IPL, David W Bryson/CNPL/Enbridge@IPL, Paul F Bagnall/CNPL/Enbridge@IPL
Subject: Line 5 - Isolation of the West Leg of the Straits of Mackinac<5>
Expire On:

ed CCOC
Line 5 Operator

Line 5 (20") - West Leg of the Straits of Mackinac
{0500 MST July 6 to 2100 MST July 9}

Proceed with plans to isolate the West leg of the Straits of Mackinac. This section will be isolated with NGL-716-0 and valves at both ends will be closed. This isolation is required to facilitate tool runs. The leg will remain isolated until NGL-717-0 is across the straits. A separate note will be issued to reactivate this piping.

This work will limit the rate to 2000m3/hr.

Line 5 operator is requested to page MBS Support and CMT Support to reflect the isolation of this leg in the MBS model and CMT linefill volume. The volume of NGL-716-0 will also need to be reduced in CMT by 1625m3 to reflect the section idled in the east leg.

Please contact me with any questions.

Christine Neff (780)420-5204.



dlatto@bjservices.ca

07/03/2003 01:53 PM

To: Don.Engen@enbridge.com
cc: djungwirth@bjservices.ca
Subject: Contact Numbers
Expire On:

Don

In addition to Joel's number which he will confirm later, below are cell and office numbers for myself and Dan

Dave Latto 403-531-7625 Office 403-815-4463 Cell
Dan Jungwirth 403-531-5409 Office 403-852-1061 Cell

Dave

Regards,

Dave Latto
Technical Sales Representative
BJ Pipeline Inspection Services
Tel: 403-531-7625
Cell: 403-815-4463
Fax: 403-236-8740



jfalk@bjservices.ca

07/03/2003 01:50 PM

To: djungwirth@bjservices.ca, dlatto@bjservices.ca
cc: don.engen@enbridge.com
Subject: Re: Enbridge Mackinaw inspection
Expire On:

We'll be arriving in Escanaba around 7 or 8 pm July 6 and will be staying at the Days Inn there at least for July 6 and 7; the number is 906-789-1200. We will come to the Escanaba shop Monday morning July 7 to unpack and test the pig. I understand it has already been delivered.

Dianne is getting a cell phone for me - I'll forward the number as soon as I have it.

==========

Joel Falk
BJ Pipeline Inspection Services
Calgary, AB
ph. 403-531-5469

Don L Engen
07/03/2003 01:04 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: East Leg Straits Update 7/3/03 - Repairs Complete<PRG.LINE05.20".straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/03/2003 01:04 PM -----

Mike D Goman@LPL
07/03/2003 12:55 PM

To: Mark S Sitek/LPL@LPL, Al V Aleknavicius/LPL@LPL, Adam J Erickson/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Scott A McEachern/LPL@LPL, Grant P Henningsen/LPL@LPL, Kent Cornelius/CNPL/Enbridge@IPL, Doug A Barry/CNPL/Enbridge@IPL, Bruce Paul/CNPL/Enbridge@IPL, Greg L Sevick/CNPL/Enbridge@IPL, Gordon Good/CNPL/Enbridge@IPL
cc:
Subject: East Leg Straits Update 7/3/03 - Repairs Complete
Expire On:

This note it to advise that as of today, all structural repairs have been completed on the seven spans over 140 long on the East Leg of the Straits of Mackinac Crossing. The plan going forward is to start the pig run/ROV inspection/Repair cycle on the West leg beginning on Monday July 7 with repairs commencing late August/Early September. Again, thanks to everyone for all the help with the repair process.

Attached is the final East Leg span table.

Enbridge Energy
2003 Straits of Mackinac Inspection & Repair
East Leg
Repairable Span List

Span Number	Length (ft)	Date Identified	Date Repaired	Repair Method	Comments
E01	224	6/19/2003	6/29/2003	Screw Anchor	Old grout bag repair not touching pipe.
E05	157	6/19/2003	7/3/2003	Screw Anchor	
E08	164	6/19/2003	7/1/2003	Screw Anchor	
E19	163	6/19/2003	7/2/2003	Screw Anchor	Original Span was 216' in 2001. Repaired at that time with grout bag 163' from start of span.
E23	185	6/20/2003	6/23/2003	Screw Anchor	
E32	201	6/20/2003	6/24/2003	Screw Anchor	Old grout bag in place, but questionable if effective. Will inspect w/ diver and repair if necessary.
E34	139	6/20/2003	6/25/2003	Screw Anchor	Old grout bag repair not touching pipe.

= Spans over 195 feet in length.

Mike Goman
Region Engineer
Enbridge (U.S.) Inc.
Office: 218-759-6622
Cell: 218-766-0608

Fax: 218-751-0344

Don L Engen
07/02/2003 03:12 PM

To: Leo M Zalaznik/LPL@LPL, John M Grotberg/LPL@LPL, Mike D Goman/LPL@LPL, Adam J Erickson/LPL@LPL, Al V Aleknavicius/LPL@LPL, Rick K Aunet/LPL@LPL, Dennis M Wedan/LPL@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Mike D Burnis/LPL@LPL, Peter T Olson/LPL@LPL, pwicons@earthlink.net, michel.hoyeck@og.ge.com, jordan@axiompipe.com, Don Tennant,
cc: Dave B McNeill/CNPL/Enbridge@IPL, Mark S Sitek/LPL@LPL, Pipeline Integrity DMS@IPL, Gary F Kosch/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, CCO Senior Operators, Doug A Barry/CNPL/Enbridge@IPL, Bryan J Walbauer/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Murray A Chudyk/CNPL/Enbridge@IPL, Doug R Newton/CNPL/Enbridge@IPL, Ashok Anand/CNPL/Enbridge@IPL, Paul Wandzura, Pipeline Integrity DMS
cc:
Subject: Line 5 (20 inch) Straits of Mackinac - West Leg - In - Line Inspections<PRG.LINE05.20".straits.ml-03>
Expire On:

The in - line inspection of the West Leg of Line 5 (20") at the Straits of Mackinac, which was deferred from March of this year is scheduled to recommence on July 7, 2003. We are planning on running the CTool - sizing\caliper tool, BJ's Geopig - high resolution caliper tool for dents, buckles,etc. and PII's MagneScan - high resolution MFL tool for metal loss.

It is planned to have all the tools in Escanaba ready for mobilization July 7th to St. Ignace. There is a large volume of crude oil between July 6th to 9th and we are being advised to try and launch the CTool the afternoon of July 7th if possible followed by the Geopig and MagneScan tools on July 8th. NGL will be across the Straits again on July 9th.

This is notice is for general information purposes only. Pipeline Control will be issuing the actual tool launch and receive schedules as required.

A contact list will follow shortly. Feel free to distribute this note to any other interested parties.

If you have any questions please contact me.

Thank you.

Don Engen
Pipeline Integrity
Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234

AFE No.	Page of
File No.	Date 07-02-03
Designed by	Checked by
Subject: LINE 5 (20") STRAITS -	

ENBRIDGE
Enbridge Pipelines Inc.

Mike Gorman, Grant Hemmigson.
1) ~~Pat Higgs~~ Christine Neff., D.E.

1) Repair Program - 5 of 7 repairs complete hope complete next two by weekend.
Strait
2) J. P. Kenney: band length criteria for repairs, ~~Geopig~~ used for baseline - good
3) Finite Element Analysis -
4) IL (- Week of July - 7th.
NGL issues

ENG 02/09/98

Don L Engen
07/02/2003 07:52 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: East Leg Straits Update 7/1/03<PRG.LINE05.20".straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 07/02/2003 07:52 AM -----

Mike D Goman@LPL
07/01/2003 03:24 PM

To: Mark S Sitek/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL
cc: Adam J Erickson/LPL@LPL
Subject: East Leg Straits Update 7/1/03
Expire On:

Today they completed span E08, which leaves two left. The contractor hopes to complete the remaining two on tomorrow and Thursday and avoid working the 4th... Things should be good to go for the pig runs next week.

Enbridge Energy
2003 Straits of Mackinac Inspection & Repair
East Leg
Repairable Span List

Span Number	Length (ft)	Date Identified	Date Repaired	Repair Method	Comments
E01	224	6/19/2003	6/29/2003	Screw Anchor	Old grout bag repair not touching pipe.
E05	157	6/19/2003			
E08	164	6/19/2003	7/1/2003	Screw Anchor	
E19	163	6/19/2003			Original Span was 216' in 2001. Repaired at that time with grout bag 163' from start of span.
E23	185	6/20/2003	6/23/2003	Screw Anchor	
E32	201	6/20/2003	6/24/2003	Screw Anchor	Old grout bag in place, but questionable if effective. Will inspect w/ diver and repair if necessary.
E34	139	6/20/2003	6/25/2003	Screw Anchor	Old grout bag repair not touching pipe.

= Spans over 195 feet in length.

Mike Goman
Region Engineer
Enbridge (U.S.) Inc.
Office: 218-759-6622
Cell: 218-766-0608
Fax: 218-751-0344

Don L Engen
06/30/2003 03:23 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: East Leg Straits Update 6/30/03<PRG.LINE05.20".straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 06/30/2003 03:23 PM -----

Mike D Goman@LPL
06/30/2003 07:20 AM

To: Mark S Sitek/LPL@LPL, Al V Aleknavicius/LPL@LPL, Adam J Erickson/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Scott A McEachern/LPL@LPL, Grant P Henningsen/LPL@LPL, Kent Cornelius/CNPL/Enbridge@IPL, Doug A Barry/CNPL/Enbridge@IPL, Bruce Paul/CNPL/Enbridge@IPL, Greg L Sevick/CNPL/Enbridge@IPL, Gordon Good/CNPL/Enbridge@IPL
cc:
Subject: East Leg Straits Update 6/30/03
Expire On:

Progress Yesterday (6/29)

The 224' span was repaired (finally!) yesterday afternoon. With this repair complete, the East leg can be returned to service at the direction of Pipeline Control. According to the latest update I have, the reactivation will occur this afternoon.

Plan for Today/Tomorrow (6/30-31)

The plan going forward is to finish the remaining three repairs as weather permits, and then place the repair barge on standby until the West leg has been inspected and repaired. The West leg work is currently scheduled for the end of August or early September.

This is the last daily update I'm planning on preparing, as the line has been returned to normal operation. Should anyone require additional updates, please let me know, otherwise I intend to communicate progress via our regular Tuesday conference calls. Thanks to everyone for the support and assistance with this repair program.

Span Table

Below is a table of the repairable spans and their status.

Enbridge Energy
2003 Straits of Mackinac Inspection & Repair
East Leg
Repairable Span List

Span Number	Length (ft)	Date Identified	Date Repaired	Repair Method	Comments
E01	224	6/19/2003	6/29/2003	Screw Anchor	Old grout bag repair not touching pipe.
E05	157	6/19/2003			
E08	164	6/19/2003			
E19	163	6/19/2003			Original Span was 216' in 2001. Repaired at that time with grout bag 163' from start of span.
E23	185	6/20/2003	6/23/2003	Screw Anchor	
E32	201	6/20/2003	6/24/2003	Screw Anchor	Old grout bag in place, but questionable if effective. Will inspect w/ diver and repair if necessary.
E34	139	6/20/2003	6/25/2003	Screw Anchor	Old grout bag repair not touching pipe.

= Spans over 195 feet in length.

Mike Goman
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Don L Engen
06/30/2003 03:18 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: East Leg Straits Update 6/28/03<PRG.LINE05.20".straits.geo-03>
Expire On:

---- Forwarded by Don L Engen/CNPL/Enbridge on 06/30/2003 03:18 PM ----

Mike D Goman@LPL
06/28/2003 07:06 PM

To: Mark S Sitek/LPL@LPL, Al V Aleknavicius/LPL@LPL, Adam J Erickson/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Scott A McEachern/LPL@LPL, Grant P Henningsen/LPL@LPL, Kent Cornelius/CNPL/Enbridge@IPL, Doug A Barry/CNPL/Enbridge@IPL, Bruce Paul/CNPL/Enbridge@IPL, Greg L Sevick/CNPL/Enbridge@IPL, Gordon Good/CNPL/Enbridge@IPL
cc:
Subject: East Leg Straits Update 6/28/03
Expire On:

Progress Today (6/28)

Although conditions were marginal, crews attempted to repair the 224' span today. The repair was 90% complete when they were forced off the water due to high winds.

Plan for Tomorrow (6/29)

In the morning crews will attempt to finish the repair. Should this attempt be successful, the East leg will be reactivated when the next NGL batch crosses the Straits. If time/weather permits, an old abandoned air bag will be removed from the line. Old debris such as this air bag is being removed as time/conditions permit since it poses a hazard to current and future ROV operations and inspections.

Span Table

Below is a table of the repairable spans and their status.

Enbridge Energy
2003 Straits of Mackinac Inspection & Repair
East Leg
Repairable Span List

Span Number	Length (ft)	Date Identified	Date Repaired	Repair Method	Comments
E01	224	6/19/2003			Old grout bag repair not touching pipe.
E05	157	6/19/2003			
E08	164	6/19/2003			
E19	163	6/19/2003			Original Span was 216' in 2001. Repaired at that time with grout bag 163' from start of span.
E23	185	6/20/2003	6/23/2003	Screw Anchor	
E32	201	6/20/2003	6/24/2003	Screw Anchor	Old grout bag in place, but questionable if effective. Will inspect w/ diver and repair if necessary.
E34	139	6/20/2003	6/25/2003	Screw Anchor	Old grout bag repair not touching pipe.

= Spans over 195 feet in length.

Mike Goman
Region Engineer
Enbridge (U.S.) Inc.
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Fax: 218-751-0344

Don L Engen
06/30/2003 03:16 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: East Leg Straits Update 6/27/03<PRG.LINE05.20".straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 06/30/2003 03:16 PM -----

Mike D Goman@LPL
06/27/2003 03:04 PM

To: Mark S Sitek/LPL@LPL, Al V Aleknavicius/LPL@LPL, Adam J Erickson/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Scott A McEachern/LPL@LPL, Grant P Henningsen/LPL@LPL, Kent Cornelius/CNPL/Enbridge@IPL, Doug A Barry/CNPL/Enbridge@IPL, Bruce Paul/CNPL/Enbridge@IPL, Greg L Sevick/CNPL/Enbridge@IPL, Gordon Good/CNPL/Enbridge@IPL
cc:
Subject: East Leg Straits Update 6/27/03
Expire On:

Progress Today (6/27)

Due to high wind and waves, the attempt to repair the 224' span was again terminated for the day.

Plan for Tomorrow (6/28)

The plan for tomorrow is to attempt the repair on the 224' span if weather allows. Should this attempt be successful, the East leg will be reactivated when the next NGL batch crosses the Straits.

Span Table

Below is a table of the repairable spans and their status.

Enbridge Energy
2003 Straits of Mackinac Inspection & Repair
East Leg
Repairable Span List

Span Number	Length (ft)	Date Identified	Date Repaired	Repair Method	Comments
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E19	163	6/19/2003			Original Span was 216' in 2001. Repaired at that time with grout bag 163' from start of span.
E23	185	6/20/2003	6/23/2003	Screw Anchor	
E32	201	6/20/2003	6/24/2003	Screw Anchor	Old grout bag in place, but questionable if effective. Will inspect w/ diver and repair if necessary.
E34	139	6/20/2003	6/25/2003	Screw Anchor	Old grout bag repair not touching pipe.

= Spans over 195 feet in length.

Mike Goman
Region Engineer
Enbridge (U.S.) Inc.
Office: 218-759-6622
Cell: 218-766-0608
Fax: 218-751-0344

Don L Engen
06/30/2003 02:46 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: East Leg Straits Update 6/26/03<PRG.LINE05.20".straits.geo-03>
Expire On:

---- Forwarded by Don L Engen/CNPL/Enbridge on 06/30/2003 02:46 PM ----

Mike D Goman@LPL
06/26/2003 12:22 PM

To: Mark S Sitek/LPL@LPL, Al V Aleknavicius/LPL@LPL, Adam J Erickson/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Scott A McEachern/LPL@LPL, Grant P Henningsen/LPL@LPL, Kent Cornelius/CNPL/Enbridge@IPL, Doug A Barry/CNPL/Enbridge@IPL, Bruce Paul/CNPL/Enbridge@IPL, Greg L Sevick/CNPL/Enbridge@IPL, Gordon Good/CNPL/Enbridge@IPL
cc:
Subject: East Leg Straits Update 6/26/03
Expire On:

Progress Today (6/26)

Due to high wind and waves, the attempt to repair the 224' span was terminated for the day. Crews did launch the ROV and inspect the span to determine the support location and assess the area prior to making the dive.

Plan for Tomorrow (6/27)

The plan for tomorrow is to attempt the repair on the 224' span if weather allows. Should this attempt be successful, the East leg will be reactivated when the next NGL batch crosses the Straits.

Span Table

Below is a table of the repairable spans and their status.

Enbridge Energy
2003 Straits of Mackinac Inspection & Repair
East Leg
Repairable Span List

Span Number	Length (ft)	Date Identified	Date Repaired	Repair Method	Comments
E01	224	6/19/2003			Old grout bag repair not touching pipe.
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E08	164	6/19/2003			
E19	163	6/19/2003			Original Span was 216' in 2001. Repaired at that time with grout bag 163' from start of span.
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E32	201	6/20/2003	6/24/2003	Screw Anchor	Old grout bag in place, but questionable if effective. Will inspect w/ diver and repair if necessary.
E34	139	6/20/2003	6/25/2003	Screw Anchor	Old grout bag repair not touching pipe.

= Spans over 195 feet in length.

Mike Goman
Region Engineer
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Cell: 218-766-0608
Fax: 218-751-0344

Don L Engen
06/30/2003 02:32 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: East Leg Straits Update 6/25/03<PRG.LINE05.20".straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 06/30/2003 02:32 PM -----

Mike D Goman@LPL
06/25/2003 04:21 PM

To: Mark S Sitek/LPL@LPL, Al V Aleknavicius/LPL@LPL, Adam J Erickson/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Scott A McEachern/LPL@LPL, Grant P Henningsen/LPL@LPL, Kent Cornelius/CNPL/Enbridge@IPL, Doug A Barry/CNPL/Enbridge@IPL, Bruce Paul/CNPL/Enbridge@IPL, Greg L Sevick/CNPL/Enbridge@IPL
cc:
Subject: East Leg Straits Update 6/25/03
Expire On:

Progress Today (6/25)

Today one screw anchor support was installed to repair a 139 foot span. The contractor used this opportunity to refine his installation technique, measure bottom time, and prepare for the deep dive to repair the 224 foot span. Also, the navigation computer problems were resolved and the water heater was replaced, so things are in place for the deep dive.

Plan for Tomorrow (6/26)

Although the forecast is not favorable due to high winds and possible thunder storms, the plan is to repair the 224' span tomorrow. Due to the depth, critical barge positioning, and heavy suspended loads during installation, the work will not be completed during less than favorable conditions. The decision to tackle this span will be made tomorrow morning. If the repair is completed tomorrow, the line may be restarted, as NGL is scheduled to be across the Straits until 2100 MST (see below). If not, the leg will be reactivated during the next NGL cycle on Saturday June 28 (assuming the repair is complete by then).

Additional Repairs based on FEA Model

Engineering has given guidance to repair all spans over 140 feet, and reactivate the leg when the spans over 195 feet are repaired. No additional repairs are anticipated in the near future as a result of the Finite Element model.

Mike Goman
Region Engineer
Enbridge (U.S.) Inc.
Office: 218-759-6622
Cell: 218-766-0608
Fax: 218-751-0344

Don L Engen
06/24/2003 04:47 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: East Leg Straits Update - 6/24/03<PRG.LINE05.20".straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 06/24/2003 04:47 PM -----

Mark S Sitek@LPL
06/24/2003 03:42 PM

To: Al V Aleknavicius/LPL@LPL, Adam J Erickson/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Scott A McEachern/LPL@LPL, Grant P Henningsen/LPL@LPL, Kent Cornelius/CNPL/Enbridge@IPL, Doug A Barry/CNPL/Enbridge@IPL, Bruce Paul/CNPL/Enbridge@IPL, Greg L Sevick/CNPL/Enbridge@IPL
cc: Mike D Goman/LPL@LPL
Subject: East Leg Straits Update - 6/24/03
Expire On:

Progress Today (6/24)

Today one screw anchor support was installed to repair a 201 foot span. This is one of two spans greater than 195 feet giving rise to shutdown of the leg. The second span is 224 feet and is in very deep water (200 feet +). There are five spans > 140 feet but < 195 feet. These five spans do not require the leg to be shutdown. One of these five spans has been repaired.

Plan for Tomorrow (6/25)

A water heater which is required for deep dives is out of service. The contractor is expected to receive a new water heater system for deep water dives tonight or tomorrow. Deep dives cannot be accomplished without this equipment to protect the diver. Tomorrow another shallow dive and repair will be completed on a 140 foot span. This will give the contractor another chance to refine their techniques to get repairs done faster and safer. Once repair techniques are refined, the contractor will probably be able to complete two shallow repairs per day, but will likely be able to only do one deep dive per day due to decompression requirements. The other span over 195 feet will likely be completed on Thursday. Due to the safety issues associated with this repair, it makes sense to give the contractor another opportunity to refine their techniques on a shallower dive first. Once the second span over 195 feet is complete, the East leg can be re-opened, provided NGL is across and there are no stress related repairs that necessitate shut down (see below).

Additional Repairs based on FEA Model

Engineering is addressing issues associated with the Finite Element Analysis model in order to accurately determine what additional repairs will be required due to stress values (the seven currently known repairs are based simply upon span length > 140 feet). This model will also identify whether additional shut down time is required. Resolution of this is expected sometime tomorrow. We are expected to have some additional repairs as a result of stresses identified by this model over and above those determined solely on the basis of span length.

AFE No.	Page of
File No.	Date 06-24-03
Designed by	Checked by

ENBRIDGE
Enbridge Pipelines Inc.

Subject: LINES - STRAITS

Mike Groman, Adam Erickson, Danny Moravick, Dale Woodland, Danette Christy Dane.

EV - Survey complete June 21st

75 Spans - 7 > 140', 139' shortest, 2241' longest

- JP KENNEY - Report -
- 14 regions identified with high stress, Each region could require numerous repairs.
- 73 repairs required.
-

ENG 02/09/98

Don L Engen

06/24/2003 08:13 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: East Leg Straits Update 6/23/03 <PRG.LINE05.20".straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 06/24/2003 08:13 AM -----

Mike D Goman@LPL

06/23/2003 10:19 PM

To: Mark S Sitek/LPL@LPL, Al V Aleknavicius/LPL@LPL, Adam J Erickson/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Scott A McEachern/LPL@LPL, Grant P Henningsen/LPL@LPL, Kent Cornelius/CNPL/Enbridge@IPL, Doug A Barry/CNPL/Enbridge@IPL, Bruce Paul/CNPL/Enbridge@IPL
cc: Larry Mersnick/US/Enbridge@LPL
Subject: East Leg Straits Update 6/23/03
Expire On:

EAST LEG OPERATIONS

Based on the revised criteria sent out by Scott McEachern on 6/20/03, the east leg was shut in today when an NGL batch was across the line due to two spans over 195 feet in length.

REPAIR BARGE

The problems with the navigation system between the repair barge and tug boat have not been fully resolved, however the contractor was able to install one screw anchor repair today on span E23, a 185' span in approximately 80 feet of water. Tomorrow the plan is to investigate and repair the two spans over 195 feet. A 201' span is in about 90 feet of water, and a 224 foot span is in over 200 feet of water. Both are old grout bag repairs that are no longer effective. Barring forecasted storms, all spans on the east leg over 195 feet should be repaired and the shutdown length criteria should be resolved.

JPKENNY ANALYSIS

The analysis has been received by Operations and Engineering, and some further scrutiny may be required. Adam can provide further updates in his Tuesday meeting tomorrow, however at first glance it appears that a significant amount of repair work may be required before reactivating the east leg.

Tomorrow will be my last day on-site at the Straits for the immediate future, and Larry Mersnick will be taking over the day-to-day inspection. Should there be any questions, I can be contacted on my cell. Thanks.

Mike Goman
Region Engineer
Enbridge (U.S.) Inc.
Office: 218-759-6622
Cell: 218-766-0608
Fax: 218-751-0344

Don L Engen

06/23/2003 04:39 PM

To: GHurd@bjservices.ca
cc: Garrett Wilkie/CNPL/Enbridge, Dave B McNeill/CNPL/Enbridge, Pipeline Integrity DMS
cc: don.engen@enbridge.com, jczyz@bjservices.ca, dlatto@bjservices.ca
Subject: Re: Enbridge Straits of Mackinac Crossing Coordinates
Expire On:

Thanks, Geoff. I'll follow up in our Line 5 meeting tomorrow.

Regards,

Don Engen
Corrosion Control Analyst
Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234
GHurd@bjservices.ca

GHurd@bjservices.ca

06/23/2003 04:15 PM

To: don.engen@enbridge.com
cc: jczyz@bjservices.ca, dlatto@bjservices.ca
Subject: Re: Enbridge Straits of Mackinac Crossing Coordinates
Expire On:

Don,

I never received a reply to the message below and I just wanted to confirm that the problems have been resolved.

Regards,

Geoff Hurd
Data Analyst
BJ Pipeline Inspection Services
403 531 5332
ghurd@bjservices.ca

----- Forwarded by Geoffrey Hurd/BJSCAN/BJSERVICES on 23/06/2003 04:13 PM -----

Geoffrey Hurd

06/06/2003 11:13 AM

To: "Kilmer, Craig" <Craig.Kilmer@jpkhouston.com>
cc: "Smith, Derek" <derek.smith@jpkhouston.com>, "Fellers, Gary" <Gary.Fellers@jpkhouston.com>, "Kvist, Orjan"

| <orjan.kvist@jpkhouston.com>, Jarek Czyz/BJSCAN/BJSERVICES@BJSERVICES, jackie.mccoy@cnpl.enbridge.com,
|
| vanessa.co@enbridge.com
|
| Subject: Re: Enbridge Straits of Mackinac Crossing Coordinates(Document link: Geoffrey Hurd) |

>----------
----------|

Craig,

Hopefully these answers help resolve the problems:

1) Why does this second data not seem to agree with the original data? i.e. the total length, the curve % values, the curve radii, the heights.

There are two reasons why the final data has changed since the preliminary data delivered at our meeting in Calgary:

a) the chainage was matched to the weld log provided by Enbridge, which changed the chainage and coordinates

b) the curve data was averaged over 5m in the final data as opposed to 1m in the original data, as agreed on during the meeting. If you would like the data averaged over a different moving average length let me know and I can provide a text file with that data. Our display software (GeoDisplay) also allows you to change this moving average value interactively in the program.

2) What is the starting point and/or matching points of both situations? I assume the second set of data starts at the pig trap valve.

The starting point of both data sets was the reducer on the north side.

3) I have been using a conversion program downloaded from the internet called Corpscon. It is free to download and was created by the Army Corp of Engineers. When converting the UTM lats and longs of previous repairs on the line to NAD 83 State Plane Michigan Central coordinates the results check exact. When I do a similar conversion of the original BJ centerline pipe data, or when I compare the latest BJ centerline pipe data you have furnished, to the earlier repair location data neither agrees. The differences vary in some locations of the crossing by 50' +/-, 70'+/-, etc.

The problem may be the type of feet being used (international, or

US survey). The previous file I gave you was using international feet, but when I downloaded Corpscon I noticed that it defaults to US survey feet. This would account for ~40' error, but it should be fairly consistent over the length of the line. Attached is a file giving the coordinates in US survey feet.

(See attached file: pipe_centerline_1m_SPC_USSurveyFeet.txt)

If this is not the problem, it would help me if you could send me the coordinates you have (in both systems - lat/long and north/east) to confirm my transformations. As well if you could send me some information on the data you have. For example, how these coordinates were surveyed, what their accuracy is, and their locations.

Once we have the problem resolved, if you would like a new CD with the final data on it let me know and I can send one to you.

Regards,

Geoff Hurd
Data Analyst
BJ Pipeline Inspection Services
403 531 5332
ghurd@bjservices.ca

"Kilmer, Craig" <Craig.Kilmer@jpkhouston.com>
05/06/2003 05:00 PM

To: "'ghurd@bjservices.ca'" <ghurd@bjservices.ca>
cc: "Smith, Derek" <derek.smith@jpkhouston.com>, "Fellers, Gary" <Gary.Fellers@jpkhouston.com>, "Kvist, Orjan" <orjan.kvist@jpkhouston.com>
Subject: Enbridge Straits of Mackinac Crossing Coordinates

Geoff,

Thank you for providing the revised centerline of the pipeline co-ordinate data. I am, however, continuing to have problems correlating the data with other data sources. My questions/comments are these -

1) Why does this second data not seem to agree with the original data? i.e. the total length, the curve % values, the curve radii, the heights.

2) What is the starting point and/or matching points of both situations? I assume the second set of data starts at the pig trap valve.

3) I have been using a conversion program downloaded from the internet called Corpscon. It is free to download and was created by the Army Corp of Engineers. When converting the UTM lats and longs of previous repairs on the line to NAD 83 State Plane Michigan Central coordinates the results check exact. When I do a similar conversion of the original BJ centerline pipe data, or when I compare the latest BJ centerline pipe data you have furnished, to the earlier repair location data neither agrees. The differences vary in some locations of the crossing by 50' +/-, 70'+/-, etc.

Can you please do some checking of the data and help me try to resolve the matter.

Thanks,

Craig



pipe centerline 1m SPC USSurveyFeet.txt

Don L Engen
06/23/2003 09:28 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: East Leg Straits Update 6/22/03<PRG.LINE05.20".straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 06/23/2003 09:28 AM -----

Mike D Goman@LPL
06/22/2003 08:25 PM

To: Mark S Sitek/LPL@LPL, Al V Aleknavicius/LPL@LPL, Adam J Erickson/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Scott A McEachern/LPL@LPL, Grant P Henningsen/LPL@LPL
cc:
Subject: East Leg Straits Update 6/22/03
Expire On:

ROV SURVEY
Correction from yesterday - 7, not 8 spans over 140 feet were identified and tagged for repair.

REPAIR BARGE
Unfortunately the repair barge is experiencing problems with its navigation computer that the tug uses to accurately position the barge. Without this computer communicating with the tug, accurate position is impossible and the anchors cannot be placed safely. No repairs were completed today. The Contractor has been working all day to remedy the problem, as well as transfer the ROV from the pilot boat to the barge in order to support anchor installations. Repairs will be attempted tomorrow, and I will update with (hopefully) progress in the evening.

JPKENNY ANALYSIS
No new developments since the 6/20 update.

Should there be any questions, I can be contacted on my cell. Thanks.

Mike Goman
Region Engineer
Enbridge (U.S.) Inc.
Office: 218-759-6622
Cell: 218-766-0608
Fax: 218-751-0344

Don L Engen
06/23/2003 09:28 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: East Leg Straits Update 6/21/03<PRG.LINE05.20".straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 06/23/2003 09:28 AM -----

Mike D Goman@LPL
06/21/2003 09:18 PM

To: Mark S Sitek/LPL@LPL, Al V Aleknavicius/LPL@LPL, Adam J Erickson/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Scott A McEachern/LPL@LPL, Grant P Henningsen/LPL@LPL
cc:
Subject: East Leg Straits Update 6/21/03
Expire On:

ROV SURVEY
The ROV survey was completed today with no additional spans over 140' identified. In total, there are eight spans at or over 140' that require repair due to the span length threshold.

REPAIR BARGE
The repair barge has been mobilized and is ready to commence with repairs tomorrow (Sunday, June 22) morning. The contractor is anticipating completing two repairs per day. Tomorrow's repairs will be completed in relatively shallow water (approx. 90'), in order to maximize diver bottom time to perfect the installation technique prior to attempting repairs in deeper water.

JPKENNY ANALYSIS
No new developments since yesterday's update.

Should there be any questions, I can be contacted on my cell. Thanks.

Mike Goman
Region Engineer
Enbridge (U.S.) Inc.
Office: 218-759-6622
Cell: 218-766-0608
Fax: 218-751-0344

Don L Engen
06/23/2003 09:26 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: East Leg Straits Update 6/20/03<PRG.LINE05.20".straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 06/23/2003 09:26 AM -----

Mike D Goman@LPL
06/20/2003 07:30 PM

To: Mark S Sitek/LPL@LPL, Al V Aleknavicius/LPL@LPL, Adam J Erickson/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Scott A McEachern/LPL@LPL, Grant P Henningsen/LPL@LPL
cc:
Subject: East Leg Straits Update 6/20/03
Expire On:

From today until the repairs are complete, I will attempt to communicate via a daily email with the update of the day's progress of the completed work at the Straits. If anyone else should be included on the distribution list, please let me know, and forward this as appropriate.

ROV SURVEY
The ROV survey began yesterday in the late morning. It was delayed from the original schedule due to software problems with a device that prints real-time GPS coordinates on the ROV video output. Now that the problem has been resolved, the inspection is going well. In total, there are nine "set points" on the east leg. The support vessel anchors at the set point, and the ROV is deployed to inspect as far upstream and downstream as its umbilical allows. Between yesterday afternoon and today, the inspection has been completed at six out of the nine set points. The engineer operating the ROV anticipates that the survey will be completed by noon tomorrow. Yesterday's inspections revealed 4 spans over the 140' threshold that require repair. The longest was a 225' span previously repaired with a grout bags. The pipe was suspended approximately 6" above the top of the grout bag pile. Today's results have not been compiled yet.

REPAIR BARGE
The repair barge is being assembled at Durosher's facility in Cheboygan, and will be pushed to Mackinaw and fully deployed tomorrow morning. As the ROV is required to assist with the screw anchor installations, repairs cannot begin until the span survey is complete. If time allows tomorrow afternoon, the ROV will be transferred to the repair barge and a repair will be attempted, otherwise repairs will commence Sunday morning. The Contractor anticipates completing two repairs per day.

JPKENNY ANALYSIS
The final report of the finite element model has not been received yet from JPKenny, however the preliminary report shows 14 locations where the maximum longitudinal stress is above the 80% threshold. There are some issues with their GPS coordinates not matching perfectly with the coordinates determined using the ROV. Engineering is working on resolving this discrepancy. Until the difference is resolved, we are unable to ascertain whether the pipe is supported or spanning in these areas, and are assuming that the pipe is supported.

When the ROV survey is complete tomorrow, we will develop a repair plan to install screw anchors on the spans greater than 140'. The span locations will be confirmed in the areas of high stress (as shown by the finite element model) when the GPS issue is resolved.

Should there be any questions, I can be contacted on my cell. Thanks.

Mike Goman
Region Engineer
Enbridge (U.S.) Inc.
Office: 218-759-6622
Cell: 218-766-0608
Fax: 218-751-0344

ORIGINAL

GE Power Systems
Oil & Gas

PII Pipeline Solutions

PIPELINE INTEGRITY
JUN 17 2003

INVOICE

Enbridge Energy, Limited Partnership
Suite 3300, 1100 Louisiana
Houston, TX 77002

Attention: Mr. Don Engen

INVOICE NO.:	**CAN2295**
DATE:	June 16, 2003
TERMS:	Thirty (30) Days Upon Receipt
GST NO.:	872167978RP
LAUNCHING PROVINCE:	Michigan USA

Any questions concerning your invoice? **Call Maureen Miller (403) 298- 0240**

Name of Job:	20" Strait of Mackinac - Mackinaw A Michigan, USA	**Inspection Length:**	20H - 6.7km
Contract No:	C2001-25	**Work Order No.**	91002-00008-03
PII Ref. No.:	101211_20H	**Technology:**	MFL

This invoice is for the following services performed under the contract between Enbridge Energy Limited Partnership and PII (Canada) Limited:

US Dollars

Total Contract Price:

Inspection: 75,000.00X0.92	69,000.00	
PipeImage=	7,000.00	
Total	$76,000.00	

Invoicing Schedule:

Mobilization (10%)	7,600.00	
Inspection (65%)	49,400.00	
Final Report (25%)	19,000.00	
Total	$76,000.00	

APPROVED
BY
EMP # DATE MM / DD / YY
TOTALS CHECKED ORDER # WO-91002-00008-03
PROJECT CHARGE
PROJECT TASK EXP. TYPE COST CTR
91204SC00931 01 162010-11 91204
OPERATING COST
LOB CONT. SEG. COST CTR. ACCOUNT SUBACCOUNT INTER-LOB

Previously Invoiced:

Date:	Invoice#:	Amount:
25-Mar-03	CAN2248	57,000.00

DB 3176 06/17/03

Current Charges:

Final Report	19,000.00
TOTAL	**$19,000.00**

PLEASE WIRE PAYMENT TO:

The Toronto-Dominion Bank
Calgary, Alberta
Account of PII (Canada) Limited
Account No: 0805 0338152

Overdue accounts are subject to a 1.5% interest charge per month

1003 - 11th Street S.W. Calgary, Alberta Canada T2R 1G2 • Phone 403 262-7447 • Fax 403 237 9693

Exhibit C
Pricing and Payments

Should the Company fail to pay the Vendor any amount due under the Contract at the due date of payment the Company shall be liable to pay interest on the unpaid amount from the due date of payment to the actual date of payment at a rate of interest two percentage points above the prime rate at Morgan Guaranty Trust Company in New York from time to time in force.

All payments made by the Company under this Agreement shall be paid in United States dollars. All payments to the Vendor shall be made by wire transfer or cheque into the following bank account:

The Toronto-Dominion Bank

Calgary, Alberta, Canada

Account of PII (Canada) Limited

Canadian Account No. 0805 0338152

Payment Stages

Payment of the Contract Sums shall be as follows:

For MagneScan, TranScan, UltraScan WM Inspections

Mobilization	10% of fee
Inspection	65% of fee
Report	25% of fee

For UltraScan CD and EW Inspection

Upon Mobilization	25%
Upon Inspection	50%
Upon Final Report	25%

ENBDNR0007056

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00009 -03

LOCATION: Edmonton, Alberta

TO: PII (Canada) Limited
1003 – 11th Street SW
Calgary, Alberta
T2R 1G2
Attention: Daryl Ronsky

DATE: March 10, 2003
COMMENCEMENT DATE: March 10, 2003
COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To supply a 20-inch MagneScan 020 MFL tool, personnel, material and equipment to inspect two 20-inch sections of Line 5 at the Straits of Mackinac in Michigan. Each section is approximately 4.2 miles (6.7 km) long. A preliminary report of the inspection is due within one calendar month of the data being received at the Vendor's facility. A final report is due 60 working days from when the data is received at the Vendor's facility.
Terms and conditions of Agreement C2001-25 take precedence over the Work Order Contract General Conditions

Company Information Only
Estimate US $155,000

Duly executed copy to Houston March 27

Estimated Value $

Capital Cost	Project # 91204SC0093		Task # 01		Exp Type # 62010-01	Exp. Organization # 91204
Operating Costs	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc. 3176 Fin 29444
IT'S AGENT

APPROVAL W. Kruse 2879

Name of Contractor: PII (Canada) Limited

By: _____ Date: _____
SIGNATURE

RIGHT-TO-AUDIT

THE COMPANY SHALL BE GRANTED THE RIGHT-TO-AUDIT CONTRACTORS AND SUB-CONTRACTORS RECORDS UPON REASONABLE NOTICE FOR ALL COST-PLUS WORK ORDER BILLINGS.

WORK ORDER CONTRACT

.dge Energy, Limited Partnership
, Enbridge Pipelines Inc.
.0201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00009 -03

LOCATION: Edmonton, Alberta

TO: PII (Canada) Limited
1003 – 11th Street SW
Calgary, Alberta
T2R 1G2
Attention: Daryl Ronsky

DATE: March 10, 2003

COMMENCEMENT DATE: March 10, 2003

COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To supply a 20-inch MagneScan 020 MFL tool, personnel, material and equipment to inspect two 20-inch sections of Line 5 at the Straits of Mackinac in Michigan. Each section is approximately 4.2 miles (6.7 km) long. A preliminary report of the inspection is due within one calendar month of the data being received at the Vendor's facility. A final report is due 60 working days from when the data is received at the Vendor's facility.
Terms and conditions of Agreement C2001-25 take precedence over the Work Order Contract General Conditions

Estimated Value $

	Project #		Task #		Exp Type #	Exp. Organization #
Capital Cost	91204SC0093		01		62010-01	91204
Operating Costs	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

Name of Contractor: PII (Canada) Limited

BY: Don Engen – Enbridge Pipelines Inc.
IT'S AGENT

APPROVAL W. Krusin 2879

By: _____ Date: MARCH 20 2003
SIGNATURE

RIGHT-TO-AUDIT

COMPANY SHALL BE GRANTED THE RIGHT-TO-AUDIT CONTRACTORS AND SUB-CONTRACTORS RECORDS UPON REASONABLE NOTICE FOR ALL COST-PLUS WORK ORDER BILLINGS.

FORMERLY: NOWSCO PIPELINE SERVICES, INC.

BJ Process and Pipeline Services

414 PINCKNEY HOUSTON, TX 77009 TELEPHONE (713) 224-1105 (800) 345-8125 FAX (713) 229-0541
P.O. BOX 8898 HOUSTON, TX 77249-8898

PIPELINE INTEGRITY

JUN 10 2003

I N V O I C E

Date: 05/27/03 No. 16-1232
ENBR

Sold To: ~~ATTN: CARL MIKKOLA~~
ENBRIDGE (U.S.) INC.
1100 LOUISIANA
SUITE 3300
HOUSTON TX 77002

Ship To: ENBRIDGE (U.S.) INC.
1100 LOUISIANA
SUITE 3300
HOUSTON TX 77002

( ) - Terms: NET 30 DAYS

PO Number	Ord Date	Shp Date	Ship Via	SO No.
GEOPIG RUN	05/28/03	05/28/03		00028689

Part No.	Ord	Shp	Description	Price	Total
	0	0	This invoice covers the charges for 20" Geopig Run - Mackinaw Straight Crossing Project	.00	.00
	1	1	Invoice 25% of the contract value upon presentation of final report.	32250.00	32250.00

3176
06/17/03

APPROVED
BY
EMP # DATE MM/DD/YY
TOTALS CHECKED ORDER # W02-91002-00040-03
PROJECT CHARGE
PROJECT TASK EXP. TYPE COST CTR.
91002
9120450009302 162010-91 91200
OPERATING COST
LOB CONT. SEG. COST CTR. ACCOUNT SUBACCOUNT INTER-LOB

Please Remit to:
BJ Process and Pipeline Services
PO Box 4346, Dept. 412
Houston, TX 77210-4346

Please refer to previous invoice # 28551

Non-Taxable	Taxable	Sales Tax	Freight	Misc	Invoice Total
32250.00	.00	.00	.00	.00	32250.00

1.0 Executive Summary

The objective of this Inertial Geometry Survey Inspection with BJ's GEOPIG™ mechanical caliper tool is to provide a continuous internal inspection for Enbridge Pipelines Inc. of their twin 20" lines crossing the Mackinaw Straight. The GEOPIG inspection provides the following:

- High-resolution caliper data which determines the location, size and shape of mechanical damage in the pipeline including dents, wrinkles, buckles, ovality and other features in the pipeline.
- Information on bending strain in the pipeline due to slope instability, settlement, free spanning, river crossings, frost heave, and/or other forces acting on the pipeline
- Plan, profile and chainage information for the pipeline, as well as geographical UTM coordinates for an accurate and instantaneous assessment of the location of anomalies and features, saving time and money while eliminating unnecessary excavations.

The data collected by the GEOPIG can be viewed and analyzed on BJ's interactive PC software, GEODENT and GEODISPLAY. These software programs are included free of charge in the cost of the inspection services.

The processed data and pipeline defect assessment will be provided in both hard copy and CD-ROM formats.

To provide Enbridge with total flexibility, we have provided optional costs for completion of the project within one mobilisation (inspection of both line sections within one mobilisation) or alternatively using two mobilisations (inspection of one line per mobilisation).

The cost of the GEOPIG inspections is are as follows:

ITEM	COST (in US$) Complete project in one mobilisation	COST (in US$) Complete project in two mobilisations
Tool Preparation	$60,500	$107,500
Mobilization / Demobilization	$33,500	$62,000
Inspection Survey and Field Report	$59,500	$57,000
Final Report Preparation	$31,500	$31,500 $32,250.
TOTAL	**$185,000**	**$258,000**

The following proposal provides details of the services provided, a description of the GEOPIG mechanical caliper tool, and detailed cost information.

TWO MOBILIZATIONS REQ'D
THIS INVOICE IS 25% OF
$129,000 (1/2 OF $258,000).
ADJUSTMENT - ADDITIONAL $73,000 REQ'D
FROM ORIGINAL $185,000 FOR WO.
D. [illegible]
06/17/03

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00010 -03

LOCATION: Edmonton, Alberta

TO: BJ Pipeline Inspection Services
(a division of BJ Process and
Pipeline Services Company
Ltd.)
4839 – 90th Avenue SE
Calgary, Alberta
T2P 2H4

DATE: March 10, 2003
COMMENCEMENT DATE: March 10, 2003
COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To provide a 20-inch Geopig inspection tool plus personnel, material and equipment to inspect two 20-inch sections of Line 5 crossing the Straits of Mackinac in Michigan. Each section is approximately 4.2 miles (6.7 km) in length.

It is requested all dents, wrinkles, buckles, ovality and any other features causing a restriction of 2 percent or greater be reported. A preliminary field report is required as soon as possible on completion of the inspection.

As per BJ proposal T/0620/02/USR/41 of February 23, 2003, Terms and conditions of Agreement CP2003-05 take precedence over the Work Order Contract General Conditions.

Company Information Only
Estimate US $185,000

Sent to Houston Apr 3/03

Estimated Value $

	Project #	Task #	Exp Type #	Exp. Organization #
Capital Cost	91204SC0093	02	62010-01	91204

	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #
Operating Costs						

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc – Edmonton, Alberat
IT'S AGENT

Name of Contractor: BJ Pipeline Inspection Services

APPROVAL W. Knesn 28.79

By: _____ Date: _____
SIGNATURE

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00010 -03

LOCATION: Edmonton, Alberta

TO: BJ Pipeline Inspection Services
(a division of BJ Process and
Pipeline Services Company
Ltd.)
4839 – 90th Avenue SE
Calgary, Alberta
T2P 2H4

DATE: March 10, 2003
COMMENCEMENT DATE: March 10, 2003
COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To provide a 20-inch Geopig inspection tool plus personnel, material and equipment to inspect two 20-inch sections of Line 5 crossing the Straits of Mackinac in Michigan. Each section is approximately 4.2 miles (6.7 km) in length.
It is requested all dents, wrinkles, buckles, ovality and any other features causing a restriction of 2 percent or greater be reported. A preliminary field report is required as soon as possible on completion of the inspection.
As per BJ proposal T/0620/02/USR/41 of February 23, 2003, Terms and conditions of Agreement CP2003-05 take precedence over the Work Order Contract General Conditions.

Estimated Value $
AS PER BJ PROPOSAL T0620/03/USR

Capital Cost	Project # 91204SC0093	Task # 02	Exp Type # 62010-01	Exp. Organization # 91204	
Operating Costs	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P
BY ENBRIDGE ENERGY COMPANY, INC AS GENERAL PARTNER

BY. Don Engen – Enbridge Pipelines Inc. – Edmonton, Alberat
IT'S AGENT

Name of Contractor: BJ Pipeline Inspection Services

APPROVAL W. Kwesic 2879

By: _____ Date: March 31st 2003
SIGNATURE

Anna M Warawa
06/17/2003 03:11 PM

To: Pipeline Integrity
cc: Pipeline Integrity DMS@IPL
Subject: <PRG.LINE05.20".straits.mi-03>
Expire On:

The above mentioned report was received on June 16, 2003.

Below the quality assurance form requiring further input from Vanessa.



Line 5 (20 inch) Straits of Mackinac East Leg PII Metal Loss March 2003.doc

Hard copy report will be available with Vanessa.

Corrosion In-Line Inspection
Data Assessment and QA Checklist

Line Number 5 Diameter 20"

Segments Inspected Straits of Mackinac East Leg Contract #101211_20H

Inspection Tool Metal Loss Vendor PII

Part 1 ILI Report / Contract Terms

ILI Coordinator or designate to review the incoming report and complete basic checks to ensure report format and contract terms have been met.

Run Date March 24, 2003

Section Analyzed Straits of Mackinac East Leg

Report Due Date June 20, 2003 Report Received Date June 16, 2003

Comments (if report not received by due date)

Report was received early.

Check List for Deliverables

Basic check to determine if requested or required items as outlined in the contract (and/or formally requested) were provided and are in the correct format (indicate NA if not applicable).

	Required / Requested	Received Hardcopy	Received Electronic	Format Good
Marker List	☒	☒	☒	Yes
Nominal Wall thickness listing	☒	☒	☐	Yes
Pipe Listing	☒	☒	☒	Yes
Pipe Tally	☒	☐	☒	Yes
PipeImage	☒	☐	☒	N/A
IMU / GPS Information	☐	☐	☐	
Morrison Format	☐	☐	☒	
LAPA	☐	☐	☐	
Rstreng Eff Area	☐	☐	☐	
On network	☐	☐	☒	Yes
	☐	☐	☐	
	☐	☐	☐	

Comments and / or Actions Required To Complete Reporting Requirements

Pipeimage - Trouble accessing Pipeimage on the network share. I will spend additional time with PII and the Help Desk to rectify the problem.

Complete and confirmed by Anna Warawa Date: June 17, 2003

Part 2 Data Assessment

Excavation Coordinator or designate to complete a QA assessment of the ILI data to confirm the data is acceptable and consistent with historical and / or other documented information about the pipeline segment. The analysis consists of expert based judgement of data validity.

QA Data Check

- Is format acceptable for analysis (y/n)
- Are all CD files acceptable for analysis (y/n)
  (i.e. files can all be opened & data is formatted)

Comments and / or Actions Required To Fix Data

QA data check completed by Date

Data Validation

Compare ILI data to historical information to determine if data is consistent with past results and expectations. Note – the items outlined below are intended to represent some of the ways that can be used to evaluate the data and is not intended as a comprehensive list (nor as a requirement) for evaluating ILI data. Methods used should be checked (y/n). Comments can be provided below.

Validation Method(s) Used	Valid
☐ Girth weld numbers okay (y/n)	
☐ Marker list and tracking report match (y/n) (AGM numbers, locations, etc).	
☐ Data consistent with historical ILI information	
☐ RPRs consistent w/ historical or expected results	
☐ RPRs consistent w/ current operating pressures	
☐ Trend plots consistent w/ historical results	
☐ Sentenced plots consistent w/ historical results	
☐ Exploratory dig results consistent w/ ILI data	
☐ Comparison of data to previously excavated data	
☐	
☐	
☐	

Comments and / or Actions Required To Validate Data

Data evaluation completed by Date

Date

Comments (any missing information should be documented with new deliverable dates – Note; if data can be assessed in the present format then assessment should begin on data as is)

Due:	Rec'd:
Due:	Rec'd:
Due:	Rec'd:
Due:	Rec'd:

Reviewed/Approved by
Excavation Coordinator: Date
Supervisor of Integrity Programs: Date

Part 3 Analysis / Generation of Excavation Packages

Excavation Coordinator or designate shall analyze the ILI information, develop a master dig list, determine whether pressure restrictions are required and outline any phased dig programs that may be required to meet operating requirements, resource requirements and / or HCA regulations.

Generate Master Dig List **Date Complete**

Generate master dig list with all features that meet Enbridge dig criteria.

Identify and document (on master list) all features that have been previously excavated
And recoated or repaired.

Evaluation of remaining features **Required** **Action By**

Is a temporary restriction being requested?

If yes, is there a Capacity Impact?

Is a phased excavation program required?

Note: For HCA's in the US phased programs may not be allowed

No. of phases

Phase criteria Phase 1 -

Phase 2 -

Phase 3 -

Reson for Phased Program:

Due to Capacity Impacts?

Other

Preparation of Dig Packages

Action By **Date Complete**

Prepare Dig List / Status Table

(including HCA or other requirements)

Request Environmental Assessments

Complete Dig Packages and Submit to Operations

Comments

NOTE: This document should be kept electronically in the network neighbourhood along with the Master Dig Lists, Excavation Program Status Tables and any supporting documentation re: decision making processes that were used. Hard copy of this form, the Master Dig List, Excavation Status Sheets and documents describing decision making processes should be inserted and retained at the front of the hard copy ILI report received from the Vendor.

AFE No.	Page of
File No.	Date 06-17-03
Designed by	Checked by

ENBRIDGE
Enbridge Pipelines Inc.

Subject: LINE 5 - STRAITS -

Adam Erickson / Mike Gorman / Larry Mesnick /
- Anchors are in route
- Surveys started this morning - 3-4 days.
- Idea is to overlap data
- Data should be available 19/20th
- Friday - June 20th - mobilize barge.
- Scott - NGL issues - did not have a strong opinion either way - look in with something other than NGL - OK.

Mike Gorman - using NGL gives you less residual stress on the pipe -
J. Sobczynski - OK with NGL.

- Install anchors on any span that requires it.
- J. P. Kenney - no word yet, Adam expects to hear this PM.
- Week of July 7th still looks ok for ILI inspections

ENG 02/09/98

Don L Engen
06/12/2003 04:28 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Schedule<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 06/12/2003 04:28 PM -----

Adam J Erickson@LPL
06/12/2003 04:14 PM

To: Al V Aleknavicius/LPL@LPL, Christine L Neff/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Grant P Henningsen/LPL@LPL, Jill M Schubert/LPL@LPL, Larry Mersnick/US/Enbridge@LPL, Mark S Sitek/LPL@LPL, Mike D Goman/LPL@LPL, Scott A McEachern/LPL@LPL, Walter J Kresic/CNPL/Enbridge@IPL
cc:
Subject: Schedule
Expire On:

Here is the updated schedule as discussed.

Document.pdf

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

Adam J Erickson
06/10/2003 12:10 PM

To: Larry Mersnick/US/Enbridge, Don L Engen/CNPL/Enbridge, Grant P Henningsen/LPL, Al V Aleknavicius/LPL, Dave B McNeill/CNPL/Enbridge, Jill M Schubert/LPL, Mike D Goman/LPL, Garrett Wilkie/CNPL/Enbridge, Dale D Wascherol/CNPL/Enbridge, Christine L Neff/CNPL/Enbridge
cc: Walter J Kresic/CNPL/Enbridge@IPL, Scott A McEachern/LPL@LPL, Mark S Sitek/LPL@LPL
Subject:
File Database: File:
Would you like the recipient to view the FILING Info? ○ Yes ● No

We will be having a meeting with regards to the Straits of Mackinac, and the 2003 program on Thursday at 3:00 Central. Please find the attached agenda and attend if possible.

Adam



weeklymeetingagenda.doc

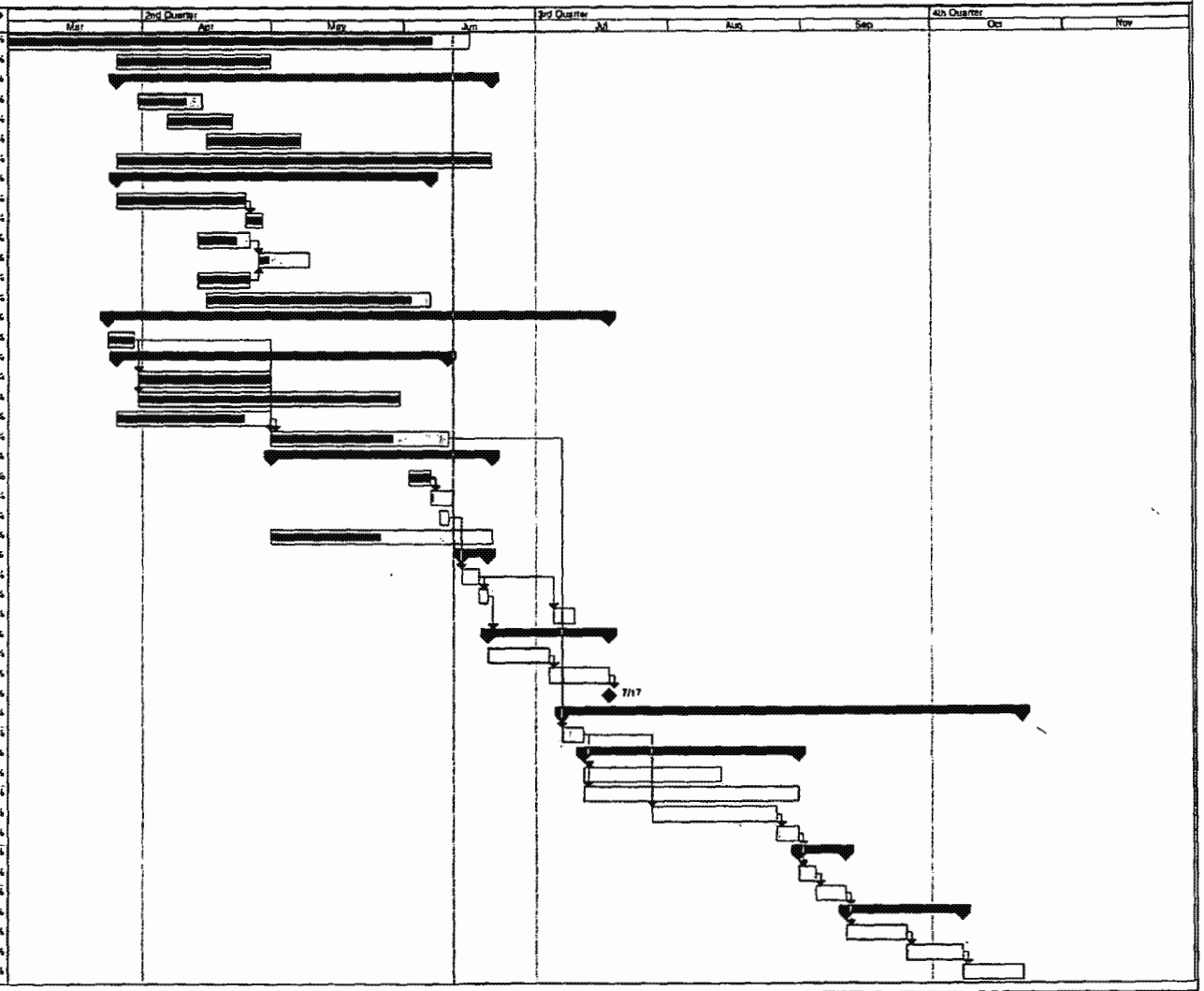
Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

2003 Straits of Mackinac Inspection/Improvement Program

(SCN 9100TR0136)

ENBRIDGE

ID	Task Name	Start	Finish	Duration	% Complete
1	Program Planning	Tue 11/5/02	Sun 6/15/03	171 days	85%
2	Integrity and Operations to Prepare Integrity Related F	Wed 3/26/03	Wed 4/30/03	27 days	100%
3	Engineering	Wed 3/26/03	Fri 8/29/03	74 days	89%
4	Identify Stress Brackets	Mon 3/31/03	Mon 4/14/03	11 days	85%
5	Shipper Communication Plan Developed	Mon 4/7/03	Mon 4/21/03	11 days	100%
6	Identify Operations Personell	Wed 4/16/03	Wed 8/7/03	16 days	100%
7	DEQ Permit Process	Wed 3/26/03	Fri 8/29/03	74 days	100%
8	Prepare Execution Plan w/Onyx	Wed 3/26/03	Fri 6/6/03	50 days	85%
9	Negotiate Contract	Wed 3/26/03	Thu 4/24/03	23 days	100%
10	Execute Contract	Fri 4/25/03	Mon 4/28/03	2 days	100%
11	Gantach Review	Mon 4/14/03	Fri 4/25/03	10 days	70%
12	Engineer Anchors	Mon 4/28/03	Fri 5/9/03	10 days	25%
13	Determine Qty and Order Anchors	Mon 4/14/03	Fri 4/25/03	10 days	100%
14	Onyx Preparation	Wed 4/16/03	Fri 6/6/03	44 days	90%
15	East Line Program	Mon 3/24/03	Thu 7/17/03	103 days	69%
16	Run Geopig and MFL on East Line	Mon 3/24/03	Sat 3/29/03	6 days	100%
17	Analysis of Data	Wed 3/26/03	Tue 6/10/03	64 days	88%
18	Vendor Analysis of Geopig Data	Mon 3/31/03	Wed 4/30/03	23 days	100%
19	Vendor Analysis of MFL Data	Mon 3/31/03	Fri 5/30/03	49 days	100%
20	FEA Model Preparation	Wed 3/26/03	Wed 4/30/03	27 days	65%
21	FEA Model Analysis	Thu 5/1/03	Tue 6/10/03	37 days	65%
22	Survey and Mobilization	Thu 5/1/03	Fri 6/20/03	47 days	45%
23	High Frequency Multibeam Inspection Both	Mon 6/2/03	Fri 6/6/03	5 days	100%
24	Multi Beam Data Input into FEA Model-Both	Sat 6/7/03	Wed 6/11/03	5 days	10%
25	ROV Mobilization	Mon 6/9/03	Tue 6/10/03	2 days	0%
26	Repair Barge Mobilization	Thu 5/1/03	Fri 6/20/03	47 days	45%
27	ROV Inspection	Sat 6/14/03	Thu 6/19/03	6 days	0%
28	ROV Survey-East Line	Sat 6/14/03	Tue 6/17/03	4 days	0%
29	ROV Visual Inspection Data of Existing Rep	Wed 6/18/03	Thu 6/19/03	2 days	0%
30	Gather Current Data 1st Time-Both Lines	Sat 7/5/03	Wed 7/9/03	5 days	0%
31	Repairs-East Line	Fri 6/20/03	Thu 7/17/03	28 days	0%
32	Structural Repairs-East Line	Fri 6/20/03	Thu 7/3/03	14 days	0%
33	Corrosion Repairs-East Line	Fri 7/4/03	Thu 7/17/03	14 days	0%
34	Barge on Standby	Thu 7/17/03	Thu 7/17/03	0 days	0%
35	West Line Program	Mon 7/7/03	Tue 10/21/03	93 days	0%
36	Run Geopig and MFL West Line	Mon 7/7/03	Fri 7/11/03	5 days	0%
37	Analysis of Data	Sat 7/12/03	Sat 8/30/03	50 days	0%
38	VendorAnalysis of Geopig Data	Sat 7/12/03	Tue 8/12/03	32 days	0%
39	Vendor Analysis of MFL Data	Sat 7/12/03	Sat 8/30/03	80 days	0%
40	FEA Model Analysis	Mon 7/28/03	Mon 8/25/03	29 days	0%
41	Re-Mobilize Inspection and Repair Crews	Tue 8/26/03	Sat 8/30/03	5 days	0%
42	ROV Inspection	Sun 8/31/03	Wed 9/10/03	8 days	0%
43	ROV Survey-West Line	Sun 8/31/03	Wed 9/3/03	4 days	0%
44	ROV Visual Inspection Data of Existing Rep	Thu 9/4/03	Wed 9/10/03	5 days	0%
45	Repairs-West Line	Thu 9/11/03	Tue 10/7/03	18 days	0%
46	Structural Repairs-West Line	Thu 9/11/03	Wed 9/24/03	10 days	0%
47	Corrosion Repairs-West Line	Thu 9/25/03	Tue 10/7/03	9 days	0%
48	De-Mobilize	Wed 10/8/03	Tue 10/21/03	10 days	0%



Project: Straits 2003
Date: Thu 6/12/03

Task | Split | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Split | Rolled Up Milestone | Rolled Up Progress | External Tasks | Project Summary | External Milestone | External Milestone | Deadline

ENBDNR0007070

Al Aleknavicius, Mike Gonera, Tony Magnick

AFE No.	Page 1 of
File No.	Date 06-12-03
Designed by	Checked by

ENBRIDGE
Enbridge Pipelines Inc.

Subject: LINE 5 - STRAITS OF MACKINAC - David M. Garrett W.

- Adam Erickson / Dale Woodard / Floyd Mott / Christine N.
Multibeam - contour of lake bottom
ROV - video of entire pipeline
Current Data gathering - current strength to be gathered.
Mapping and MFL -

2003 Plans -
as above.
Analysis
Repair

- No corrosion / sagging features to be concerned about.
- Tuesday 1000 central meetings.
-
Previous Repairs
6 repairs every 5 years

Schedule:
- began / completed multibeam - East & West.
Begin -
- Saturday June 14th - ROV survey - 4 Days
- Barge - 24th of June..
-

- UBNG L in line to relieve longitudinal stress due to sag.
-

20" = 308.1 m³/mile
308.1
4.2 miles each section
6162
1232 4.0
12950 2
1295 m³/4.2 miles

308.1
3
924.3
+2
6162
1295
6
7740 lbs.

96/60/20 ENG

AFE No.	Page 2 of
File No.	Date 06-12-03
Designed by	Checked by
Subject: Straits of Mackinac Meeting	

ENBRIDGE
Enbridge Pipelines Inc.

- Schedule
  ROW -
  West Line Survey schedule -
- Wait until ROW survey finished -
- July 7th for ICI now. (week of July 7th).

ENG 02/09/98

Meeting Agenda-Straits of Mackinac
Thursday at 3:00 PM Central
Dial In number 800-503-2899 Access Code 7250548

Invitees:

Grant Henningsen	Adam Erickson	Dale Wascherol
Al Aleknavicius	Mike Goman	Garrett Wilke
Larry Mersnick	Dave McNeil	Christine Neff
Don Engen	Jill Schubert	

Copy of minutes:

Scott McEachern	Gordon Good	David Bryson
Mark Sitek	Greg Sevick	
John Hayes	Art Meyer	
Walter Kresic	Kent cornelius	

1. Communications
    - Layout of proposed communications
        - Weekly Meetings-Tuesday 10:00 AM Central
        - Until 2003 program is complete.
        - Operations to hold daily update meetings while repairs are in progress

2. Schedule
    - Multibeam
    - ROV Survey
    - Current Data Gathering
    - Geopig and MFL
    - Analysis
    - Repair

3.Operations-Update on issues/concerns

4. Pipeline Control- Update on issues/concerns

5. Shipper Services- Update on issues/concerns

6. Pipeline Integrity- Update on issues/concerns

Don L Engen

06/10/2003 11:33 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Line 5 (20") West Straits Inspections<PRG.LINE05.20".straits.mi-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 06/10/2003 11:33 AM -----

Adam J Erickson@LPL

06/10/2003 11:10 AM

To: Larry Mersnick/US/Enbridge@LPL, Don L Engen/CNPL/Enbridge@IPL, Grant P Henningsen/LPL@LPL, Al V Aleknavicius/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Jill M Schubert/LPL@LPL, Mike D Goman/LPL@LPL, Garrett Wilkie/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL
cc: Walter J Kresic/CNPL/Enbridge@IPL, Scott A McEachern/LPL@LPL, Mark S Sitek/LPL@LPL
Subject:
Expire On:

We will be having a meeting with regards to the Straits of Mackinac, and the 2003 program on Thursday at 3:00 Central. Please find the attached agenda and attend if possible.

Adam

weeklymeetingagenda.doc

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

Don L Engen
06/10/2003 04:39 PM

To: Michelle Wayne/CNPL/Enbridge,
cc: Pipeline Integrity DMS
cc:
Subject: Export Papers Request - CTool<PRG.LINE05.20".straits.mi-03>
Expire On:

Hi Michelle,

I completed an "Export Papers Request" and am forwarding the Equipment List for inclusion. Please call if you have any questions.

Thanks.

Don Engen
Pipeline Integrity
Office: 420-8715
Cell: 982-2032



CTool 20 inch Inventory For Customs - Line 5 West Strait - June 10, 2003.

Equipment List

Item	Make	Model	S/N	Country of Origin	Value Can$
CRATE 1					
Total estimated weight 550 lbs					
Crate 1 28"x28"x48" approx					
20 " CTOOL (COMPLETE)			20	Canada	$ 5,000.00
Spare scraper cup				Canada	$ 800.00
Spare detector disc (2)				Canada	$ 300.00
Spare odometer wheel				Canada	$ 150.00
Oring				Canada	$ 2.00
Teflon tape				Canada	$ 0.50
Small tube of grease				Canada	$ 0.25
Two down load cords				Canada	$ 25.00
Spare odometer sensor cord				Canada	$ 250.00
Small nuts and bolts				Canada	$ 3.00
Electronics Retractor				Canada	$ 25.00
CTOOL Locator	WAVETRAK	WTC6	2005	Canada	$ 1,000.00
CTOOL Locator Housing	WAVETRAK	WTC Style	323	Canada	$ 50.00
Multimeter	Fluke	77 Series II	62820191R	USA	$ 300.00
Wrench Set/Hand tools	Canada	Mastercraft	N/A	Canada	$ 100.00
Digital Caliper	Canada		G08038769	Canada	$ 50.00
				Total	$ 8,055.75

ENBRIDGE

Export Papers Request

Composed By: Don L

Engen/CNPL/Enbridge

Composed Date: 06/10/2003

Exporter: Enbridge Pipelines Inc. - Crate at 6010 - 87 St. Pick up June 16, 2003. Phone 430-6901 one working day before picking up. Attention: Don Savard	**Consignee:** Enbridge US - 2811 - 27th Avenue, Escanaba, Michigan,49829 Attention: Leo Zalaznik - Phone: (906) 789-1221 Ext. - 23	**US Consignee's I.R.S. No:**
Shipping Via: Amtroline	**Bill of Lading No:**	**Shipping Charges Prepaid or Collect:** Prepaid
US Customs Charges Paid by Exporter or Consignee: Exporter	**Country of Origin:** Canada	**No. of Pieces Shipping:** 1 Crate
Weight: 550 lbs.	**Total Value of Goods (CDN):** $8055.75	**Enbridge Charge Code:** 40002/000/41144/62010-0

Reason for Export: CTool is owned by Enbridge and stored in Edmonton. The tool is required for in - line inspection work on Line 5 at the Straits of Mackinac in Michigan.

Complete Description of Goods (Including Serial no.'s part no.'s etc.)
See Equipment List

Papers Received:
Papers Forwarded:
Via:
Milne & Craighead Fax Number: ○ 428-6603 ○ 890-7171
Contact:
Department:
Return Fax Number:
Return Phone Number:

Don L Engen
06/10/2003 04:45 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: 20" Contents for shipping to the US<PRG.LINE05.20.straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 06/10/2003 04:45 PM -----

"Brian Powlousky" <brian@axiompipe.com>
06/10/2003 11:46 AM
Please respond to brian

To: "Don Engen" <Don.Engen@enbridge.com>, "Don Savard" <pipdon@telusplanet.net>, "Jordan Dyck" <jordan@axiompipe.com>
cc:
Subject: 20" Contents for shipping to the US
Expire On:

Please find attached the list outlining crate contents for the 20" straights west leg.

If you have any questions please don't hesitate to call

Thanks and Have a great day

Brian Powlousky
Axiom Pipeline Solution Inc.

780.975.1323 CRATE 20 INCH CTOOL CONTENTS FOR SHIPPING TO US.x



Don L Engen

06/10/2003 10:04 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Line 5 (20") Straits<PRG.LINE05.20".straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 06/10/2003 10:04 AM -----



"Don Savard" <plpdon@telusplanet.net>

06/08/2003 06:54 PM

To: "Don Engen" <don.engen@cnpl.enbridge.com>
cc: "Jordan Dyck" <jadman@telusplanet.net>
Subject:
Expire On:

Greeting Don

Jordan has let me know about the 20" run on the 23 June. I will have Axiom prepare their listing of materials to be sent and will include the CTOOL material for customs purposes. Will we go the same route as last time with Enbridge purchasing preparing the customs paper??
I will be away on business till Wednesday but can be reached on my cell 780 446 5222.
Will contact you on my return.
Regards Don

Don L Engen
06/10/2003 10:41 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Line 5 (20") Straits - Customs List<PRG.LINE05.20".straits.geo-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 06/10/2003 10:41 AM -----

"Don Savard" <plpdon@telusplanet.net>
06/09/2003 06:23 AM

To: "Jordan Dyck" <jadman@telusplanet.net>
cc: "Don Engen" <don.engen@cnpl.enbridge.com>
Subject:
Expire On:

Greetings Jordan

Here is the modified crate contents listing for shipping. You indicated that you wanted to change some things on the list. Please make the necessary changes and forward the list to Don Engan and cc me. This will get the paper work started for the shipment of the 20 inch tool to the US.



Regards Don CRATE 20 INCH CTOOL CONTENTS FOR SHIPPING TO US.x



Leanne M Thomson
06/09/2003 03:27 PM

To: Don L Engen/CNPL/Enbridge@IPL, Tanis J Elm/CNPL/Enbridge@IPL, Scott D Ironside/CNPL/Enbridge@IPL, Brad S Smith/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL
cc: Walter J Kresic/CNPL/Enbridge@IPL
Subject: 2004 Canadian Operating Budget<BUD.op.2004.can>
Expire On:

Hi All,

I have received notice that the 2004 Canadian Operating budget process is now starting. There are a number of steps that I have to go through before the budget gets approved so in order for me to make the VP approval deadline, I must have all the projects/consulting services budget amounts by **June 18th.** Please send me via e-mail the reason for the budget item, the account it affects, the dollar amount, and approx. split out of costs per quarter. I will review the items and costs with each respective person once I have them placed in my operating cost summary table.

If you have any question, please let me know.

Thanks,
Leanne.

Equipment List

Item	Make	Model	S/N	Country of Origin	Value Can$
CRATE 1					
Total estimated weight 550 lbs					
Crate 1 28"x28"x48" approx					
20 " CTOOL (COMPLETE)			20	Canada	$ 5,000.00
Spare scraper cup				Canada	$ 800.00
Spare detector disc (2)				Canada	$ 300.00
Spare odometer wheel				Canada	$ 150.00
Oring				Canada	$ 2.00
Teflon tape				Canada	$ 0.50
Small tube of grease				Canada	$ 0.25
Two down load cords				Canada	$ 25.00
Spare odometer sensor cord				Canada	$ 250.00
Small nuts and bolts				Canada	$ 3.00
Electronics Retractor				canada	$ 25.00
Tool Pinger	WAVETRAK	WTC6	2001	Canada	$ 1,000.00
Tool Locator	WAVETRAK	WT12A	39842	Canada	$ 5,000.00
Tool Locator	WAVETRAK	WT12A	398200	Canada	$ 5,000.00
GPS Unit	Garmin	Etrex	AX-GPS1	Taiwan	$ 250.00
GPS Unit	Garmin	Etrex	AX-GPS2	Taiwan	$ 250.00
Car Power inverter	Belkin	F5C400	270312	China	$ 50.00
Car Power inverter	Motomaster	Eliminator	7314-059827	Canada	$ 50.00
Multimeter	Fluke		62820191R	USA	$ 300.00
Wrench Set/Hand tools	Canada	Mastercraft	N/A	Canada	$ 100.00
Safety coveralls	Canada		N/A	Canada	$ 50.00
Safety coveralls	Canada		N/A	Canada	$ 50.00
Hard Hat	Canada		N/A	Canada	$ 20.00
Hard Hat	Canada		N/A	Canada	$ 20.00
Safety goggles	Canada		N/A	Canada	$ 10.00
Safety goggles	Canada		N/A	Canada	$ 10.00
Safety Boots	Canada		N/A	Canada	$ 50.00
Safety Boots	Canada		N/A	Canada	$ 50.00
Total Crate 2					$ 12,715.75



Don L Engen

06/06/2003 05:03 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: RE: FW: Enbridge Straits of Mackinac Crossing Coordinates<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 06/06/2003 05:03 PM -----



"Fellers, Gary" <Gary.Fellers@jpkhouston.com>

06/06/2003 04:26 PM

To: "'Adam.Erickson@enbridge.com '" <Adam.Erickson@enbridge.com>
cc: "'Dave.McNeill@enbridge.com '" <Dave.McNeill@enbridge.com>, "'Don.Engen@enbridge.com '" <Don.Engen@enbridge.com>, "'Grant.Henningsen@enbridge.com '" <Grant.Henningsen@enbridge.com>, "'Mike.Goman@enbridge.com '" <Mike.Goman@enbridge.com>, Garrett_Wilkie/CNPL/Enbridge.IPL <Garrett_Wilkie/CNPL/Enbridge.IPL@Enbridge-US.com>
Subject: RE: FW: Enbridge Straits of Mackinac Crossing Coordinates<PRG.LINE05.20".straits.ml-03>
Expire On:

Adam,

I will consult with Craig in the morning. However, there is a lot of merit in what Garrett has to say. I am responding from home at this time (1730/06/06.03).

Gary

-----Original Message-----
From: Adam.Erickson@enbridge.com
To: Fellers, Gary
Cc: Dave.McNeill@enbridge.com; Don.Engen@enbridge.com; Fellers, Gary; Grant.Henningsen@enbridge.com; Mike.Goman@enbridge.com; Garrett_Wilkie/CNPL/Enbridge.IPL@Enbridge-US.com
Sent: 6/6/03 3:18 PM
Subject: Re: FW: Enbridge Straits of Mackinac Crossing Coordinates<PRG.LINE05.20".straits.ml-03>

What do you think fo this, I think application of a general 10% corrosion
assumption would be adequate.

Garrett, how much defect/how many indications are there on the lines?
Adam

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

Garrett

Wilkie@IPL To: Adam J Erickson/LPL@LPL

cc: Dave B McNeill/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, "Fellers, Gary"

06/06/2003 <Gary.Fellers@jpkhouston.com>, Grant P Henningsen/LPL@LPL, Mike D Goman/LPL@LPL, pidms

02:45 PM Subject: Re: FW: Enbridge Straits of Mackinac Crossing Coordinates<PRG.LINE05.20".straits.ml-03> (Document link: Adam J Erickson)

I apologize, I should have provided more detail in the last email.

There is absolutely no reportable corrosion present within the line.

We had the same concern as you. We knew the results from the 1997 inspection. We had PII compare the results of the 1997 to the new 2003 inspection for an additional level of analysis. The worst 1997 feature that was termed 39% deep corrosion has the exact same signature (shape) in the 2003 inspection and due to improvements in analysis techniques and software has been reclassified as a manufacturing "MFG" defect that is approximately 20%. This is the story for the entire run. The only thing that is present in the line are manufacturing defects.

The MFL tool tolerance is 10% metal loss. Therefore, for the JP Kenny analysis, an assumption of 10% metal loss could be assumed. To put that in perspective though, 10% is the same tolerance on the API 5L spec from the mill and therefore the nominal wall thickness has this much variation anyway.

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Pipeline Integrity - Senior Engineer
Enbridge Pipelines Inc.
(780)420-8428

Adam J Erickson@LPL To: Garrett Wilkie/CNPL/Enbridge@IPL

cc: Dave B McNeill/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, "Fellers,

Gary"
06/06/2003 <Gary.Fellers@jpkhouston.com>,
Grant P Henningsen/LPL@LPL, Mike D Goman/LPL@LPL
08:34 AM Subject: Re: FW: Enbridge
Straits of Mackinac Crossing Coordinates<PRG.LINE05.20".straits.ml-03>
(Document link: Garrett Wilkie)

Expire On:

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Office:(715) 394-1548
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Garrett

Wilkie@IPL To: Adam J Erickson/LPL@LPL

cc: "Fellers, Gary"
<Gary.Fellers@jpkhouston.com>, Grant P Henningsen/LPL@LPL, Mike D

06/06/2003 Goman/LPL@LPL, Don L
Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, pidms

09:02 AM Subject: Re: FW: Enbridge
Straits of Mackinac Crossing Coordinates<PRG.LINE05.20".straits.ml-03>
(Document link: Adam J
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Adam J Erickson@LPL 06/06/2003 07:07 AM

To: Mike D Goman/LPL@LPL, "Fellers, Gary" <Gary.Fellers@jpkhouston.com>, Garrett Wilkie/CNPL/Enbridge@IPL
cc: Grant P Henningsen/LPL@LPL
Subject: FW: Enbridge Straits of Mackinac Crossing Coordinates
Expire On:

Looks like 9:00 is the time, please dial in to 800-503-2899 access code 7250548. Sorry about the short notice Garrett, but please join if possible.

Adam

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

----- Forwarded by Adam J Erickson/LPL on 06/06/2003 08:06 AM -----

"Fellers, Gary" <Gary.Fellers@jpkhouston.com> 06/06/2003 06:30 AM

To: "Adam Erickson (adam.erickson@enbridge-us.com)" <adam.erickson@enbridge-us.com>
cc: "Kilmer, Craig" <Craig.Kilmer@jpkhouston.com>, "Kvist, Orjan" <orjan.kvist@jpkhouston.com>, "Smith, Derek" <derek.smith@jpkhouston.com>
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Cc: Smith, Derek; Fellers, Gary; Kvist, Orjan
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cc:
cc:
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Expire On:

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Adam J Erickson@LPL
06/06/2003 02:18 PM

To: "Fellers, Gary" <Gary.Fellers@jpkhouston.com>
cc: Dave B McNeill/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, "Fellers, Gary" <Gary.Fellers@jpkhouston.com>, Grant P Henningsen/LPL@LPL, Mike D Goman/LPL@LPL, Garrett Wilkie/CNPL/Enbridge@IPL
Subject: Re: FW: Enbridge Straits of Mackinac Crossing Coordinates<PRG.LINE05.20".straits.ml-03>
Expire On:

What do you think fo this, I think application of a general 10% corrosion assumption would be adequate.

Garrett, how much defect/how many indications are there on the lines?
Adam

Adam Erickson
Enbridge Energy
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Cell:(218) 393-6405

Garrett Wilkie@IPL

Garrett Wilkie@IPL
06/06/2003 02:45 PM

To: Adam J Erickson/LPL@LPL
cc: Dave B McNeill/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, "Fellers, Gary" <Gary.Fellers@jpkhouston.com>, Grant P Henningsen/LPL@LPL, Mike D Goman/LPL@LPL, pidms
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ENBRIDGE

Garrett Wilkie

06/06/2003 01:45 PM

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cc: Dave B McNeill/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, "Fellers, Gary" <Gary.Fellers@jpkhouston.com>, Grant P Henningsen/LPL@LPL, Mike D Goman/LPL@LPL, pidms
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06/06/2003 03:08 PM

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Garrett Wilkie@IPL
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cc: "Fellers, Gary" <Gary.Fellers@jpkhouston.com>, Grant P Henningsen/LPL@LPL, Mike D Goman/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, pidms
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06/05/2003 08:02 AM

To: Walter J Kresic/CNPL/Enbridge
cc: Pipeline Integrity DMS
cc: Don L Engen/CNPL/Enbridge@IPL
Subject: Re: Line 5 (20") West Leg - Straits of Mackinac In - Line Inspection<PRG.LINE05.20".straits.ml.03>
Expire On:

The East Leg is complete. The Geopig and MFL reports have been received. There are no geometry or metal loss concerns reported.

Don
Walter J Kresic

Walter J Kresic
06/04/2003 05:17 PM

To: Don L Engen/CNPL/Enbridge@IPL
cc:
Subject: Re: Line 5 (20") West Leg - Straits of Mackinac In - Line Inspection<PRG.LINE05.20".straits.ml.03>
Expire On:

Did we complete the East Leg? If so, were there any concerns?

Don L Engen

Don L Engen
06/04/03 03:32 PM

To: Leo M Zalaznik/LPL@LPL, Mike D Goman/LPL@LPL, Adam J Erickson/LPL@LPL, Al V Aleknavicius/LPL@LPL, Rick K Aunet/LPL@LPL, Dennis M Wedan/LPL@LPL, Joe M Shafer/LPL@LPL, Fred W Klumpp/LPL@LPL, Mike J Skaggs/LPL@LPL, Larry G Schnurer/LPL@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Mike D Burnis/LPL@LPL, Peter T Olson/LPL@LPL
cc: Dave B McNeill/CNPL/Enbridge@IPL, Mark S Sitek/LPL@LPL, Pipeline Integrity DMS@IPL, Gary F Kosch/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, CCO Senior Operators, Doug A Barry/CNPL/Enbridge@IPL, Bryan J Walbauer/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Murray A Chudyk/CNPL/Enbridge@IPL, Doug R Newton/CNPL/Enbridge@IPL, Ashok Anand/CNPL/Enbridge@IPL, Paul W Wandzura/CNPL/Enbridge@IPL, Walter J Kresic/CNPL/Enbridge@IPL
Subject: Line 5 (20") West Leg - Straits of Mackinac In - Line Inspection<PRG.LINE05.20".straits.ml.03>
Expire On:

Pipeline Integrity is still planning on completing inspections on the west leg of the 20 inch line at the Straits of Mackinac during the week of June 23, 2003. The tool line up will include a cleaning tool, CTool(sizing), Geopig Tool(caliper\geometry) and the MFL Tool for metal loss.
This message is for information purposes only and run details will be issued in the near future.
If you have any questions or concerns please contact me.

Thanks.

Don Engen
Pipeline Integrity

Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234



Don L Engen

06/04/2003 04:10 PM

To: Leo M Zalaznik/LPL, Mike D Goman/LPL@LPL, Adam J Erickson/LPL@LPL, Al V Aleknavicius/LPL@LPL, Rick K Aunet/LPL@LPL, Dennis M Wedan/LPL@LPL, Joe M Shafer/LPL@LPL, Fred W Klumpp/LPL@LPL, Mike J Skaggs/LPL@LPL, Larry G Schnurer/LPL@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Mike D Burnis/LPL@LPL, Peter T Olson/LPL@LPL

cc: Dave B McNeill/CNPL/Enbridge@IPL, Mark S Sitek/LPL@LPL, Pipeline Integrity DMS@IPL, Gary F Kosch/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, CCO Senior Operators, Doug A Barry/CNPL/Enbridge@IPL, Bryan J Walbauer/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Murray A Chudyk/CNPL/Enbridge@IPL, Doug R Newton/CNPL/Enbridge@IPL, Ashok Anand/CNPL/Enbridge@IPL, Paul W Wandzura/CNPL/Enbridge, Walter J Kresic/CNPL/Enbridge,

cc:

Subject: Line 5 (20") West Leg - Straits of Mackinac In - Line Inspection <PRG.LINE05.20".straits.mi.03>

Expire On:

Pipeline Integrity is still planning on completing inspections on the west leg of the 20 inch line at the Straits of Mackinac during the week of June 23, 2003. The tool line up will include a cleaning tool, CTool(sizing), Geopig Tool(caliper\geometry) and the MFL Tool for metal loss.
This message is for information purposes only and run details will be issued in the near future.
If you have any questions or concerns please contact me.

Thanks.

Don Engen
Pipeline Integrity
Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234

From: Don L Engen on 03/21/2003 08:39:27 AM

To: Jim M McKone/LPL@LPL, Leo M Zalaznik/LPL@LPL, John M Grotberg/LPL@LPL, Mike D Goman/LPL@LPL, Adam J Erickson/LPL@LPL, Al V Aleknavicius/LPL@LPL, Rick K Aunet/LPL@LPL, Dennis M Wedan/LPL@LPL, Joe M Shafer/LPL@LPL, Fred W Klumpp/LPL@LPL, Mike J Skaggs/LPL@LPL, Larry G Schnurer/LPL@LPL, Blake C Olson/LPL@LPL, Gary F Kayser/LPL@LPL, Mike D Burnis/LPL@LPL, Peter T Olson/LPL@LPL, pwicons@yahoo.com, michel.hoyeck@og.ge.com, james1.simmons@og.ge.com, aaron.roberie@corrpro.ca, landals@attglobal.net, jordan@axiompipe.com

cc: Dave B McNeill/CNPL/Enbridge@IPL, Mark S Sitek/LPL@LPL, Pipeline Integrity DMS@IPL, Dean G Rawson/CNPL/Enbridge@IPL, Gary F Kosch/CNPL/Enbridge@IPL, Christine L Neff/CNPL/Enbridge@IPL, CCO Senior Operators, Doug A Barry/CNPL/Enbridge@IPL, Bryan J Walbauer/CNPL/Enbridge@IPL, Dale D Wascherol/CNPL/Enbridge@IPL, Murray A Chudyk/CNPL/Enbridge@IPL, Doug R Newton/CNPL/Enbridge@IPL, Ashok Anand/CNPL/Enbridge@IPL

Subject: Line 5 (20"/30") Superior to Iron River, Iron River to North Straits, Straits of Mackinac In - Line Inspections - March \ April, 2003 - Contact List-Revision 1 <PRG.LINE05.20".straits.mi-03>

Revision to correct phone number for Mike Skaggs.

Attached is a revised contact list for the Line 5 (20" and 30") in - line inspections. Please advise of any additions or deletions required and feel free to forward this to any other interested parties.

Thank you.

Don Engen
Pipeline Integrity
Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234



Line 5 (20 Inch) Straits of Mackinac, Line 5 (30 Inch) PE to IR, IR to Straits Contact List Mar-April 2003

Anna M Warawa
06/02/2003 02:05 PM

To: Pipeline Integrity
cc: Pipeline Integrity DMS@IPL
Subject: Line 5 (20") Straits of Mackinac (East) BJ Pipeline Inspection Services March 2003 <PRG.Line05.20".straits.geo-03>
Expire On:

The above mentioned report was received on May 29, 2003.

Below the quality assurance report requiring further input from Vanessa.



Line 5 (20 inch) Straits of Mackinac East BJ Pipeline Services GEOPIG March 2003.doc

Corrosion In-Line Inspection
Data Assessment and QA Checklist

Line Number Line 5 Diameter 20"

Segments Inspected Straits of Mackinac (East)

Inspection Tool Geopig (GPS) Vendor BJ Pipeline Services

Part 1 ILI Report / Contract Terms

ILI Coordinator or designate to review the incoming report and complete basic checks to ensure report format and contract terms have been met.

Run Date March 24, 2003

Section Analyzed Straits of Mackinac

Report Due Date June 20, 2003 Report Received Date May 29, 2003

Comments (if report not received by due date)

Check List for Deliverables

Basic check to determine if requested or required items as outlined in the contract (and/or formally requested) were provided and are in the correct format (indicate NA if not applicable).

	Required / Requested	Received Hardcopy	Received Electronic	Format Good
Marker List	☒	☐	☐	
Nominal Wall thickness listing	☒	☐	☐	
Pipe Listing	☒	☐	☐	
Pipe Tally	☒	☐	☐	
PipeImage	☒	☐	☐	
IMU / GPS Information	☐	☐	☐	
Morrison Format	☐	☐	☐	
LAPA	☐	☐	☐	
Rstreng Eff Area	☐	☐	☐	
On network	☒	☐	☒	
	☐	☐	☐	
	☐	☐	☐	

Comments and / or Actions Required To Complete Reporting Requirements

Vanessa - We need to adjust the quality assurance form to accommodate the Geopig data requirements.

Complete and confirmed by Anna Warawa Date: June 2, 2003

Part 2 Data Assessment

Excavation Coordinator or designate to complete a QA assessment of the ILI data to confirm the data is acceptable and consistent with historical and / or other documented information about the pipeline segment. The analysis consists of expert based judgement of data validity.

QA Data Check

- Is format acceptable for analysis (y/n)
- Are all CD files acceptable for analysis (y/n)
  (i.e. files can all be opened & data is formatted)

Comments and / or Actions Required To Fix Data

QA data check completed by Date

Data Validation

Compare ILI data to historical information to determine if data is consistent with past results and expectations. Note – the items outlined below are intended to represent some of the ways that can be used to evaluate the data and is not intended as a comprehensive list (nor as a requirement) for evaluating ILI data. Methods used should be checked (y/n). Comments can be provided below.

Validation Method(s) Used	Valid
☐ Girth weld numbers okay (y/n)	
☐ Marker list and tracking report match (y/n) (AGM numbers, locations, etc).	
☐ Data consistent with historical ILI information	
☐ RPRs consistent w/ historical or expected results	
☐ RPRs consistent w/ current operating pressures	
☐ Trend plots consistent w/ historical results	
☐ Sentenced plots consistent w/ historical results	
☐ Exploratory dig results consistent w/ ILI data	
☐ Comparison of data to previously excavated data	
☐	
☐	
☐	

Comments and / or Actions Required To Validate Data

Data evaluation completed by Date
Date

Comments (any missing information should be documented with new deliverable dates – Note; if data can be assessed in the present format then assessment should begin on data as is)

Due:	Rec'd:
Due:	Rec'd:
Due:	Rec'd:
Due:	Rec'd:

Reviewed/Approved by
Excavation Coordinator: Date
Supervisor of Integrity Programs: Date

Part 3 Analysis / Generation of Excavation Packages

Excavation Coordinator or designate shall analyze the ILI information, develop a master dig list, determine whether pressure restrictions are required and outline any phased dig programs that may be required to meet operating requirements, resource requirements and / or HCA regulations.

Generate Master Dig List **Date Complete**

Generate master dig list with all features that meet Enbridge dig criteria.

Identify and document (on master list) all features that have been previously excavated
And recoated or repaired.

Evaluation of remaining features **Required** **Action By**

Is a temporary restriction being requested?

If yes, is there a Capacity Impact?

Is a phased excavation program required?

Note: For HCA's in the US phased programs may not be allowed

No. of phases
Phase criteria Phase 1 -
Phase 2 -
Phase 3 -

Reson for Phased Program:
Due to Capacity Impacts?
Other

Preparation of Dig Packages

Action By **Date Complete**

Prepare Dig List / Status Table
(including HCA or other requirements)

Request Environmental Assessments

Complete Dig Packages and Submit to Operations

Comments

NOTE: This document should be kept electronically in the network neighbourhood along with the Master Dig Lists, Excavation Program Status Tables and any supporting documentation re: decision making processes that were used. Hard copy of this form, the Master Dig List, Excavation Status Sheets and documents describing decision making processes should be inserted and retained at the front of the hard copy ILI report received from the Vendor.

AFE No.	Page of
File No.	Date 05-29-03
Designed by	Checked by

ENBRIDGE
Enbridge Pipelines Inc.

Subject: LINE 5 STRAITS OF MACKINAC MEETING.

Adam Erickson, J. P. Kenney, Garett Wiltse, D. E.

- Line Stresses, BJ data - high.
- Need corrosion overlay for same area.
- They are using 30% metal loss - factor - seems quite conservative.
- Latest PLI report showing minimal corrosion.

- Superior Special Services - scheduled.
- West Line - 161 June 23rd still good.
- Nothing from the BJ report on the first East Leg had no features (dent etc) of any significance.
- Penney - Draft to be to Adam Erickson - June 5th.

- PLI MFL report in tomorrow.
- J. P. Kenney needs ASAP.
- Use NAD 83

ENG 02/09/98

Adam J Erickson@LPL

05/20/2003 08:36 AM

To: Al V Aleknavicius/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, "Fellers, Gary" <Gary.Fellers@jpkhouston.com>, Grant P Henningsen/LPL@LPL
cc: Scott A McEachern/LPL@LPL, Scott D Ironside/CNPL/Enbridge@IPL
Subject: Meeting-Straits of Mackinac
Expire On:

As discussed this morning, we will be having an update meeting with regard to the Straits of Mackinac next Thursday May 29 at 10 am Central. Please attend as necessary.

Adam

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

Adam J Erickson@LPL

05/20/2003 07:55 AM

To: Grant P Henningsen/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Al V Aleknavicius/LPL@LPL, "Fellers, Gary" <Gary.Fellers@jpkhouston.com>
cc: Garrett Wilkie/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL, Scott A McEachern/LPL@LPL, Scott D Ironside/CNPL/Enbridge@IPL
Subject: Meeting-Straits of Mackinac
Expire On:

Here is an updated schedule with regard to the proposed work in the Straits of Mackinac. Please review and call me with questions.

Adam



Straits 2003Rev8For Scott98.mpp

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

AFE No.	Page of
File No.	Date 05-20-03
Designed by	Checked by

ENBRIDGE
Enbridge Pipelines Inc.

Subject: STRAITS OF MACKINAC - MEETING

Adam Erickson J.P Kinney (3), DAVE McNEICE, D.E. ( ) Jerry Zeller - Proj. Mgr, Greg Kilmer, Enbridge
- O.J. ??) J.P. Kenney, Grant Henningsen.
- Schedule - Mobilization - Superior Specialty Services
- Hi frequency multibeam - June 2nd
- ROV Inspection - June 11th.

- Geophysical and MagneScan data in this week.
- Interest meeting - next week
- June 21ST. Tool runs. 23rd - Monday.?

- Criteria established - working with Kinder to date,

Transition plan -

Next meeting - 10:00 AM CDT - May 29th.

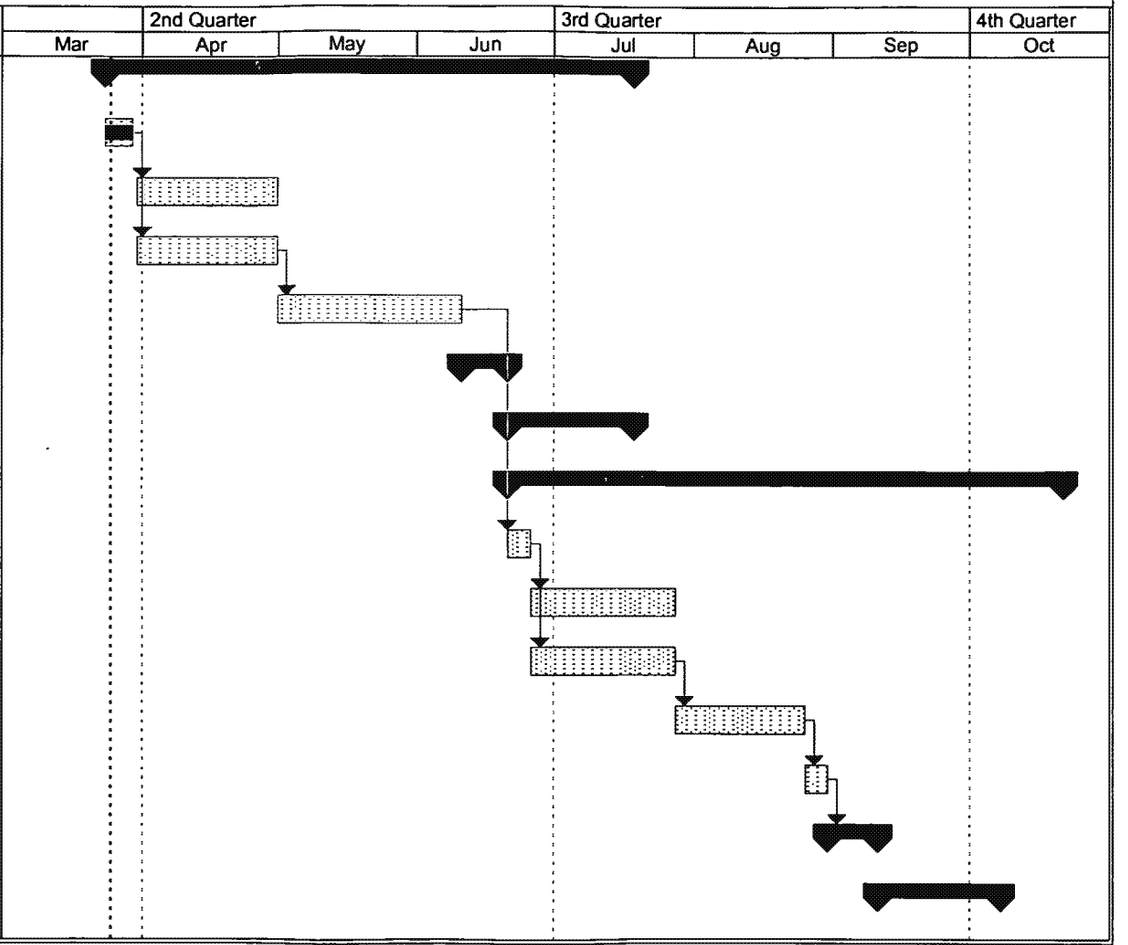
ENG 02/09/98

2003 Straits of Mackinac Inspection/Improvement Program

(SCN 9100TR0136)

ENBRIDGE

ID	Task Name	Duration	Start	Finish
2	**~~West~~ East Line Program And Common Preliminary Program**	**104 days?**	**Mon 03/24/03**	**Fri 07/18/03**
3	Run Geopig and MFL on West Line	6 days	Mon 03/24/03	Sat 03/29/03
5	Vendor Analysis of Geopig Data	23 days	Mon 03/31/03	Wed 04/30/03
6	Vendor Analysis of MFL Data	23 days	Mon 03/31/03	Wed 04/30/03
7	FEA Model Analysis	37 days?	Thu 05/01/03	Tue 06/10/03
14	**ROV Inspection**	**10 days**	**Wed 06/11/03**	**Fri 06/20/03**
17	**Repairs-West Line**	**28 days**	**Sat 06/21/03**	**Fri 07/18/03**
21	**~~East~~ West Line Program**	**109 days?**	**Sat 06/21/03**	**Tue 10/21/03**
22	Run Geopig and MFL East Line	5 days	Sat 06/21/03	Wed 06/25/03
24	VendorAnalysis of Geopig Data	32 days?	Thu 06/26/03	Sun 07/27/03
25	Vendor Analysis of MFL Data	32 days	Thu 06/26/03	Sun 07/27/03
26	FEA Model Analyiss	29 days	Mon 07/28/03	Mon 08/25/03
27	Re-Mobilize Inspection and Repair Crews	5 days	Tue 08/26/03	Sat 08/30/03
28	**ROV Inspection**	**9 days**	**Sun 08/31/03**	**Wed 09/10/03**
31	**Repairs-East Line**	**19 days**	**Thu 09/11/03**	**Tue 10/07/03**



Project: Straits 2003
Date: Tue 03/25/03

Task
Split
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Split
Rolled Up Milestone
Rolled Up Progress
External Tasks
Project Summary
External Milestone
Deadline

Adam J Erickson@LPL

05/14/2003 07:09 AM

To: Grant P Henningsen/LPL@LPL, Dave B McNeill/CNPL/Enbridge@IPL, Al V Aleknavicius/LPL@LPL, "Fellers, Gary" <Gary.Fellers@jpkhouston.com>
cc: Garrett Wilkie/CNPL/Enbridge@IPL, Don L Engen/CNPL/Enbridge@IPL
Subject: Meeting-Straits of Mackinac
Expire On:

We will be having a meeting regarding the Straits of Mackinac Tuesday May 20th at the Superior Office at 9:00 AM central. Topics will include:
Schedule Update
Transfer of pig Information
Transition Plan
Criteria Established to date
The dial in number will be 1-800-503-2899 and the access code will be 7250548
Please invite others as appropriate.
Adam

Adam Erickson
Enbridge Energy
Office:(715) 394-1548
Fax:(715) 394-1564
Cell:(218) 393-6405

April 30, 2003

Enbridge Pipelines Inc.
10201 Jasper Ave
Edmonton, Alberta
Canada
T5J 2J9

ATTENTION: Don Engen, Project Engineer

RE: **LINE 5 2003 INSPECTION PROJECT**

Dear Don

Please find enclosed the following:

1. PWI Consultants Ltd. Daily Time Tickets.
2. Original receipt for courier and coping.
3. Daily Work Summary.
4. Corrpro Daily Time Tickets.
5. PWI Invoice for services.

I have not enclosed any of the field reports from Corrpro or Axiom as they will be sending you their final reports. I enjoyed working with you and look forward to working with you on the next project. Let me know when we will inspect the West Straits Line.

I will look forward to seeing you soon, and thanks for all your assistance on the line # 5 projects.

Yours truly,

PWI Consultants Ltd.
Don Demich, President.

PIPELINE INTEGRITY
MAY - 7 2003

INVOICE # L5-2003-04

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley,MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
E-Mail: pwicons@earthlink.net
Tax # EIN 41-1924824

WO # 91002-00013 -03

INVOICE DATE: April 30,2003

PERIOD: March 11th - April 19th, 2003

TO:
Enbridge Pipelines Inc.
10201 Jasper Ave
Edmonton, Alberta Canada
T5J 2J9

Attention: Don Engen,
Project Engineer

TO SUPPLY THE FOLLOWING:

To provide supervisory and consulting services for GPS surveys, AGM deployment, cleaning caliper, geopig and MFL in0line inspections on Line 5, two-20 inch sections at the Straits of Mackinac. Each section is approximately 4.2 miles in length and Line 5- 30 inch between Superior,WI and iron River, MI -173 Miles and between Iron River and the Straits of Mackinac 206 Miles.

LABOR:

		Days	Rate/Day		Total
Manager	D.S.Demich	24.25	$ 600.00		$ 14,550.00
				Sub Total	**$ 14,550.00**

PER DIEM:

		Days	Rate/Day		Total
Manager	D.S.Demich	22	$ 120.00		$ 2,640.00
				Sub Total	**$ 2,640.00**

EXPENSES COST + 10%
UPS & Coping (Original receipt attached) $ 38.18

			Sub Total	$ 38.18

	Miles	Rate/Mile		
Personal 4x4 Vehicle	3955	$ 0.50		$ 1,977.50
			Sub Total	**$ 1,977.50**

			Mark Up	**10%**
Labor	$ 14,550.00			$ 14,550.00
Per Diem	$ 2,640.00			$ 2,640.00
Expenses	$ 38.18		$ 3.82	$ 42.00
Vehicle	$ 1,977.50			$ 1,977.50
				$ 19,209.50

APPROVED

BY _____
EMP # _____ DATE _____
TOTALS CHECKED _____ ORDER # WO 91002-00013-03

PROJECT CHARGE

PROJECT	TASK	EXP TYPE	COST CTR.	
91204SC0092	04	K2010-01	91204	$11,513.50
91204SC0093	04	K2010-01	91204	$7,696.00

OPERATING COST

LOB	CONT. SEG.	COST CTR.	ACCOUNT	SUBACCOUNT	INTER-LOB
/	/	/	/	/	
/	/	/	/	/	

TOTAL DO INVOICE

D. Engen 3176
05-09-03

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00013 -03

LOCATION: Edmonton, Alberta

TO: PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Attention: Don Demich

DATE: March 13, 2003

COMMENCEMENT DATE: March 13, 2003

COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To provide supervisory and consulting services for GPS surveys, AGM deployment, cleaning, caliper, Geopig and MFL in-line inspections on Line 5, two-20-inch sections at the Straits of Mackinac. Each Section is approximately 4.2 miles in length and Line 5 – 30-inch between Superior, WI and Iron River, MI – 173 miles and between Iron River and the Straits of Mackinac – 206 miles. Per 2003 rate schedule.

Company Information Only
Estimate
91204SC0092 – US $25,000
91204SC0093 – US $10,000

Rest to Houston Cipul 3/03

Estimated Value $

Capital Cost	Project #		Task #		Exp Type #	Exp. Organization #
	91204SC0092		04		62010-01	91204
	91204SC0093		04		62010-01	91204
Operating Costs	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: 3176
IT'S AGENT

APPROVAL 2944

Name of Contractor:

By: _____ Date: _____
SIGNATURE

RIGHT-TO-AUDIT

THE COMPANY SHALL BE GRANTED THE RIGHT-TO-AUDIT CONTRACTORS AND SUB-CONTRACTORS RECORDS UPON REASONABLE NOTICE FOR ALL COST-PLUS WORK ORDER BILLINGS.

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00013 -03

LOCATION: Edmonton, Alberta

TO: PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Attention: Don Demich

DATE: March 13, 2003

COMMENCEMENT DATE: March 13, 2003

COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To provide supervisory and consulting services for GPS surveys, AGM deployment, cleaning, caliper, Geopig and MFL in-line inspections on Line 5, two-20-inch sections at the Straits of Mackinac. Each Section is approximately 4.2 miles in length and Line 5 – 30-inch between Superior, WI and Iron River, MI – 173 miles and between Iron River and the Straits of Mackinac – 206 miles. Per 2003 rate schedule.

Estimated Value $

	Project #	Task #	Exp Type #	Exp. Organization #
Capital Cost	91204SC0092	04	62010-01	91204
	91204SC0093	04	62010-01	91204

	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #
Operating Costs						

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

Name of Contractor: PWI Consultants LLC

BY: 3176
IT'S AGENT

APPROVAL 2944

By: [signature] Date: 03-28-03
SIGNATURE

RIGHT-TO-AUDIT

THE COMPANY SHALL BE GRANTED THE RIGHT-TO-AUDIT CONTRACTORS AND SUB-CONTRACTORS RECORDS UPON REASONABLE NOTICE FOR ALL COST-PLUS WORK ORDER BILLINGS.

********** SALE **********
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****
Shift:1041 Drw:01 ID:532 Clerk:Greg
3/12/03 12:27:00

Center #1755
13033 Ridgedale Drive
Minnetonka, MN 55305
Phone 952-544-1384

Qty	Description	Unit	Ext
237	Copies	0.06S	14.22
1	Shipping	23.04	23.04

Sub Total:	37.26
Sales Tax:	0.92
Total Sale:	38.18
Credit Card:	38.18
Change:	0.00

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MBE MAIL BOXES ETC.®

PARCEL SHIPPING ORDER

Rev. 4/02

CUSTOMER (please print)

PRINT NAME Dr. Demich DATE 03/12/2003

STREET 4325 Tumbleweed PHONE 612 940-1040

CITY/STATE/ZIP Apple Valley, MN 55124 E MAIL:

PARCEL SHIPPING ORDER No. 95757496

PKG.	SENT TO:	LIST ALL CONTENTS	DECLARED VALUE	C.O.D. AMT.	ZONE	WT	DIM. WT.	CK. ONE	Pkg. Charges Amt	Pkg. Charges Type
A	NAME Aaron Rabinic Canada Canada STREET 1024X-314 Street APT. # CITY/STATE/ZIP Edmonton Alberta Can PHONE 780 447-4566 E MAIL: EPSO#		$	$				☐ SONIC AIR ☐ EARLY A.M. ☐ NEXT DAY AIR ☐ 2ND DAY AIR ☐ 3 DAY SELECT ☐ GROUND ☐ OTHER	13.09	SHP CHG DEC VAL COD PKG LABOR PKG MAT
			☐ RESIDENTIAL ☐ COMMERCIAL		☐ PACKED BY CUSTOMER					
			BREAKABLE ☐ YES ☐ NO SEE #3 BELOW		REPLACEABLE ☐ YES ☐ NO SEE BACK					
B	NAME STREET APT # CITY/STATE/ZIP PHONE E MAIL: EPSO#		$	$				☐ SONIC AIR ☐ EARLY A.M. ☐ NEXT DAY AIR ☐ 2ND DAY AIR ☐ 3 DAY SELECT ☐ GROUND ☐ OTHER		SHP CHG DEC VAL COD PKG LABOR PKG MAT
			☐ RESIDENTIAL ☐ COMMERCIAL		☐ PACKED BY CUSTOMER					
			BREAKABLE ☐ YES ☐ NO SEE #3 BELOW		REPLACEABLE ☐ YES ☐ NO SEE BACK					
C	NAME STREET APT # CITY/STATE/ZIP PHONE E MAIL: EPSO#		$	$				☐ SONIC AIR ☐ EARLY A.M. ☐ NEXT DAY AIR ☐ 2ND DAY AIR ☐ 3 DAY SELECT ☐ GROUND ☐ OTHER		SHP CHG DEC VAL COD PKG LABOR PKG MAT
			☐ RESIDENTIAL ☐ COMMERCIAL		☐ PACKED BY CUSTOMER					
			BREAKABLE ☐ YES ☐ NO SEE #3 BELOW		REPLACEABLE ☐ YES ☐ NO SEE BACK					

1. Subject to the terms and conditions herein, this Mail Boxes Etc. Center ("we" "us" or "our") will receive and forward parcels for customer ("you"). The carrier for all parcels accepted by us shall be UPS unless otherwise noted (Other _____). Parcels accepted from you are subject to refusal for shipment by the carrier. You represent that your true name and address appear above.

2. We do not accept hazardous material, illegal items or articles of unusual value, including but not limited to cash and jewelry for shipment.

3. We assume no liability for the delivery of the parcels accepted for shipment nor for loss or damage by any cause to the parcels or their contents while in transit. We are not liable for the failure of the carrier to properly collect or remit funds for COD Parcels. If Recipient's check is accepted for COD's by the carrier, it will be at your risk unless "Cash Only" is noted on the COD Tag. You acknowledge that you have read and understand the instructions on the COD tag and further agree that you accept all risk including but not limited to, risk of nonpayment, insufficient funds and forgery. You futher agree that we will not be liable upon any such instrument.

(Continued on back).

CUSTOMER'S SIGNATURE

I certify that I agree to the terms and condition's here in, and that the stated contents and their value for each package listed are truthful and complete.

SIGN HERE X

SUB-TOTAL	$
TAX	
TOTAL CHARGES	$

Thank You

CENTER # _____

EMPLOYEE'S INITIALS _____

CUSTOMER COPY www.mbe.com

© 2002 MAIL BOXES ETC., INC.® (2002 Ed., Rev.2002) (FORM #220100)

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Minneapolis - Superior

Work Description
Travel from Minneapolis to Superior and attend pre-job meeting, pick-up radio;s and return to Minneapolis.

Date
11-Mar-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Cool & Overcast

Ticket #
1

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00

Sub Total (1) **$600.00**

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00

Sub Total (2) **$0.00**

D S Demich — D S D

PWI Company Rep: — Signature

Don Engen - Enbridge — D Engen

Customer Rep. — Signature

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	325	$0.50	$162.50

* S B indicates Stand-By — Sub Total (3) **$162.50**

Per Diem	Days	Rate	Special	Total
Don Demich	0	$120.00		$0.00
				$0.00

Sub Total (4) **$0.00**

Daily Totals (Sub totals 1 - 4) >>>>: $762.50

Daily Grand Total >>>>> $762.50

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Minneapolis

Work Description
Copy all the AGM sites and courier to Corrpro Edmonton
E-mail Aaron Roberie all the additional sites for the GPS crew.

Date
12-Mar-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Cool & Overcast

Ticket #
2

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	0.25	$600.00	$150.00

Sub Total (1) **$150.00**

Miscellaneous	Cost	Mark Up 1	Total
Courier & Coping	$38.18	$3.82	$42.00

Sub Total (2) **$42.00**

D S Demick — D S

PWI Company Rep: — Signature

Don Engen-Enbridge — D Engen

Customer Rep — Signature

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	13	$0.50	$6.50

* S.B. indicates Stand-By

Sub Total (3) **$6.50**

Per Diem	Days	Rate	Special	Total
Don Demich	0	$120.00		$0.00
				$0.00

Sub Total (4) **$0.00**

Daily Totals (Sub totals 1 - 4) >>>>: $198.50

Daily Grand Total >>>>> $198.50

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Minneapolis - Escanaba Michigan

Work Description
Drive from Minneapolis to Escanaba.

Date
16-Mar-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Sunny & Warm

Ticket #
3

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00

Sub Total (1) **$600.00**

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00

Sub Total (2) **$0.00**

D S. Demick — D Sd
PWI Company Rep. — Signature

Don ENGEN-Enbridge — D Engen
Customer Rep. — Signature

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	362	$0.50	$181.00

* S B. indicates Stand-By — Sub Total (3) **$181.00**

Per Diem	Days	Rate	Special	Total
Don Demich	1	$120.00		$120.00
				$0.00

Sub Total (4) **$120.00**

Daily Totals (Sub totals 1 - 4) >>>>: $901.00

Daily Grand Total >>>>> $901.00

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Escanaba - St.Ignace

Work Description
Meet PLM crew at shop and work with PII, BJ and Axiom crews preparing equipment. Work on schedule for Straits inspection program. Drive to St. Ignace

Date
17-Mar-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Sunny & Windy

Ticket #
4

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00

Sub Total (1) **$600.00**

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00

Sub Total (2) **$0.00**

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	149	$0.50	$74.50

* S B indicates Stand-By

Sub Total (3) **$74.50**

Per Diem	Days	Rate	Special	Total
Don Demich	1	$120.00		$120.00
				$0.00

Sub Total (4) **$120.00**

A S Demich
PWI Company Rep:

Signature

Dan Engen-Enbridge
Customer Rep.

Signature

Daily Totals (Sub totals 1 - 4) >>>>: $794.50

Daily Grand Total >>>>> $794.50

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer: Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location: St. Ignace-Macknaw

Work Description: East 20" line cleaning and C-tools runs, Cable broke pulling PII tool into line, the remainer of the day spent removing the tool. Check PII tool damage (Mostly Sensors)

Date: 18-Mar-03

W.O. Number: 91002-000013-03

Customer Project #: Line # 5 Inspection Program

Weather: Sunny & Cool

Ticket #: 5

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00

Sub Total (1) **$600.00**

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00

Sub Total (2) **$0.00**

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	44	$0.50	$22.00

* S B indicates Stand-By

Sub Total (3) **$22.00**

Per Diem	Days	Rate	Special	Total
Don Demich	1	$120.00		$120.00
				$0.00

Sub Total (4) **$120.00**

Daily Totals (Sub totals 1 - 4) >>>>: $742.00

Daily Grand Total >>>>> $742.00

D. S. Demich — PWI Company Rep — Signature

Don Engen-Enbridge — Customer Rep. — Signature

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Superior - St. Ignace

Work Description
East 20" line BJ Geo tool run, line shut down at 09:00 till 14:00, PII crew re-builds tool. Corrpro start GPS survey @ Superior. BJ tool did not work.

Date
19-Mar-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Sunny & Cool

Ticket #
6

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00

Sub Total (1) **$600.00**

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00

Sub Total (2) **$0.00**

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	31	$0.50	$15.50

* S B indicates Stand-By

Sub Total (3) **$15.50**

Per Diem	Days	Rate	Special	Total
Don Demich	1	$120.00		$120.00
				$0.00

Sub Total (4) **$120.00**

D S Demich — D S B
PWI Company Rep. — Signature

Don Engen-Enbridge — D Engen
Customer Rep. — Signature

Daily Totals (Sub totals 1 - 4) >>>> $735.50

Daily Grand Total >>>>> $735.50

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Superior - St. Ignace

Work Description
Work with PII and BJ crews as they re-build the inspection tools. Send Axiom technician back to Superior to get the 30" C-tool prepared. Corrpro working on GPS MP 1120 +

Date
20-Mar-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Overcast Raining and Cold

Ticket #
7

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00

Sub Total (1) **$600.00**

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00

Sub Total (2) **$0.00**

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	28	$0.50	$14.00

* S.B. indicates Stand-By

Sub Total (3) **$14.00**

Per Diem	Days	Rate	Special	Total
Don Demich	1	$120.00		$120.00
				$0.00

Sub Total (4) **$120.00**

PWI Company Rep — Signature

Customer Rep. — Signature

Daily Totals (Sub totals 1 - 4) >>>>: $734.00

Daily Grand Total >>>>> $734.00

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Superior -St. Ignace

Work Description
Work with BJ crews as they re-build the inspection tool.
Axiom technician working on C-tool in Superior. Corrpro crew doing GPS on AGM sites from MP 1142 +.

Date
21-Mar-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Fog,Rain and Cold

Ticket #
8

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00
		Sub Total (1)	$600.00

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00
		Sub Total (2)	$0.00

D S Demich
PWI Company Rep:

Signature

DON ENGEN-ENBRIDGE
Customer Rep.

Signature

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	19	$0.50	$9.50

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Superior -St. Ignace

Work Description
Work with BJ crews as they re-build the inspection tool. Axiom technician working on C-tool in Superior. Corrpro crew doing GPS on AGM sites.

Date
22-Mar-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Fresh snow, fog and cool

Ticket #
9

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00

Sub Total (1) **$600.00**

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00

Sub Total (2) **$0.00**

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	12	$0.50	$6.00

* S.B. indicates Stand-By

Sub Total (3) **$6.00**

Per Diem	Days	Rate	Special	Total
Don Demich	1	$120.00		$120.00
				$0.00

Sub Total (4) **$120.00**

Don Demich
PWI Company Rep

Signature

DON ENGEN - ENBRIDGE
Customer Rep.

Signature

Daily Totals (Sub totals 1 - 4) >>>>: $726.00

Daily Grand Total >>>>> $726.00

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Superior -St. Ignace

Work Description
Prepare PII Tool to load in East Line trap, BJ checked tool
Axiom on standby in Superior. Corrpro crew doing GPS
on AGM sites from MP 1174 +

Date: 23-Mar-03
W.O. Number: 91002-000013-03
Customer Project #: Line # 5 Inspection Program
Weather: Rain & Fog
Ticket #: 10

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00
		Sub Total (1)	$600.00

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00
		Sub Total (2)	$0.00

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	6	$0.50	$3.00

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Superior -St. Ignace

Work Description
Load & Launch both PII and BJ tools on east leg of the Straits. Axiom tracking both cleaning and C-tool from Superior . Corrpro working on GPS for AGM Sites.

Date
24-Mar-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Rain & Fog

Ticket #
11

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00

Sub Total (1) **$600.00**

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00

Sub Total (2) **$0.00**

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	33	$0.50	$16.50

* S.B. indicates Stand-By

Sub Total (3) **$16.50**

Per Diem	Days	Rate	Special	Total
Don Demich	1	$120.00		$120.00
				$0.00

Sub Total (4) **$120.00**

Don Demich
PWI Company Rep:

Signature

DON ENGEN - ENBRIDGE
Customer Rep

Signature

Daily Totals (Sub totals 1 - 4) >>>>: $736.50

Daily Grand Total >>>>> $736.50

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Superior -St. Ignace

Work Description
Pack all inspection equipment @ St. Ignace and haul back to Escanaba. Axiom tracking Cleaning,C-tool. Corrpro GPS on AGM sites to Iron River. Travel to Iron River.

Date
25-Mar-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Sunny & Warm

Ticket #
12

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00

Sub Total (1) **$600.00**

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00

Sub Total (2) **$0.00**

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	248	$0.50	$124.00

* S.B. indicates Stand-By

Sub Total (3) **$124.00**

Per Diem	Days	Rate	Special	Total
Don Demich	1	$120.00		$120.00
				$0.00

Sub Total (4) **$120.00**

Don Demich — DS
PWI Company Rep: — Signature

DON ENGEN - ENBRIDGE — DE
Customer Rep. — Signature

Daily Totals (Sub totals 1 - 4) >>>>: $844.00

Daily Grand Total >>>>> $844.00

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Superior -St. Ignace

Work Description
Meet with Corrpro, issue safe work permit, Paperwork in the morning. Meet with Axiom and issue work permit. Receive Cleaning & C-tool at Iron River.

Date
26-Mar-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Cool & Overcast

Ticket #
13

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00

Sub Total (1) **$600.00**

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00

Sub Total (2) **$0.00**

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	113	$0.50	$56.50

* S.B. indicates Stand-By

Sub Total (3) **$56.50**

Per Diem	Days	Rate	Special	Total
Don Demich	1	$120.00		$120.00
				$0.00

Sub Total (4) **$120.00**

Don Demich — ASD
PWI Company Rep: Signature

DON ENGEN-ENBRIDGE — N
Customer Rep. Signature

Daily Totals (Sub totals 1 - 4) >>>>: $776.50

Daily Grand Total >>>>> $776.50

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Superior -St. Ignace

Work Description
Receive and Launch Cleaning & C-tool at Iron River Stn.
Corrpro GPS on AGM sites. Travel after lunch from Iron River to Minneapolis.

Date
27-Mar-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Cool, overcast with freezing rain and snow

Ticket #
14

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00
		Sub Total (1)	$600.00

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00
		Sub Total (2)	$0.00

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	338	$0.50	$169.00

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Superior -St. Ignace

Work Description
Contact crews, Corrpro,Axiom wit regards to the cleaning & C-tool run from IR to Ignace, and the GPS and the PII Inspection run from Superior to Iron River.

Date
March 28-April 07,2003

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather

Ticket #

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00

Sub Total (1) **$600.00**

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00

Sub Total (2) **$0.00**

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	0	$0.50	$0.00

* S.B. indicates Stand-By

Sub Total (3) **$0.00**

Per Diem	Days	Rate	Special	Total
Don Demich	0	$120.00		$0.00
				$0.00

Sub Total (4) **$0.00**

Don Demich
PWI Company Rep:

Signature

Don Engel - Enbridge
Customer Rep

Signature

Daily Totals (Sub totals 1 - 4) >>>>: $600.00

Daily Grand Total >>>>> $600.00

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Iron River to St. Ignace

Work Description
Travel from Golden Valley to Ironwood and meet with crew.
Then travel to Iron River and meet with Corrpro crews.

Date
8-Apr-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Cool, overcast

Ticket #
15

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1	$600.00	$600.00
		Sub Total (1)	$600.00

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00
		Sub Total (2)	$0.00

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	351	$0.50	$175.50

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Iron River to St. Ignace

Work Description
Load and launch PII inspection tool from Iron River Station, After the tool launched work with the Corrpro crew and travel to Escanaba shop, with PII Equipment.

Date
9-Apr-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Sunny & Warm

Ticket #
16

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1	$600.00	$600.00
		Sub Total (1)	$600.00

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00
		Sub Total (2)	$0.00

Don Demich — PWI Company Rep:
Signature
DON ENGEN-ENBRIDGE — Customer Rep.
Signature

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	107	$0.50	$53.50

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Iron River to St. Ignace

Work Description
Work in te Escanaba PLM office, work on schedule with line 5 operator and notify Corrpro of scheduled shut down. Paperwork for the remainer of the day.

Date
10-Apr-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Sunny & Warm

Ticket #
17

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1	$600.00	$600.00
		Sub Total (1)	$600.00

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00
		Sub Total (2)	$0.00

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	9	$0.50	$4.50

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Iron River to St. Ignace

Work Description
Work in te Escanaba PLM office, work with Garry Kosch in scheduling for next week in case of a re-run of the PII tool. Paperwork for the remainer of the day.

Date
11-Apr-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Sunny & Warm

Ticket #
18

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1	$600.00	$600.00
		Sub Total (1)	$600.00

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00
		Sub Total (2)	$0.00

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	5	$0.50	$2.50

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Iron River to St. Ignace

Work Description
Travel from Escanaba to St.Ignace receive PII tool, pull tool and travel back to Escanaba, clean tool and PII crew work on downloading data from the run.

Date
12-Apr-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Sunny & Warm

Ticket #
19

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1	$600.00	$600.00

Sub Total (1) **$600.00**

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00

Sub Total (2) **$0.00**

Don Demich — PWI Company Rep:
Signature

DON ENGESET - ENBRIDGE — Customer Rep.
Signature

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	278	$0.50	$139.00

* S B indicates Stand-By

Sub Total (3) **$139.00**

Per Diem	Days	Rate	Special	Total
Don Demich	1	$120.00		$120.00
				$0.00

Sub Total (4) **$120.00**

Daily Totals (Sub totals 1 - 4) >>>>: $859.00

Daily Grand Total >>>>> $859.00

DAILY TIME TICKET

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Golden Valley, MN 55416
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Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Iron River to St. Ignace

Work Description
Work with PII crew at Escanaba, talk with Line 5 about launch schedule for Monday morning, organize PLM crews to come in early on Monday to load tool.

Date
13-Apr-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Sunny & Warm

Ticket #
20

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1	$600.00	$600.00
		Sub Total (1)	$600.00

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00
		Sub Total (2)	$0.00

Don Demich
PWI Company Rep: Signature

Dyni Engen - Enbridge
Customer Rep Signature

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	7	$0.50	$3.50
			Sub Total (3)	$3.50

* S.B indicates Stand-By

Per Diem	Days	Rate	Special	Total
Don Demich	1	$120.00		$120.00
				$0.00
			Sub Total (4)	$120.00

Daily Totals (Sub totals 1 - 4) >>>>: $723.50

Daily Grand Total >>>>> $723.50

DAILY TIME TICKET

PWI Consultants Ltd.
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Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer: Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Date: 14-Apr-03

W.O. Number: 91002-000013-03

Location: Iron River to St. Ignace

Customer Project #: Line # 5 Inspection Program

Work Description: Meet crew PLM shop @ 03:00 and load tool for IR Launch Drive to IR and drain trap and load PII tool, the launch time was 08:55. Travel to Schererville office.

Weather: Sunny & Warm

Ticket #: 21

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1	$600.00	$600.00
		Sub Total (1)	$600.00

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00
		Sub Total (2)	$0.00

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	481	$0.50	$240.50

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Date
15-Apr-03

W.O. Number:
91002-000013-03

Location
Iron River to St. Ignace

Customer Project #
Line # 5 Inspection Program

Work Description
Work on scheduling with trackers, line 5 and PLM crews after the line was shut down due to leak in MN.

Weather
Sunny & Warm

Ticket #
22

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	0.5	$600.00	$300.00

Sub Total (1) **$300.00**

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00

Sub Total (2) **$0.00**

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	0	$0.50	$0.00

DAILY TIME TICKET

PWI Consultants Ltd
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Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Iron River to St. Ignace

Work Description
Work in the Schererville office on the Hartsdale Project
Made some calls to line 5 and trackers.

Date
16-Apr-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Sunny & Warm

Ticket #
23

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	0	$600.00	$0.00
		Sub Total (1)	$0.00

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00
		Sub Total (2)	$0.00

Don Demich — D. S. D.
PWI Company Rep: — Signature

DON ENGEN · ENBRIDGE — [signature]
Customer Rep. — Signature

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	0	$0.50	$0.00

DAILY TIME TICKET

PWI Consultants Ltd.
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Golden Valley, MN 55416
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Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Iron River to St. Ignace

Work Description
Travel from Schererville to Escanaba

Date
17-Apr-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Cool and Overcast

Ticket #
24

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	0.5	$600.00	$300.00
		Sub Total (1)	$300.00

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00
		Sub Total (2)	$0.00

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	355	$0.50	$177.50

DAILY TIME TICKET

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E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Iron River to St. Ignace

Work Description
Travel from Escanaba to St.Ignace receive PII tool, pull tool and travel back to Escanaba, clean tool and PII crew, worked on downloading data from the run.

Date
18-Apr-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Cool and Overcast

Ticket #
25

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00
		Sub Total (1)	$600.00

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00
		Sub Total (2)	$0.00

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	281	$0.50	$140.50

DAILY TIME TICKET

PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Phone: (763) 381-0245
Fax: (763) 381-0246
Cell: (612) 940-1040
E-Mail: pwicons@earthlink.net

Customer
Enbridge Energy Inc.
10201 Jasper Ave, Edmonton Alberta Canada T5J 3N7

Location
Iron River to St. Ignace

Work Description
Pack-up PII tool and equipment and load onto the transport, lock up PLM shop and travel to Golden Valley Line 5 Superior to St.Ignace project complete.

Date
19-Apr-03

W.O. Number:
91002-000013-03

Customer Project #
Line # 5 Inspection Program

Weather
Cool, Overcast and Foggy

Ticket #
26

Employee Name	Days	Rate	Total
Don Demich (Project Mgr.)	1.0	$600.00	$600.00
		Sub Total (1)	$600.00

Miscellaneous	Cost	Mark Up 1	Total
	$0.00	$0.00	$0.00
		Sub Total (2)	$0.00

Don Demich
PWI Company Rep: Signature

DON ENGEN - ENBRIDGE
Customer Rep. Signature

Equipment	Unit #	Miles	Rate	Total
4x4 Jeep	P	360	$0.50	$180.00

AFE No.	Page of
File No.	Date 05-09-03
Designed by	Checked by

ENBRIDGE
Enbridge Pipelines Inc.

Subject PWI Cost Breakout Line 5 (20" 30") IC1

762.50 1/2
190.50 - 30"
901.00 - 30" / 20" 4 @ 50.50 ea.
794.20 - 20"
742.04 - 20"
735.50 - 20"
734.00 - 20"
729.50 - 20"
726.00 - 20"
723.00 - 20"
736.54 - 20"
844.00 - 20"
776.54 - 30"
889.04 - 30"
600.00 - 30"
895.50 - 30"
773.50 - 30"
724.54 - 30"
722.54 - 30"
859.00 - 30"
723.50 - 30"
960.50 - 30"
360 - 30"
537.54 - 30"
860.50 - 30"
900.00 - 30"

20/30 381.25 ea.

9120458C0093
20"
$7596.75
+ 99.25
$7696.

9120458C0092
30"
$11,414.25
+ 99.25
$11,513.50

$19,209.50

ENG 01/09/98

LINE 5 DAILY WORK SUMMARY

Report prepared by Don Demich, PWI Consultants Ltd.

March 11, 2003

Pre-Job meeting in Duluth Minnesota with Don Engen running the meeting, Enbridge PLM foreman and Supervisor, PII, PWI were present. BJ and Corrpro were on a conference call.

March 12, 2003
Take all the AGM site drawings from the 1996 survey and make copies courier them to Aaron Roberie with Corrpro in Edmonton. I e-mailed a list of the AGM site spreadsheet including the new sites that we would like to add to the project. Aaron was to past on all the data to the GPS Crew, That was scheduled to arrive in Superior on March 18th.

March 16, 2003

Travel from Minneapolis to Escanaba, BJ crew from Calgary flew to Green Bay and then drove to Escanaba. PII crew had been in Escanaba since last Friday, Jordon with Axiom was in Duluth.

March 17,2003

PII and BJ crews met at Escanaba PLM shop and I put them through the safety indoctrination training. The BJ equipment arrived at the shop and was unloaded, by the PLM crew. Talked with Jordon from Axiom and was informed that the C-Tool had not arrived in Superior as yet. Talked with line 5 operator and was informed we would have crude across the straits for the March 18-19th. The PLM crew was in Hazmat training for the day, the PII and BJ crews worked on preparing there tools. Jordon from Axiom picked up his tool and traveled from Superior, WI to St. Ignace, MI. About 6:00PM local time we started loading the inspection equipment on the PLM trucks and drove from Escanaba to St. Ignace. We were instructed to inspect the east line with all four tools, and the west line we were to run the cleaning, c-tool and the PII inspection tool. The BJ geo tool was only to be run in the east line.

PII Crew	**Leonard J. Garcia Jr. James Simmons**
BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck**
PWI	**Don Demich**
Escanaba PLM Crew	**Leo Zalaznik Foreman (St. Ignace Site)**
Ironwood PLM Crew	**John Grotberg Foreman (Mackinaw Site)**

March 18, 2003

Meet with BJ crew at 05:00 and travel to the St. Ignace trap site, the PLM Foreman issued a work permit for the crews, we then held a tailgate safety meeting prior to starting work. PLM crew drained the launch trap on the east line and the cleaning tool was loaded and launched at 08:40. The tool as received at Mackinaw at 10:10. The flow rate was 200 c/m per hour and the flow was 37% in the east line and 63 in the west line. While the cleaning tool was in the line the PLM crew drained the east launch trap and loaded the C-tool. The tool was launched at 10:15 and after about 30 minutes, we pinched down the valve on the west line to 1/3 open the speed of the tool in the east line increased by 33%. The tool was received @ 11:30, the crew pulled the tool and the technician from Axiom checked data on the tool. At 12:45 were given the go ahead to launch the PII tool. The PLM crew started to load the tool in the trap, @ 13:00 while pulling the tool into the trap the winch cable snapped, about 8 feet of the tool was in the trap. We spent about 1.5 hours fishing to hook on the cable or tool in the line, we were successful in hooking the line. We tried to winch the tool in again and moved the tool about 4" when the second cable broke. After several discussions we were given permission from the PII Calgary group to pull the tool out backwards. The PLM crew set up the tray and the tool was pulled out backward using come-a-long equipment. The tool was removed at 17:00 and taken back into the shop. The PLM crew left the site and me and the PII technicians stayed to access the damage to the tool, @ 18:45 we locked up the returned to our hotels

PII Crew	**Leonard J. Garcia Jr. James Simmons**
BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck**
PWI	**Don Demich**
Escanaba PLM Crew	**Leo Zalaznik Foreman (St. Ignace Site)**
Ironwood PLM Crew	**John Grotberg Foreman (Mackinaw Site)**
Electricians	**Mike Burnis, Peter Olson**

March 19, 2003

Meet with BJ crew at 05:00 and travel to the St. Ignace trap site, the PLM Foreman issued a work permit for the crews. Open East line trap and feed pulling cable to the trap door, attach to BJ tool and start pulling in the tool at 06:40, the tool was pulling into the trap and the cable released and trap closed and pressured up, all air was bled on of the trap. The tool was launched at 07:18 and was received at Mackinaw at 08:37. The west line was pinched down to the same position as the C-tool run, but the flow rate was 2350 C/M/H. The tool speed was 3.13 MPH; the tool was surging in the line. The trap was isolated and drained, the BJ tool was removed. The PLM crews closed the trap and re-pressured the trap; all valves were returned to the normal operating position. The pinched valve the west line was re-opened. The tool was returned to the St. Ignace work site and the BJ crew down loaded data. We informed that the tool Inertia has not worked for any of the run. The crew worked with the data while the PLM crew drove the tool around the area for approximately one hour. We then unloaded he tool and put it back in the work shop, the tool was re checked and the Inertia was working. After several discussions with scheduling, we would not be able to run the tools till late Sunday night or early Monday morning. The remainder of the day was spent repairing tools by both BJ and PII. The crews were the same as yesterday.

Cont: March 19th.
Contacted Corrpro crew and the started the GPS survey on the AGM sites in Superior and completed sites to MP 1120.

PII Crew	**Leonard J. Garcia Jr. James Simmons**
BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck**
PWI	**Don Demich**
Escanaba PLM Crew	**Leo Zalaznik Foreman (St. Ignace Site)**
Ironwood PLM Crew	**John Grotberg Foreman (Mackinaw Site)**
Electricians	**Mike Burnis, Peter Olson**
Corrpro	**Jess Landals, Martin Racicot**

March 20, 2003
Call line 5 operator to inform them of the work in progress
06:30 open up the St. Ignace site and issue a Safe Work Permit to the BJ, PII crews at this site, add Corrpro GPS crew to the permit that are working on line # 5 from MP 1120- towards Iron R Call line 5 operator to inform them of the work in progress
iver. Tailgate safety meeting was held at St. Ignace with BJ and PII crews. The line # 5 operator was informed of all crews working locations. The PII crew was finished rebuilding the tool and traveled to Escanaba to pick up gear. The BJ crew finished rebuilding the Geo tool and they left the tool on test for the night.

PII Crew	**Leonard J. Garcia Jr. James Simmons**
BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck travel to Superior, WI**
PWI	**Don Demich**
Corrpro	**Jess Landals, Martin Racicot**

NOTE: parts for PII tools arrived in St. Ignace @ 2:00 AM Local time.

March 21, 2003
Call line 5 operator to inform them of the work in progress
06:15 open up the St. Ignace site and issue a Safe Work Permit to the PII crew at this site, add Corrpro GPS crew to the permit that are working on line # 5 from MP 1142- towards Iron River. Tailgate safety meeting was held at St. Ignace with PII crew. Line # 5 operator was called and informed of contract personal on the line. The BJ crew downloaded test from the Geo tool. The tool had worked for 3 hours and then failed again. The technicians took the tool apart and replaced the recorder board, the tool was put on test for one hour, and the test was good. They left the tool running for the night.

Corrpro crew completed the GPS on the Line # 5 AGM sites from MP 1142-1172.
Axiom prepared the C-tool in the Superior shop.

Cont March 21

BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck working on C-tool at Superior shop.**
PWI	**Don Demich**
Corrpro	**Jess Landals, Martin Racicot**

March 22, 2003

Call line 5 operator to inform them of the work in progress.
06:15 open up the St. Ignace site and issue a Safe Work Permit to the BJ crew at this site, add Corrpro GPS crew to the permit that are working on line # 5; moved from Superior to Iron River, worked on paperwork for the day. Axiom on stand-by till the scheduled cleaning/c-tool runs on March 24th. The BJ tool worked over night and the crew put the tool back together. The tool was assembled and put back on test at 08:30. I met with the PII crew to discuss the schedule for March 23rd. The BJ crew arrived back at St. Ignace at 14:45 and the BJ crew checked the tool again, everything was working normally. The facility was secured and the crew left for the day.

BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck on Stand-by**
PWI	**Don Demich**
Corrpro	**Jess Landals, Martin Racicot**

March 23, 2003

Call line 5 operator to inform them of the work in progress.
08:30 open up the St. Ignace site and issue a Safe Work Permit to the PII/BJ crews at this site, add Corrpro GPS crew to the permit that are working on line # 5 from MP 1174-1202. Axiom on stand-by till the scheduled cleaning/c-tool runs on March 24th. BJ checked out the geo tool and confirmed everything was working properly; they left the site at 09:30. The PII crew checked out the MFL tool and prepared the tool to be launched on March 24th. The crew left the St. Ignace site at 10:30; I called to let the Line 5 operator know we had left the site for the day. Late in the afternoon I returned to the St. Ignace site to check out the road as it had started washing out at noon. A portion of the road was washed away, drove in two 4 foot stakes and flagged the hazard. I traveled to the Sheriff's department and reported the road condition; I indicated that the access from the west was closed. They contacted the road department and said they would be out to check out the situation. (The culvert was blocked or frozen). Called Jordan with Axiom and told him to meet the Superior PLM crew at 06:30, to load and launch the cleaning and C-tool. The rate will be about 2000 C/M/H. I informed Jordan that we would be slowing down the rate to 1200 while we inspect the east line across the straits.

Cont March 23rd

PII Crew	**Leonard J. Garcia Jr. James Simmons**
BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck on Standby in Superior.**
PWI	**Don Demich**
Corrpro	**Jess Landals, Martin Racicot**

March 24, 2003
Call line 5 operator to inform them of the work in progress.
04:45 open up the St. Ignace site and issue a Safe Work Permit to the PII/BJ crews at this site, add Corrpro GPS crew to the permit that are working on line # 5 from MP 1202 towards Iron River. Axiom launched and track cleaning and C-tool from Superior.

The launch trap at St. Ignace was flushed and then drained, the PII tool was loaded, the rate had been reduced to 1400 cu/m/h and the west line was shut in for the tool runs. The tool was launched at 09:55 and received at Mackinaw at 10:46. The trap was isolated and we waited for the PLM crew and equipment to arrive at the receive site. The trap was drained and the tool removed; there was some damage to the tool which occurred in the receiving trap. While the tool was being removed the BJ tool was loaded into the launch trap at St. Ignace. After we had closed and pressured up the Mackinaw trap the BJ tool was launched with the same flow rates @ 13:49. The tool was received at Mackinaw at 14:39, the trap was drained and the tool removed. Line 5 operator was informed of all times for launches and receiving of the tools. When we were done with the BJ tool run the west line was re-opened and the operator was inform that we were done with the tool runs at the straits. The flow was increased to 2100 cu/m/h. The tools were taken back to the shop at St. Ignace and both inspection companies downloaded data. We were informed later that both runs were successful. I called the operator at 17:15 to inform him that the crew was leaving the St. Ignace facility for the day.

PII Crew	**Leonard J. Garcia Jr. James Simmons**
BJ Crew	**Richard Fawcett and Geoff Hurd**
PWI	**Don Demich**
Escanaba PLM Crew	**Leo Zalaznik Foreman (St. Ignace Site)**
Electricians	**Mike Burnis, Peter Olson**
Axiom	**Jordan Dyck, Greg Phillips**
Corrpro	**Jess Landals, Martin Racicot**

March 25, 2003
Call line 5 operator to inform them of the work in progress.
04:45 open up the St. Ignace site and issue a Safe Work Permit to the PII/BJ crews at this site, add Corrpro GPS crew to the permit that are working on line # 5 from MP 1242 towards Iron River. Axiom tracking cleaning and C-tool from Superior. The PII and BJ crews packed up equipment at St. Ignace and the PLM crew loaded equipment and returned to Escanaba. The inspection tools were cleaned and prepared for shipping. Both inspection companies will have trucks at the Escanaba PLM shop at 05:30 tomorrow to transport equipment. I worked in the Escanaba office till mid afternoon and then traveled to Iron River to meet up with the Corrpro GPS crew. They informed me that they had finished to the Iron River Station. Notified Axiom and Line 5 operator of my new hotel.

PII Crew	**Leonard J. Garcia Jr. James Simmons**
BJ Crew	**Richard Fawcett and Geoff Hurd**
PWI	**Don Demich**
Escanaba PLM Crew	**Leo Zalaznik Foreman (St. Ignace Site)**
Electricians	**Mike Burnis**
Axiom	**Jordan Dyck, Greg Phillips.**
Corrpro	**Jess Landals, Martin Racicot**

March 26, 2003
05:30 meet with Corrpro and issue them a Safe Work Permit that expires March 30, talked with Line 5 operator to check the pump schedule for the day. Talk with John Grotberg and set up a meeting at 13:00 @ Iron River Station, the crew to set up equipment to receive tools. Drive out to MP 1239 and meet the Axiom crew, I issued them a Safe Work Permit that would expire March 31. Travel back to Iron River station. Talk to Line 5 operator and was informed that the line would be shut down for approximately 4 hours from 16:30 to 20:30. The actual shut down occurred at 17:15. The line was started up @ 22:00. The PLM and crew and I left for the Iron River Station at 23:00.

PWI	**Don Demich**
Axiom	**Jordan Dyck, Greg Phillips.**
Corrpro	**Jess Landals, Martin Racicot**
Ironwood PLM Crew	**John Grotberg Foreman**
Electrician	**Mike Skaggs**
Mechanic	**Fred Klupp**

March 27, 2003
The PLM crew and myself prepared to receive and launch cleaning and c-tool from the Iron River station. The tools were received at the station @ 02:01. The trap was isolated and drained, when we opened the trap door we discovered mud plug material. The PLM crew removed approximately 4 bbls. Of the mud plug material. The tools were removed and Jordan from Axiom downloaded data from the C-tool. Their was no fiscal damage to either tool. The tools were cleaned, Jordan replaced recording equipment in the C-tool and we loaded them into the launch trap. The trap was pressurized and the tools were launched at 05:20. The PLM crew and I went back to the motel. The Axiom crew tracked the rest of the day to MP. 1321.6. The Corrpro crew worked on the GPS on the AGM sites to MP. 1355.

After lunch I traveled from Iron River to Minneapolis.

PWI	**Don Demich**
Axiom	**Jordan Dyck, Greg Phillips.**
Corrpro	**Jess Landals, Martin Racicot**
Ironwood PLM Crew	**John Grotberg Foreman**
Electrician	**Mike Skaggs**
Mechanic	**Fred Klupp**

March 29, 2003
Axiom tracked the cleaning and C-tool .

Corrpro worked on AGM sites

Axiom	**Jordan Dyck, Greg Phillips.**
Corrpro	**Jess Landals, Martin Racicot**

April 8, 2003
Travel from Golden Valley to Ironwood, the PII crew's equipment was taken to Escanaba and the tool was loaded and ready for the run on April 09th. I called the line 5 operators and was informed that the schedule had not changed. The Ironwood PLM crew was too met at the shop @ 7:00 AM and then will travel to Iron River. I then traveled to Iron River and met with the Corrpro crew, they have finished the GPS of the AGM sites, with the exception of all the stations as the locks have all been changed.

PWI Consultants Ltd.	**Don Demich**
Corrpro	**Jess Landals, Martin Racicotm,**
	Mike Roumell, George Gebaenjans
Ironwood PLM Crew	**John Grotberg Foreman**
PII	**James Simmons, Tom**

April 09, 2003
Travel to Iron River station and met with the Ironwood PLM, PII, and Corrpro, the launch trap was drained and the inspection tool was loaded. The trap door was closed and the line was pressured up, the tool was sitting in the trap for 10 minutes prior to the launching of the tool. The tool was launched at 09:54. The Corrpro crew placed the AGM markers and track the tool. The PLM loaded the PII tray and equipment and we traveled to Escanaba PLM shop. The flow rate was 2000 Cubic meters per hour.

PWI Consultants Ltd.	**Don Demich**
Corrpro	**Jess Landals, Martin Racicotm,**
	Mike Roumell, George Gebaenjans
Ironwood PLM Crew	**John Grotberg Foreman**
PII	**James Simmons, Tom**

April 10, 2003
Work in Escanaba shop, notify Corrpro of planned shut down, for a delivery.

PWI Consultants Ltd.	**Don Demich**
Corrpro	**Jess Landals, Martin Racicotm,**
	Mike Roumell, George Gebaenjans
Ironwood PLM Crew	**John Grotberg Foreman**
PII	**James Simmons, Tom**

April 11, 2003
Work in Escanaba office, talked to Garry Kosch in scheduling about product for next week in case of a re-run. The time for the run was approximately 71 hours and we only had 73 hour of battery life with the PII tool.

PWI Consultants Ltd.	**Don Demich**
Corrpro	**Jess Landals, Martin Racicotm,**
	Mike Roumell, George Gebaenjans
PII	**James Simmons, Tom**

April 12, 2003
Call the line 5 operator at 05:30 for an update of the tool speed and ETA to the straits, I was informed that we had lost some rate during the night and the arrival time of the tool would in 73.3 hours for the launch. Ask him if we could up the rate for a few hours and I was informed that they had no more oil to give us. I was concerned about the battery life in the PII tool. We traveled from Escanaba to St. Ignace and prepared to receive the tool. The tool was received at 11:57, the trap was isolated and drained, the tool was removed, loaded and the PLM crew after the trap was re-filled traveled back to Escanaba. The tool was unloaded and cleaned, the PII crew started to download data. We were informed late that evening that the tool had shut off due to low battery power. The tool had stopped recording 1.48 miles from the receive trap. Work on preparing the tool for a re-run, very little wear on tool, and one roller had seized up.

PWI Consultants Ltd.	**Don Demich**
Corrpro	**Jess Landals, Martin Racicotm,**
	Mike Roumell, George Gebaenjans
PII	**James Simmons, Tom**
Escanaba PLM Crew	**Leo Zalaznik Foreman (St. Ignace Site)**

April 13, 2003
Work at the Escanaba shop with PII preparing the tool for a re-run. Talked with Garry Kosch about the schedule for a re-run on Monday April 14th, I was informed there was an OSA batch crossing Iron River station @ 05:00. Talk to the Escanaba PLM about starting early to load the equipment and travel to Iron River. I talked with Corrpro and informed them of the re-run and we would only require two personal for the next run. Martin Racicotm and Mike Roumell started to demob. The tool was ready in the late afternoon.

PWI Consultants Ltd.	**Don Demich**
Corrpro	**Jess Landals, Martin Racicotm,**
	Mike Roumell, George Gebaenjans
PII	**James Simmons, Tom**

April 14, 2003
Meet the PLM crew at the shop @ 03:00 and load the tool in Escanaba, travel to Iron River and meet with the Ironwood PLM crew. Drain trap and prepare to launch the tool, which occurred at 08:55, with the rate @ 2000 c/m per hour, the Corrpro technicians tracked the tool. The PII crew traveled back to Escanaba. I traveled to Schererville, IN as the Griffith Lateral office was being re-opened.

PWI Consultants Ltd.	**Don Demich**
Corrpro	**Jess Landals, George Gebaenjans**
PII	**James Simmons, Tom**
Escanaba PLM Crew	**Leo Zalaznik Foreman**
Ironwood PLM Crew	**John Grotberg Foreman**

April 15, 2003

From the Schererville office, talked with crews for scheduling due to the leak in Minnesota, talk to the Escanaba PLM about working on Good Friday. I informed the PII crew about the delay and talked with the line 5 operator and Garry Kosch about the tool start and stopped setting. I was informed we would have no shut downs in the area's we wanted to re-survey.

PWI Consultants Ltd.	**Don Demich**
Corrpro	**Jess Landals, George Gebaenjans**
PII	**James Simmons, Tom**
Escanaba PLM Crew	**Leo Zalaznik Foreman**

April 16th, 2003

Talked with Line 5 and trackers from the Schererville office.

PWI Consultants Ltd.	**Don Demich**
Corrpro	**Jess Landals, George Gebaenjans**
PII	**James Simmons, Tom**

April 17, 2003

Work in Schererville office till noon, talk with Corrpro, Line # 5 operator, PII crew and Escanaba PLM crew, with regards to the tool run.

PWI Consultants Ltd.	**Don Demich**
Corrpro	**Jess Landals, George Gebaenjans**
PII	**James Simmons, Tom**
Escanaba PLM Crew	**Leo Zalaznik Foreman**

April 18th,2003

Meet the PII and PLM crew at the Escanaba shop and travel to St. Ignace. I stopped and worked with the Corrpro crew from MP 1465 to the trap. The tool was located in the trap at 11:57 MST. The PLM crew isolated and drained the trap, the tool was pulled from the trap and loaded on the trailer. The trap was closed and pressurized, will the equipment was loaded and prepared for the trip back to Escanaba. The Corrpro crew was released and traveled from St. Ignace to Superior, WI. Once we were back at the Escanaba shop we unloaded all the PII equipment and tool. Everything was steam cleaned prior to the PLM crew leaving for the day. The PII crew and I stayed till midnight and the data from the run was verified to be good.

PII Crew	**James Simmons and Tom**
PWI	**Don Demich**
Escanaba PLM Crew	**Leo Zalaznik Foreman (St. Ignace Site)**
Electricians	**Pete Olson**
Corrpro	**Jess Landals, George Gebaenjans**

April 19th,2003

Meet with the PII crew and pack up equipment for shipping. The transport truck arrived at the Escanaba PLM shop at 09:00 and we loaded all the equipment and tools. The PII crew traveled to Green Bay and flew to Houston, TX. I drove from Escanaba to Minneapolis.

PWI Consultants Ltd.	**Don Demich**
PII	**James Simmons, Tom**

From: Don L Engen on 05/06/2003 10:07 AM

To: Jim M McKone/LPL@LPL, John M Grotberg/LPL@LPL, Leo M Zalaznik/LPL@LPL, Mike D Goman/LPL@LPL, Tim W Pollock/LPL@LPL, Bruce L Larson/LPL@LPL, Steve G Booth/LPL@LPL, John R Gauderman/LPL@LPL, Al V Aleknavicius/LPL@LPL

cc: Pipeline Integrity DMS@IPL, Leanne M Thomson/CNPL/Enbridge@IPL, Geoffrey Guitare/US/Enbridge@LPL

Subject: Do NOT use Pipeline Integrity SC Numbers in Necho<BUD.op.2003.usa>

Gentlemen,

As a reminder, as per Leanne's note below please refrain further from using the SC numbers when doing expense accounts through Necho. Please pass this on to others involved.

Don Engen
Pipeline Integrity
Office: (780) 420-8715
Cell: (780) 982-2032
Fax: (780) 420-5234

----- Forwarded by Don L Engen/CNPL/Enbridge on 05/06/2003 09:43 AM -----

Leanne M Thomson
03/26/2003 11:29 AM

To: Don L Engen/CNPL/Enbridge@IPL, Tanis J Elm/CNPL/Enbridge@IPL
cc: Geoffrey Guitare/US/Enbridge@LPL
Subject: Do NOT use Pipeline Integrity SC Numbers in Necho<BUD.op.2003.usa>
Expire On:

Please do not use the following SC numbers when expensing in Necho.

91204SC0099
91204SC0098
91204SC0097
91204SC0096
91204SC0095
91204SC0094
91204SC0093
91204SC0092

Instead, please use the department expense code specific to the charge (i.e. 70501 for Airfare). If the SC number is used through Necho, the expense will then go to your specific operating account (i.e. 62010 for ILI) instead of to the correct account. Since we do not budget our ILI or inhibitor programs to include any travel expenses (airfare, accomodations, meal etc), this is the only way we can work around the costs going to the ILI or inhibitor accounts. Please note, this must followed by anyone (Operations, PLM, etc.) working on any ILI or inhibitor program that has the above SC numbers since those cost should have been included in their own operating budget. Please pass this information to those involved (please make any changes to this memo as you see fit).

Please let me know if you have any questions regarding the above.

Thanks,
Leanne.

Dave B McNeill

05/05/2003 05:26 PM

To: Adam J Erickson/LPL@LPL
cc: Don L Engen/CNPL/Enbridge@IPL, Garrett Wilkie/CNPL/Enbridge@IPL, Pipeline Integrity DMS@IPL, Scott A McEachern/LPL@LPL, Grant P Henningsen/LPL@LPL, Walter J Kresic/CNPL/Enbridge@IPL
Subject: Line 5 - Straits Tool Runs <PRG.Line05.20".straits.ml-03>
Expire On:

Adam, we talked to the tool vendors and they would be able to have tools ready to go on the Straits for the end of May (pending a decision date... i.e. if we wait a week or two to book the tools then this can slide pending tool availability). Reports could be provided within a month of the run. I am not sure what is driving the inquiries but if you could let me know where the direction is coming from and what is driving the questions it would be much appreciated.

On another note, I am again finding that we are out of the loop on this program. We are getting little feedback and there have been no follow up meetings since March. As we discussed in March there was a need to maintain close communication to make sure that the project time line was being met. Some of the milestones have not been met and the schedule as it was conveyed in March appears to be taking a hit. One of the key milestones was to schedule a meeting with BJ and JP Kenny to determine 1) JP Kenny's data and reporting requirements and 2) to complete Geodisplay training. This was intended to occur prior to BJ analyzing the data so that they could ensure the correct data was captured in the report and was in a format that JP Kenny could use. We are still awaiting direction from yourself on dates for this meeting. Accordingly, BJ is holding off on issuing a final report until this is resolved. As such, the reporting deadline (end of April) for the geopig data has passed.

I still have not received an answer as to when JP Kenny requires the corrosion and girth weld data. The schedule we had drawn up in March showed that the data was required at the end of May. The last schedule I received showed that it was due at the end of April. Integrity does not need this data until late May / June time frame. I need you to nail down the date when JP Kenny requires this information so we can ensure the Vendor can deliver on time.

Unless we get resolution on these issues soon there is a good possibility that the data will not be in the format that you need or will not be delivered on time to meet the schedule. If not already resolved with Garrett, please make sure that all of the time line issues are resolved this week and that the training, etc. is confirmed with Garrett, BJ and JP Kenny and that a date is booked. If the loose ends are not tied up this week then there are no guarantees we can meet the schedule. If we do not resolve these issues this week then I will make preparations to have the reports finalized by the Vendors as soon as possible. It is our preference to have yourself and JP Kenny involved in decisions on data requirements and formats to ensure that the data meets your needs, however, if this is not possible then we will proceed with finalizing the data to ensure we can meet the repair schedule.

Dave McNeill
Supervisor, Pipeline Integrity Programs
(780) 420-8731
(780) 420-5234 fax

Anna M Warawa
04/23/2003 08:47 AM

To: Pipeline Integrity
cc: Pipeline Integrity DMS@IPL
Subject: Line 5 (20") Straits of Mackinac East Axiom Tracking Donsa Ctool March 2003 <PRG.LINE05.20".straits.ml-03>
Expire On:

The above mentioned report was received on April 15, 2003.

Quality assurance report requires further input from Martha.



Line 5 (20 inch) Straits of Mackinac (East) Axiom Tracking Donsa Ctool March 2003.d

Hard copy report will be available with Martha.

AGM Report
Data Assessment

Line Number: 5 Diameter: 20" (508 mm) Segments Inspected: Straits of Mackinac (East Leg)

Inspection Tool: Donsa - Ctool Run Date: March 18, 2003

Part 1 AGM Report / Contract Terms

ILI Coordinator or designate to review the incoming report and complete basic checks to ensure report format and contract terms have been met.

Vendor: Axiom Report Due Date: Report Received Date: April 15, 2003

Check List for Deliverables

Basic checks to determine if requested or required items as outlined in the contract (and/or formally requested) were provided and are in the correct format (indicate NA if not applicable).

	Required / Requested	Received Hardcopy	Received Electronic	Format Good
Run Summary	☒	☒	☒	Yes
AGM Maps	☐	☐	☐	
AGM GPS Information	☒	☒	☒	Yes
AGM Sketches	☐	☐	☐	
AGM Photos	☐	☐	☐	

Comments (if report not received by due date or there is any missing information, in which case it should be documented with new deliverable dates – Note; if data can be assessed in the present format then assessment should begin on data as is)

Data is on the network. Due: Rec'd:

Issued as Straits of Mackinaw but actually is Straits of Mackinac. Due: Rec'd:

Clarification recommended to Vendors in the future.

Complete and confirmed by Anna Warawa Date: April 23, 2003

Part 2 Data Assessment

Excavation Program Assistant or designate to complete a QA assessment of the AGM report to confirm data is sufficient, acceptable and consistent with Enbridge Route Sheets and or other documented information about the pipeline segment. When ILI report received, compare AGM data to ILI Marker List to determine if data is consistent. Note – the items outlined below are intended to represent some of the ways that can be used to evaluate the data and is not intended as a comprehensive list (nor as a requirement) for evaluating AGM data.

ILI Report Received

Validation Method(s) Used Valid

☐ AGM data and ENB Route Sheets and Chainage Book match (y/n)

☐ Marker list and tracking report match (y/n)(AGM numbers, locations, etc).

Comments and / or Actions Required to Validate Data

Due: Rec'd:

Data evaluation completed by Date:

BJ Process and Pipeline Services

414 PINCKNEY HOUSTON, TX 77009 TELEPHONE (713) 224-1105 (800) 345-8125 FAX (713) 229-0541
P.O. BOX 8898 HOUSTON, TX 77249-8898

INVOICE

Date: 04/01/03 No. 16-1196
ENBR

Sold To: ~~ATTN: CARL MIKKOLA~~
ENBRIDGE (U.S.) INC.
1100 LOUISIANA
SUITE 3300
HOUSTON TX 77002

Ship To: ENBRIDGE (U.S.) INC.
1100 LOUISIANA
SUITE 3300
HOUSTON TX 77002

( ) - Terms: NET 30 DAYS

PO Number	Ord Date	Shp Date	Ship Via	SO No.
00028551		03/31/03		00028551

Part No.	Ord	Shp	Description	Price	Total
	0	0	This invoice covers the charges for the 20" Geopig run- Mackinaw Straight Crossing Project.	.00	.00
	1	1	Invoice 75% of the contract value upon completion of mobilization and field operations.	96750.00	96750.00

APPROVED
BY
EMP # DATE
TOTALS CHECKED ORDER # WO91602-00010-03 (MM/DD/YY)
PROJECT CHARGE
PROJECT: 91204SC0093 TASK: 02 EXP. TYPE / COST CTR.: 16010-419204
OPERATING COST
LOB / CONT. SEG. / COST CTR. / ACCOUNT / SUBACCOUNT / INTER-LOB

3/26/03
04-22-03

Please Remit to:
BJ Process and Pipeline Services
PO Box 4346, Dept. 412
Houston, TX 77210-4346

Non-Taxable	Taxable	Sales Tax	Freight	Misc	Invoice Total
96750.00	.00	.00	.00	.00	96750.00

als

Royal Bank of Canada
Main Branch
335-8th Avenue SW
Calgary, Alberta
T2P 1C9
ID # 003 transit 00009
Account CAD 0001057

Payment Stages

Payment of the Contract Sums shall be as follows:

- 40% ($51,600) upon mobilization for crew and equipment;
- 35% ($45,150) upon completion of Field Operations;
- 25% ($32,250) upon presentation of the Final Report

The payment stages shall be applicable to each mobilization.

Don

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00010 -03

LOCATION: Edmonton, Alberta

TO: BJ Pipeline Inspection Services
(a division of BJ Process and
Pipeline Services Company
Ltd.)
4839 – 90th Avenue SE
Calgary, Alberta
T2P 2H4

DATE: March 10, 2003
COMMENCEMENT DATE: March 10, 2003
COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To provide a 20-inch Geopig inspection tool plus personnel, material and equipment to inspect two 20-inch sections of Line 5 crossing the Straits of Mackinac in Michigan. Each section is approximately 4.2 miles (6.7 km) in length.

It is requested all dents, wrinkles, buckles, ovality and any other features causing a restriction of 2 percent or greater be reported. A preliminary field report is required as soon as possible on completion of the inspection.

As per BJ proposal T/0620/02/USR/41 of February 23, 2003, Terms and conditions of Agreement CP2003-05 take precedence over the Work Order Contract General Conditions.

Company Information Only
Estimate US $185,000

Duly executed copy attached

Estimated Value $ Sent to Houston Cipul 3/03

Capital Cost	Project #		Task #	Exp Type #		Exp. Organization #
	91204SC0093		02	62010-01		91204
Operating Costs	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc. – Edmonton, Alberat
IT'S AGENT

APPROVAL W. Knesn 28-79

Name of Contractor: BJ Pipeline Inspection Services

By: _____ Date: _____
SIGNATURE

ENBDNR0007165

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
0201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00010 -03

LOCATION: Edmonton, Alberta

TO: BJ Pipeline Inspection Services
(a division of BJ Process and
Pipeline Services Company
Ltd.)
4839 – 90th Avenue SE
Calgary, Alberta
T2P 2H4

DATE: March 10, 2003
COMMENCEMENT DATE: March 10, 2003
COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To provide a 20-inch Geopig inspection tool plus personnel, material and equipment to inspect two 20-inch sections of Line 5 crossing the Straits of Mackinac in Michigan. Each section is approximately 4.2 miles (6.7 km) in length.

is requested all dents, wrinkles, buckles, ovality and any other features causing a restriction of 2 percent or greater be reported. A preliminary field report is required as soon as possible on completion of the inspection.

As per BJ proposal T/0620/02/USR/41 of February 23, 2003, Terms and conditions of Agreement CP2003-05 take precedence over the Work Order Contract General Conditions.

Estimated Value $ AS PER BJ PROPOSAL T0620/03/USR

Capital Cost	Project # 91204SC0093	Task # 02	Exp Type # 62010-01	Exp. Organization # 91204	
Operating Costs	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY. Don Engen – Enbridge Pipelines Inc. – Edmonton, Alberat
IT'S AGENT

Name of Contractor: BJ Pipeline Inspection Services

APPROVAL W. K. WESTC 2879

Date: MARCH 31st 2003

SIGNATURE

Anna M Warawa
04/22/2003 01:27 PM

To: Pipeline Integrity
cc: Pipeline Integrity DMS@IPL
Subject: Line 5 (20") Straits of Mackinac (East) Axiom Tracking PII Metal Loss Survey March 2003 <PRG.LINE05.20".straits.ml-03>
Expire On:

The above mentioned report was received on April 15, 2003.

Below the quality assurance report requiring further input from Martha.

Line 5 (20 inch) Straits of Mackinac (East) Axiom Tracking PII Metal Loss March 2003.d

Hard copy report will be available with Martha.

AGM Report
Data Assessment

Line Number: 5 Diameter: 20" (508 mm) Segments Inspected: Straits of Mackinac (East Leg)

Inspection Tool: PII Metal Loss Survey Run Date: March 24, 2003

Part 1 AGM Report / Contract Terms

ILI Coordinator or designate to review the incoming report and complete basic checks to ensure report format and contract terms have been met.

Vendor: Axiom Report Due Date: Report Received Date: April 15, 2003

Check List for Deliverables

Basic checks to determine if requested or required items as outlined in the contract (and/or formally requested) were provided and are in the correct format (indicate NA if not applicable).

	Required / Requested	Received Hardcopy	Received Electronic	Format Good
Run Summary	☒	☒	☒	Yes
AGM Maps	☐	☐	☐	
AGM GPS Information	☒	☒	☒	Yes
AGM Sketches	☐	☐	☐	
AGM Photos	☐	☐	☐	

Comments (if report not received by due date or there is any missing information, in which case it should be documented with new deliverable dates – Note; if data can be assessed in the present format then assessment should begin on data as is)

Data is on the network. Due: Rec'd:

Issued as Straits of Mackinaw but actually is Straits of Mackinac. Due: Rec'd:

Clarification recommended to Vendors in the future.

Complete and confirmed by Anna Warawa Date: April 22, 2003

Part 2 Data Assessment

Excavation Program Assistant or designate to complete a QA assessment of the AGM report to confirm data is sufficient, acceptable and consistent with Enbridge Route Sheets and or other documented information about the pipeline segment. When ILI report received, compare AGM data to ILI Marker List to determine if data is consistent. Note – the items outlined below are intended to represent some of the ways that can be used to evaluate the data and is not intended as a comprehensive list (nor as a requirement) for evaluating AGM data.

ILI Report Received

Validation Method(s) Used Valid

☐ AGM data and ENB Route Sheets and Chainage Book match (y/n)

☐ Marker list and tracking report match (y/n)(AGM numbers, locations, etc).

Comments and / or Actions Required to Validate Data

Due: Rec'd:

Data evaluation completed by Date:

Anna M Warawa
04/22/2003 11:42 AM

To: Pipeline Integrity
cc: Pipeline Integrity DMS@IPL
Subject: Line 5 (20") Straits of Mackinac (East) Axiom Tracking BJ Pipeline Service Geopig March 2003 RERUN <PRG.Line05.20".straits.geo-03>
Expire On:

The above mentioned report was received on April 15, 2003.

Quality assurance provided below and requires further input from Martha.

Line 5 (20 inch) Straits of Mackinac (East) Axiom Tracking BJ Pipeline Service Geopig March 2003 Rerun.d

The hard copy report will be available with Martha.

AGM Report
Data Assessment

Line Number: 5 Diameter: 20" (508 mm) Segments Inspected: Straits of Mackinac (East Leg) RERUN

Inspection Tool: BJ Pipelines Services - Geopig Run Date: March 24, 2003

Part 1 AGM Report / Contract Terms

ILI Coordinator or designate to review the incoming report and complete basic checks to ensure report format and contract terms have been met.

Vendor: Axiom Report Due Date: Report Received Date: April 15, 2003

Check List for Deliverables

Basic checks to determine if requested or required items as outlined in the contract (and/or formally requested) were provided and are in the correct format (indicate NA if not applicable).

	Required / Requested	Received Hardcopy	Received Electronic	Format Good
Run Summary	☒	☒	☒	Yes
AGM Maps	☐	☐	☐	
AGM GPS Information	☐	☒	☒	Yes
AGM Sketches	☐	☐	☐	
AGM Photos	☐	☐	☐	

Comments (if report not received by due date or there is any missing information, in which case it should be documented with new deliverable dates – Note; if data can be assessed in the present format then assessment should begin on data as is)

Data is on the network. Due: Rec'd:

Issued as Straits of Mackinaw but actually is Straits of Mackinac. Due: Rec'd:

Clarification recommended to Vendors in the future.

Complete and confirmed by Anna Warawa Date: April 22, 2003

Part 2 Data Assessment

Excavation Program Assistant or designate to complete a QA assessment of the AGM report to confirm data is sufficient, acceptable and consistent with Enbridge Route Sheets and or other documented information about the pipeline segment. When ILI report received, compare AGM data to ILI Marker List to determine if data is consistent. Note – the items outlined below are intended to represent some of the ways that can be used to evaluate the data and is not intended as a comprehensive list (nor as a requirement) for evaluating AGM data.

ILI Report Received

Validation Method(s) Used Valid

☐ AGM data and ENB Route Sheets and Chainage Book match (y/n)

☐ Marker list and tracking report match (y/n)(AGM numbers, locations, etc).

Comments and / or Actions Required to Validate Data

Due: Rec'd:

Data evaluation completed by Date:

info@axiompipe.com

AXIOM PIPELINE SOLUTIONS INC.

Tel: (780)424-9262 • 11339-111 Ave. Edmonton Alberta Canada T5G 0C8 • Fax: (780)421-4325

Mr. Don Engen
Enbridge Pipelines Inc.
10201 Jasper Avenue
P.O. Box 398
Edmonton, Alberta
T5J 2J9

RE: Invoicing – Line 5 Tracking Operations

Don please find enclosed invoicing for:

- WP-91002-00007-03, Line 5, Straits of Mackinaw (East Leg) - CTool Operations / MFL / GEOPig Tracking and GPS Documentation.
- WP-91002-00006-03, Line 5, SR-IR, IR-MA - CTool Operations.

Both these invoices include the entire projects extended costs for Vehicles and Air Fare. A breakdown on the invoice and backup is supplied.

I you have any questions please call me at (780) 984-8198.

Thank you

Jordan Dyck

info@axiompipe.com

AXIOM PIPELINE SOLUTIONS INC.

Tel: (780)424-9262 • 11339-111 Ave. Edmonton Alberta Canada T5G 0C8 • Fax: (780)421-4325

TO: ENBRIDGE PIPELINES LTD.
10201 Jasper Avenue
P.O. Box 398
Edmonton, Alberta T5J 2J9

DATE: April 11, 2003

INVOICE: 03.01.52

JOB No: 03.01.152

P.O. No: WO 91002-00007-03

ATTN: Don Engen –

RE: CTooL Operation/MFL/Geopig – Line 5
Mackinaw EAST

Qty	Description	Unit Price	Sub-Total
	LINE 5 – Mackinaw EAST		
104	Operations – (1 Technician – 104.0 hrs)	$40.00	$4,160.00
12	Reporting – (1 Technician – 12 hrs)	$30.00	$360.00
11	Accommodations – (11.0 Days, 1 Technician)	$100.00	$1,100.00
11	Subsistence – (11.0 Days, 1 Technician)	$35.00	$385.00
11	Communication (11.0 Days, 1 Unit)	$20.00	$220.00
11	Vehicle Days – (11.0 Days, 1 Unit)	N/C	$0.00
1984	Mileage – (1 Units – 1984 Miles)	$0.55	$1091.20
	All values in US Dollars.		

APPROVED
BY D Engen
EMP # 3176 DATE 04/16/03 MM/DD/YY
TOTALS
CHECKED ORDER # WO-91002-00007-03
PROJECT CHARGE
PROJECT TASK EXP TYPE COST CTR.
9120-ISC00131 02 16201041 91204 $6,316.20
9120-ISC00131 03 16201041 91204 $1,000.00
OPERATING COST
LOB CONT. SEG. COST CTR. ACCOUNT SUBACCOUNT INTER-LOB

	Subtotal	$7,316.20
TERMS: NET 15 DAYS	**Total**	**$7,316.20**

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00007 -03

LOCATION: Edmonton, Alberta

TO: Axiom Pipeline Solutions Inc.
11339 – 111 Avenue
Edmonton, Alberta
T5G 0C8
Attention: Brian Powlousky

DATE: March 10, 2003

COMMENCEMENT DATE: March 10, 2003

COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To provide personnel, material and equipment to prepare the 20-inch CTool and inspect Line 5 (20-inch), two sections at the Straits of Mackinac, Michigan. Each section 4.2 miles (6.7 km) long. Some GPS surveying is also required at the Straits. A field report of the CTool inpsection is required as soon as possible after each inspection. A final report is required within 30 days of the completion of the inspection.

Company Information Only

91204SC0093 / 02 / 62010-01 US $34,000
91204SC0093 / 03 / 62010-01 US $ 2,000

Covered to Dawko Dec 08

Estimated Value $

	Project #	Task #	Exp Type #	Exp. Organization #
Capital Cost	91204SC0093	02	62010-01	91204
	91204SC0093	03	62010-01	91204

	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #
Operating Costs						

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc. – Edmonton, Alberta
IT'S AGENT

APPROVAL

Name of Contractor: Axiom Pipeline Solutions Inc.

By: _____ Date: _____
SIGNATURE

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00007 -03

LOCATION: Edmonton, Alberta

TO: Axiom Pipeline Solutions Inc.
11339 – 111 Avenue
Edmonton, Alberta
T5G 0C8
Attention: Brian Powlousky

DATE: March 10, 2003

COMMENCEMENT DATE: March 10, 2003

COMPLETION DATE: June 30, 2003

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Estimated Value $

Capital Cost	Project #		Task #		Exp Type #	Exp. Organization #
	91204SC0093		02		62010-01	91204
	91204SC0093		03		62010-01	91204
Operating Costs	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #

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ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY. Don Engen – Enbridge Pipelines Inc. – Edmonton, Alberta
IT'S AGENT

APPROVAL

Name of Contractor: Axiom Pipeline Solutions Inc.

By: _____ Date: 20/MAR/03
SIGNATURE

info@axiompipe.com

AXIOM PIPELINE SOLUTIONS INC.

Tel: (780)424-9262 • 11339-111 Ave. Edmonton Alberta Canada T5G 0C8 • Fax: (780)421-4325

DAILY SUMMARY

ENBRIDGE PIPELINES LTD.

CTOOL OPERATIONS/MFL/GEOPig Tracking – Line 5 Straits of Mackinaw (East Leg)

Enbridge Project # WP-91002-00007-03 **Axiom reference # 03.01.152**

March 10, 2003

Duties: Mobilize from Edmonton to Superior.

Time:

Jordan Dyck – 9.0

Accommodations – 1.0
Subsistence – 1.0
Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 25 Miles

March 11, 2003

Duties: Attend pre-job at Superior terminal

Time:

Jordan Dyck – 8.0

Accommodations – 1.0
Subsistence – 1.0
Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 33 Miles

March 12, 2003

Duties: Pick up GPS from Superior PLM. Mobilize to Escanaba and meet with PLM. Mobilize to St. Ignace.

Time:

Jordan Dyck –11.0

Accommodations – 1.0
Subsistence – 1.0

Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 440 Miles

March 13, 2003

Duties: Survey both east and west legs of line 5 Straits Mackinaw for geopig run. Mobilize from St. Ignace to Superior.

Time:
Jordan Dyck – 11.0

Accommodations – 1.0
Subsistence – 1.0
Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 492 Miles

March 14, 2003

Duties: Return GPS to Superior PLM. Attempt to find location of CTool in transport.

Time:
Jordan Dyck – 8.0

Accommodations – 1.0
Subsistence – 1.0
Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 20 Miles

March 15, 2003

Duties: Stand-by. Prep data for upcoming runs.

Time:
Jordan Dyck – 8.0

Accommodations – 1.0
Subsistence – 1.0
Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 20 Miles

info@axiompipe.com

AXIOM PIPELINE SOLUTIONS INC.

Tel: (780)424-9262 • 11339-111 Ave. Edmonton Alberta Canada T5G 0C8 • Fax: (780)421-4325

March 16, 2003

Duties: Stand-by. Prep data for upcoming runs.

Time:

Jordan Dyck – 8.0

Accommodations – 1.0
Subsistence – 1.0
Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 18 Miles

March 17, 2003

Duties: Await / receive shipment of CTools in Superior. Prep 20" Ctool for run in Straits of Mackinaw. Mobilize from Superior to St. Ignace.

Time:

Jordan Dyck – 14.0

Accommodations – 1.0
Subsistence – 1.0
Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 415 Miles

March 18, 2003

Duties: Run cleaning pig in east leg of Mackinaw Straits. Run, download, analyze and report on CTool run in east leg of Mackinaw Straits. Experience difficulties loading MFL. MFL is pulled out backward.

Time:

Jordan Dyck – 11.0

Accommodations – 1.0
Subsistence – 1.0
Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 45 Miles

March 19, 2003

Duties: Run Geopig in east leg of Mackinaw Straits. BJ techs declared the run a failure.

ENBDNR0007177

info@axiompipe.com

AXIOM PIPELINE SOLUTIONS INC.

Tel: (780)424-9262 • 11339-111 Ave. Edmonton Alberta Canada T5G 0C8 • Fax: (780)421-4325

Time:

Jordan Dyck – 8.0

Accommodations – 1.0
Subsistence – 1.0
Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 30 Miles

March 20, 2003

Duties: Meet with Don Demich, Don D released Jordan to return to Superior to prep 30" CTool for Line 5 Superior to Iron River.

Time:

Jordan Dyck – 8.0

Accommodations – 1.0
Subsistence – 1.0
Communications – 1.0
Vehicle day – 1.0
Mileage (1 unit) – 446 Miles

April 7, 2003

Duties: Prepare reports and CD's for both CTool and Geopig Runs.

Time:

Jordan Dyck – 8.0 (Reporting)

April 8, 2003

Duties: Prepare reports and CD's for MFL Run.

Time:

Jordan Dyck – 4.0 (Reporting)

ENBDNR0007178

info@axiompipe.com

AXIOM PIPELINE SOLUTIONS INC.

Tel: (780)424-9262 • 11339-111 Ave. Edmonton Alberta Canada T5G 0C8 • Fax: (780)421-4325

Summary:

Item	Quantity	Total$
Operation's	104.0 Hrs	$ 4,160.00
Reporting	12.0 Hrs	$ 360.00
Accommodations	11.0 Days	$ 1,100.00
Subsistence	11.0 Days	$ 385.00
Communications	11.0 Days	$ 220.00
Vehicle Days	11.0 Days	$ N/C
Mileage	1984 Miles	$ 1,091.20
		$ 7,316.20

ENBDNR0007179

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00007 -03

LOCATION: Edmonton, Alberta

TO: Axiom Pipeline Solutions Inc.
11339 – 111 Avenue
Edmonton, Alberta
T5G 0C8
Attention: Brian Powlousky

DATE: March 10, 2003

COMMENCEMENT DATE: March 10, 2003

COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To provide personnel, material and equipment to prepare the 20-inch CTool and inspect Line 5 (20-inch), two sections at the Straits of Mackinac, Michigan. Each section 4.2 miles (6.7 km) long. Some GPS surveying is also required at the Straits. A field report of the CTool inpsection is required as soon as possible after each inspection. A final report is required within 30 days of the completion of the inspection.

Company Information Only

91204SC0093 / 02 / 62010-01 US $34,000
91204SC0093 / 03 / 62010-01 US $ 2,000

Covered to Dakota Pipeline

Estimated Value $

	Project #	Task #	Exp Type #	Exp. Organization #
Capital Cost	91204SC0093	02	62010-01	91204
	91204SC0093	03	62010-01	91204

	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #
Operating Costs						

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ENBRIDGE ENERGY PARTNERS, L.P
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY Don Engen – Enbridge Pipelines Inc. – Edmonton, Alberta
IT'S AGENT

APPROVAL

Name of Contractor: Axiom Pipeline Solutions Inc.

By: _____ Date _____
SIGNATURE

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00007 -03

LOCATION: Edmonton, Alberta

TO: Axiom Pipeline Solutions Inc.
11339 – 111 Avenue
Edmonton, Alberta
T5G 0C8
Attention: Brian Powlousky

DATE: March 10, 2003

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Estimated Value $

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ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc. – Edmonton, Alberta
IT'S AGENT

APPROVAL

Name of Contractor: Axiom Pipeline Solutions Inc

By: _____ Date: 20/MAR/03
SIGNATURE

Don

Enbridge Pipelines Inc.
10201 Jasper Avenue
P.O. Box 398
Edmonton, Alberta
Canada
T5J 2J9
(Courier T5J 3N7

Don Engen
Corrosion Control Analyst
Pipeline Integrity
don.engen@enbridge.com
Phone: (780) 420-8715
Fax: (780) 420-5234

ENBRIDGE

PI: PIL-2003-169
File No.: ILI.con C2003-05
April 2, 2003

Joel Kanvik
Senior Counsel & Assistant Secretary
Enbridge Energy Limited Partnership
1100 Louisiana St. , Suite 3300
Houston, Texas 77002-5217

Dear Joel:

Re: Agreement CP-2003-05 Between BJ Pipeline Inspection Services and Enbridge Energy Limited Partnership for Geopig Mechanical Caliper Inspection Line 5 (20-Inch) Straits of Mackinac

Attached with this letter is Agreement CP2003-05 for Geopig Caliper inspection services on Line 5 at the Straits of Mackinac in Michigan. BJ Pipeline Services have already reviewed the document at their Calgary and Houston offices and are prepared to execute the Agreement.

Please review the Agreement (three copies) and execute on behalf of Enbridge Energy Limited Partnership. The Agreement can be delivered to BJ's Houston address at: BJ PPS, 414 Pickney Street, Houston 77009, Attention: Andy Barden. If you feel there are any comments or changes required, please contact Jim Noe of their legal staff at jnoe@bjservices.com or by telephone at (713) 895-5406. After all copies are executed, retain one for your records, BJ retains one and return one copy to Pipeline Integrity.

Please be aware it was necessary to proceed with the first portion of the inspection on the East Leg of the Straits due to a time line we needed to meet for repairs and maintenance, should they be required. A "Letter of Intent" was used as the document authorizing the program to proceed. A copy of the "Letter of Intent " is attached for your information. The West Leg Geopig inspection is planned for June or July this year.

Thank you for your assistance. If you have any questions please call.

Sincerely,

Don Engen

cc: Dave McNeill
Attachment: Agreement CP2003-05 - 3 copies
Letter of Intent

ENBRIDGE

10201 Jasper Avenue
P.O. Box 398
Edmonton, Alberta
Canada
T5J 2J9
(Courier T5J 3N7)

Dave McNeill, P.Eng.
Supervisor, Integrity Programs
Pipeline Integrity
dave.mcneill@cnpl.enbridge.com
Phone: (780) 420-8731
Fax: (780) 420-5234

March 11, 2003
Via Fax: (403) 236-8740

PIL 2003-145
File: ILI.con.C2003-05

Mr. Dan Jungwirth
BJ Pipeline Inspection Services
4839 – 90 Avenue S.E.
Calgary, Alberta
T2P 2H4

Dear Mr. Jungwirth:

Re: Letter of Intent – 20" Geopig Inspection Tool
Line 5 Straits of Mackinac

It is Enbridge Pipeline Inc.'s intent to utilize the 20-inch Geopig inspection tool for inspection on two – 20-inch sections of Line 5 at the Straits of Mackinac in Michigan. The inspection is scheduled to take place the week of March 17, 2003. The tool will be stored at Enbridge's Escanaba Pipe Line Maintenance shop. On completion of the tool run, BJ may demobilize the tool back to Canada.

Yours very truly,

Dave McNeill

cc: Don Engen

Don

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00010 -03

LOCATION: Edmonton, Alberta

TO: BJ Pipeline Inspection Services
(a division of BJ Process and
Pipeline Services Company
Ltd.)
4839 – 90th Avenue SE
Calgary, Alberta
T2P 2H4

DATE: March 10, 2003
COMMENCEMENT DATE: March 10, 2003
COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To provide a 20-inch Geopig inspection tool plus personnel, material and equipment to inspect two 20-inch sections of Line 5 crossing the Straits of Mackinac in Michigan. Each section is approximately 4.2 miles (6.7 km) in length.
It is requested all dents, wrinkles, buckles, ovality and any other features causing a restriction of 2 percent or greater be reported. A preliminary field report is required as soon as possible on completion of the inspection.
As per BJ proposal T/0620/02/USR/41 of February 23, 2003, Terms and conditions of Agreement CP2003-05 take precedence over the Work Order Contract General Conditions.

Company Information Only
Estimate US $185,000

Duly executed copy attached

Estimated Value $ Sent to Houston Capvl 3/03

	Project #	Task #	Exp Type #	Exp. Organization #
Capital Cost	91204SC0093	02	62010-01	91204

	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #
Operating Costs						

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ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc – Edmonton, Alberat
IT'S AGENT

APPROVAL W. Knesn 28.79

Name of Contractor: BJ Pipeline Inspection Services

By: _____ Date: _____
SIGNATURE

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00010 -03

LOCATION: Edmonton, Alberta

TO: BJ Pipeline Inspection Services
(a division of BJ Process and
Pipeline Services Company
Ltd.)
4839 – 90th Avenue SE
Calgary, Alberta
T2P 2H4

DATE: March 10, 2003
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COMPLETION DATE: June 30, 2003

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It is requested all dents, wrinkles, buckles, ovality and any other features causing a restriction of 2 percent or greater be reported. A preliminary field report is required as soon as possible on completion of the inspection.

As per BJ proposal T/0620/02/USR/41 of February 23, 2003, Terms and conditions of Agreement CP2003-05 take precedence over the Work Order Contract General Conditions.

Estimated Value $ AS PER BJ PROPOSAL T0620/03/USR

	Project #	Task #	Exp Type #	Exp. Organization #
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ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc. – Edmonton, Alberat
IT'S AGENT

Name of Contractor: BJ Pipeline Inspection Services

Date: MARCH 31st 2003

SIGNATURE

APPROVAL W. Kwestc 2879

Don

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00013 -03

LOCATION: Edmonton, Alberta

TO: PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
Attention: Don Demich

DATE: March 13, 2003

COMMENCEMENT DATE: March 13, 2003

COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To provide supervisory and consulting services for GPS surveys, AGM deployment, cleaning, caliper, Geopig and MFL in-line inspections on Line 5, two-20-inch sections at the Straits of Mackinac. Each Section is approximately 4.2 miles in length and Line 5 – 30-inch between Superior, WI and Iron River, MI – 173 miles and between Iron River and the Straits of Mackinac – 206 miles. Per 2003 rate schedule.

Company Information Only
Estimate
91204SC0092 – US $25,000
91204SC0093 – US $10,000

Duly executed copy attached
Sent to Houston Apr 3/03

Estimated Value $

Capital Cost	Project #	Task #	Exp Type #	Exp. Organization #	
	91204SC0092	04	62010-01	91204	
	91204SC0093	04	62010-01	91204	
Operating Costs	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #

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ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: [signature] 3176
IT'S AGENT

APPROVAL [signature] 2944

Name of Contractor: _____

By: _____ Date: _____
SIGNATURE

RIGHT-TO-AUDIT

THE COMPANY SHALL BE GRANTED THE RIGHT-TO-AUDIT CONTRACTORS AND SUB-CONTRACTORS RECORDS UPON REASONABLE NOTICE FOR ALL COST-PLUS WORK ORDER BILLINGS.

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00013 -03

LOCATION: Edmonton, Alberta

TO: PWI Consultants Ltd.
4325 Tyrol Crest
Golden Valley, MN 55416
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Estimated Value $

	Project #	Task #	Exp Type #	Exp. Organization #
Capital Cost	91204SC0092	04	62010-01	91204
	91204SC0093	04	62010-01	91204

	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #
Operating Costs						

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ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

Name of Contractor: PWI Consultants LLC

BY: [signature] 3176
IT'S AGENT

APPROVAL [signature] 2944

By: [signature] Date: 03-28-03
SIGNATURE

RIGHT-TO-AUDIT

THE COMPANY SHALL BE GRANTED THE RIGHT-TO-AUDIT CONTRACTORS AND SUB-CONTRACTORS RECORDS UPON REASONABLE NOTICE FOR ALL COST-PLUS WORK ORDER BILLINGS.

Don L Engen
04/10/2003 11:27 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: L5 Mackinaw East Leg MFL<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 04/10/2003 11:27 AM -----

"Jordan Dyck" <jordan@axiompipe.com>
04/10/2003 10:58 AM

To: <michel.hoyeck@og.ge.com>
cc: "Don Engen" <Don.Engen@cnpl.enbridge.com>
Subject: L5 Mackinaw East Leg MFL
Expire On:

Hi Michel,

This is the message I received from the project coordinator on the Line 5 work. Since no box numbers were sent to me, I don't see any reason to ship you a CD for this section. Please advise if you require one. I will send you the Line 2 Glenboro to Gretna CD today.

March 24th

Launch PII tool @ 09:55 received @ 10:46, James said
he put out boxes but Houston is not using the boxes,
he was told that they didn,t need them for this short
of run.

Jordan Dyck

Axiom Pipeline Solutions Inc.

Cell: (780) 984-8198

AXIOM
PIPELINE SOLUTIONS INC.



Don L Engen

04/10/2003 11:04 AM

To: Lynn Laurel/US/Enbridge@LPL
cc: Pipeline Integrity DMS
cc: Don L Engen/CNPL/Enbridge@IPL, Walter J Kresic/CNPL/Enbridge@IPL
Subject: Re: CORRPRO CANADA INV# CAN2248 WO# 91002-00009-03
Expire On:

Hi Lynn,

I'm confused. CAN2248 is a GE\PII (Canada) Limited invoice which belongs to WO-91002-00009-03 for 20" Straits of Mackinac work. The WO # stated by PII on the invoice is 91002-00008-03, which is wrong. The approval box has the correct WO #.
WO 91002-00008-03 is also made out to GE\PII but it is for Line 5 (30") between Superior and The Straits of Mackinac.
Any Corrpro invoices should be under WO-91002-00012-03 - Tracking 30" MFL tool on Line 5 between Superior and the Straits, WO-91002-00014-03 for tracking cleaning and batch pigs (inhibition program) on Line 6A between Griffith and Sarnia and WO-91002-00016-03 is for tracking cleaning and batch pigs (inhibition program) on Line 2 (26") between Gretna and Superior.

Hope this helps. Let me know if you need more information.

Thanks.
Don
Lynn Laurel@LPL



Lynn Laurel@LPL

04/07/2003 08:23 AM

To: Don L Engen/CNPL/Enbridge@IPL, Walter J Kresic/CNPL/Enbridge@IPL
cc:
Subject: CORRPRO CANADA INV# CAN2248 WO# 91002-00009-03
Expire On:

Good Morning,,

I just wanted to re-check the WO # to apply CORRPRO Invoice# CAN2248 for $57,000.00. I received it here in Houston last week but when I pulled up the WO #91002-00009-03 referenced on the invoice that WO is made out to Betz Dearborn. It looks like the invoice had been coded to WO# 91002-0008-03 which is made out to CORRPRO but I was not sure if it covers this work. The description on the invoice is 20" Strait of Mackinac - Mackinaw A.

Let me know if you need me to fax a copy back to you.

Thanks for the help, Lynn



Don L Engen

04/04/2003 07:47 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Mackinaw East Leg MFL & Geopig Rerun Data<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 04/04/2003 07:47 AM -----



"Jordan Dyck" <jordan@axiompipe.com>

04/04/2003 12:57 AM

To: <pwicons@yahoo.com>
cc: "Don Engen" <Don.Engen@cnpl.enbridge.com>
Subject: Mackinaw East Leg MFL & Geopig Rerun Data
Expire On:

Hi Don,

Enbridge has requested that I issue reports for the east leg of the Mackinaw Straits runs. Could you please send me the tracking data for the following runs:

Line 5 – Mackinaw Straits East Leg – MFL (Tracking times and timer box numbers)

Line 5 – Mackinaw Straits East Leg – GeoPig RERUN (Tracking times)

Thanks,

Jordan Dyck

Axiom Pipeline Solutions Inc.

Cell: (780) 984-8198

AXIOM
PIPELINE SOLUTIONS INC.

Don L Engen
04/09/2003 10:10 AM

To: Pipleine Integrity DMS
cc:
cc:
Subject: Mackinaw Data<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 04/09/2003 10:10 AM -----

"Jordan Dyck" <jordan@axiompipe.com>
04/08/2003 09:06 AM

To: "Don Demich" <pwicons@yahoo.com>
cc: "Don Engen" <Don.Engen@cnpl.enbridge.com>
Subject: Mackinaw Data
Expire On:

Hi Don,

I would like to get the reports delivered to Enbridge this week. Could you please forward me the following data:

Line 5 – Mackinaw Straits East Leg – MFL (Tracking times and timer box numbers)

Line 5 – Mackinaw Straits East Leg – GeoPig RERUN (Tracking times)

Thanks,

Jordan Dyck

Axiom Pipeline Solutions Inc.

Cell: (780) 984-8198

AXIOM
PIPELINE SOLUTIONS INC.

Don L Engen

04/03/2003 10:26 AM

To: "Jordan Dyck" <jordan@axiompipe.com>
cc: Pipeline Integroty DMS
cc: "Don Engen" <Don.Engen@cnpl.enbridge.com>
Subject: Re: Line 5 Mackinaw Straits
Expire On:

Jordan,

If you could chase it down I'd appreciate it. I don't recall Don Demich saying he was going to produce a report. If Don is going to do it, fine. If not please go ahead. Thanks Jordan. Let me know if you need me to slough off any more work.

Don
"Jordan Dyck" <jordan@axiompipe.com>

"Jordan Dyck" <jordan@axiompipe.com>

04/03/2003 09:55 AM

To: "Don Engen" <Don.Engen@cnpl.enbridge.com>
cc:
Subject: Line 5 Mackinaw Straits
Expire On:

Hi Don,

I'm wondering how you want the reporting done for the MFL run in the East leg of the Line 5 Mackinaw Straits. I ran the CTool and the failed run of the GeoPig, but was not present for the MFL or the second run of the GeoPig. Do you want me to get the information (i.e. tracking times and box numbers) from Don Demich and produce a report, or is Don Demich going to be responsible for this information?

Jordan Dyck

Axiom Pipeline Solutions Inc.

Cell: (780) 984-8198

AXIOM
PIPELINE SOLUTIONS INC.



dlatto@bjservices.ca

04/02/2003 11:04 AM

To: Don.Engen@enbridge.com
cc:
Subject: BJ PPS Houston contact address
Expire On:

Revised address

414 Pinckney
Houston 77009
Texas
US

Regards,

Dave Latto
Technical Sales Representative
BJ Pipeline Inspection Services
Tel: 403-531-7625
Cell: 403-815-4463
Fax: 403-236-8740
----- Forwarded by Dave Latto/BJSCAN/BJSERVICES on 02/04/2003 11:03 AM -----

Dave Latto
02/04/2003 11:01 AM

To: Don.Engen@enbridge.com
cc:
Subject: BJ PPS Houston contact address

Don

The contract should be sent to
BJ PPS
414 Pickney Street
Houston 77009
US

Attention: Andy Barden

If there are comments, they should sent to the attention of Jim Noe our legal guy at jnoe@bjservices.com or discussed by telephone at 713-895-5406.

Regards,

Dave Latto
Technical Sales Representative
BJ Pipeline Inspection Services
Tel: 403-531-7625
Cell: 403-815-4463
Fax: 403-236-8740

Christine L Neff

03/20/2003 04:07 PM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL

cc:

Subject: Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinaw - MP 1075 to MA - East leg <5> *Rev. 1

Expire On:

*Revision 1 - clarified tool numbering and changed start time

ed CCO Coordinator
Line 5 Operator

Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinaw - MP 1075 to MA - **East** leg
{0400 MST March 24 to 0800 MST March 24}
~ ~

Proceed with plans to run a Geopig tool and an MFL tool in the 20" Line 5 **East** leg of the straits crossing to MA. This run does require continuous flow. In order to maintain a consistent, predictable flow rate on the tools, the west leg will be isolated immediately prior to the first tool launch and will be returned to service following the landing of the second tool. **This will limit the line 5 rate to 1200m3/hr for the duration of the work.** In order to avoid contamination or degradation, this run is batch dependent. Both tools will be launched in LSB, batches LSB-675-0 and LSB-729-0 and the run will be completed prior to the head of LSB-692-0 reaching MA.

*****Note: There are two additional LSB batches immediately prior to LSB-729-0 that would be acceptable for the tool run, provided the isolation of the west leg takes place with LSB at MA and normal operations resume when the head of LSB-692-0 reaches MA.**********

The MFL tool (5MA3) will be launched from MP 1475 two hours prior to the head of LSB-729-0 reaching MA, which is currently scheduled for 0600/24, resulting in a launch of 0400/24. The Geopig tool (5MA4) will be launched 3 hours later. The tools must be launched and received prior to the head of LSB-692-0 reaching MA.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

Field personnel shall report to the Edmonton Control Center the location of the pigs upon launching and prior to the pig landing.

Provided below is the estimated schedule for the run.

			5MA3 - MFL Tool		5MA4 - Geopig Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time	Estimated Time	Actual Time
	1475		0400/24		0700/24	

MA	1479	1300 m3	0500/24		0800/24	

*All times are listed in MST.

Please contact me with any questions.

Christine Neff (780)420-5204.

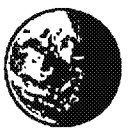


Don L Engen

03/26/2003 07:55 AM

To: Dave B McNeill/CNPL/Enbridge,
cc: Pipeline Integrity DMS
cc:
Subject: Line 5 Report March 25th. <PRG.LINE05.20".straits.mi-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 03/26/2003 07:55 AM -----



"Don Demich" <pwicons@earthlink.net>

03/25/2003 06:51 PM
Please respond to pwicons

To: "Don Engen" <don.engen@enbridge.com>
cc:
Subject: Line 5 Report March 25th.
Expire On:

We finished the east leg of the Mackinaw Straits project late last night, this morning we finished packing equipment, which was loaded and hauled back to the Escanaba PLM shop. The tools were cleaned and prepared for shipping. The tools will be loaded on the transports early morning of March 26th. I travelled to Iron River in the afternoon and meet with Corrpro and went over the GPS data to date. I will stay here till Thursday morning to receive and launch tools from Iron River. I will head out in the field in the morning and caught up with Jordan.

PS: Can you include me on the email list for the batch schedules and flow rates, so I can keep up with the changes. I have not received anything since last week.

I will call you late morning.

Hotel info: AmericInn room # 315 (906 235-9100) Fax: 906 265-4244

PWI Consultants Ltd.
Don Demich
pwicons@earthlink.net
pwicons@yahoo.com
Cell: 612 940-1040

Don L Engen
03/26/2003 07:39 AM

To: Dave B McNeill/CNPL/Enbridge, Garrett Wilkie/CNPL/Enbridge,
cc: Pipeline Integrity DMS
cc:
Subject: Field report for Re-run 20" Line 5 Mackinac Straits<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 03/26/2003 07:39 AM -----

rfawcett@bjservices.ca
03/25/2003 08:23 PM

To: don.engen@enbridge.com
cc:
Subject: Field report for Re-run 20" Line 5 Mackinac Straits
Expire On:

Don,
Attached is the field report for the successful completion of the 20" Line 5 Straits of Mackinac - East.

(See attached file: Enbridge Mackinac East Geopig Field Report.doc)

Again I would like to express my thanks to the Enbridge personnel that assisted with this phase of the project.

Regards

Richard Fawcett
Project Leader
BJ Pipeline Inspection Services
403 531 5046
rfawcett@bjservices.ca

Enbridge Mackinac East Geopig Field Report.doc

Pipeline Inspection Services

Field Operations Report

Enbridge Pipelines Inc.
10201 Jasper Ave
Edmonton, AB
T5J 3N7

March 25, 2003

Attention: Don Engen

Re: Field Operations Report for 20" Mechanical Caliper Inspection of Enbridge NPS 20 Pipeline (Line 5 Straits of Mackinac - East)

Dear Mr. Engen,

The following field report describes the preliminary analysis of the data collected by the BJ Geopig tool during the successful rerun of Enbridge Pipelines' NPS 20 Line 5 – Straits of Mackinac (East) on March 24th, 2003.

The Geopig was launched at 15:49 on March 24th and arrived at the receive trap about 50 minutes later. After removal from the receive trap the tool was taken to the shop for data downloading and analysis.

Field analysis has revealed that the tool collected a full set of data with all the calipers, odometers and inertial systems functioning normally for the entire run. The preliminary analysis of the caliper data revealed no pipe wall anomalies larger than 5% O.D

We would like to take this opportunity to thank Enbridge Pipelines for their outstanding support during this job. If you have any comments or questions please feel free to contact us at your convenience.

Sincerely,
Per. BJ Pipeline Inspection Services

Richard Fawcett
Project Leader



Don L Engen

03/25/2003 08:00 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: (FMS Message from: FM Edmonton Control Centre) <PRG.LINE05.20".straits.mi-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 03/25/2003 08:00 AM -----

FM Edmonton Control Centre
Sent by: Vincent MacIntyre

03/24/2003 02:50 PM
Please respond to FM Edmonton Control Centre

To: DAN W KLARNER/LPL@LPL, MIKE D GOMAN/LPL@LPL, LEO M ZALAZNIK/LPL@LPL, DON L ENGEN/CNPL/ENBRIDGE@IPL, DAVE B MCNEILL/CNPL/ENBRIDGE@IPL, CCO Field Work, ESCANABA PLM CREW@LPL, ADAM J ERICKSON/LPL@LPL, Christine L Neff/CNPL/Enbridge@IPL
cc:
Subject: (FMS Message from: FM Edmonton Control Centre)
Expire On:

STRAITS

5MA4 - GEOPIG TOOL WAS LAUNCHED AT 13:49 MST / MARCH 24

5MA4 - GEOPIG TOOL WAS LANDED AT MA STATION AT 14:40 MST / MARCH 24

Thank You
Vincent MacIntyre
Edmonton Control Centre

Don L Engen
03/25/2003 08:03 AM

To: Pipeline Integrity DMS, Dave B McNeill/CNPL/Enbridge,
cc:
cc:
Subject: Line 5 Daily Work Report <PRG.LINE05.20".straits.ml-03>
Expire On:

Dave,

The 20" MFL and Geopig runs appear to have been successful on the East Leg.
Don
----- Forwarded by Don L Engen/CNPL/Enbridge on 03/25/2003 08:03 AM -----

"Don Demich" <pwicons@earthlink.net>
03/24/2003 09:25 PM
Please respond to pwicons

To: "Don Engen" <don.engen@enbridge.com>
cc:
Subject: Line 5 Daily Work Report
Expire On:

Don

Both runs on the 20" east leg across the straits were successful and we will be packing equipment in the morning and going back to the Escanaba shop. Some damage occurred to the PII tool in the receiving trap at Mackinaw, I have attached some pictures.

I will call you in the morning.

I will head back up the line tomorrow to catch up with Corrpro and Axlom, once we are done in Escanaba.

PWI Consultants Ltd.
Don Demich
pwicons@earthlink.net
pwicons@yahoo.com
Cell: 612 940-1040

PII Tool Damage Rec Trap.JPG LINE 5 DAILY WORK SUMMARY.doc

LINE 5 DAILY WORK SUMMARY

Report prepared by Don Demich, PWI Consultants Ltd.

March 11, 2003

Pre-Job meeting in Duluth Minnesota with Don Engen running the meeting, Enbridge PLM foreman and Supervisor, PII, PWI were present. BJ and Corrpro were on a conference call.

March 12, 2003

Take all the AGM site drawings from the 1996 survey and make copies courier them to Aaron Roberie with Corrpro in Edmonton. I e-mailed a list of the AGM site spreadsheet including the new sites that we would like to add to the project. Aaron was to past on all the data to the GPS Crew, That was scheduled to arrive in Superior on March 18th.

March 16, 2003

Travel from Minneapolis to Escanaba, BJ crew from Calgary flew o Green Bay and then drove to Escanaba. PII crew had been in Escanaba since last Friday, Jordon with Axiom was in Duluth.

March 17,2003

PII and BJ crews met at Escanaba PLM shop and I put them through the safety indoctrination training. The BJ equipment arrived at the shop and was unloaded, by the PLM crew. Talked with Jordon from Axiom and was informed that the C-Tool had not arrived in Superior as yet. Talked with line 5 operator and was informed we would have crude across the straits for the March 18-19th. The PLM crew was in Hazmat training for the day, the PII and BJ crews worked on preparing there tools. Jordon from Axiom picked up his tool and traveled from Superior, WI to St. Ignace, MI. About 6:00PM local time we started loading the inspection equipment on the PLM trucks and drove from Escanaba to St. Ignace. We were instructed to inspect the east line with all four tools, and the west line we were to run the cleaning, c-tool and the PII inspection tool. The BJ geo tool was only to be run in the east line.

PII Crew	**Leonard J. Garcia Jr. James Simmons**
BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck**
PWI	**Don Demich**
Escanaba PLM Crew	**Leo Zalaznik Foreman (St. Ignace Site)**
Ironwood PLM Crew	**John Grotberg Foreman (Mackinaw Site)**

March 18, 2003

Meet with BJ crew at 05:00 and travel to the St. Ignace trap site, the PLM Foreman issued a work permit for the crews, we then held a tailgate safety meeting prior to starting work. PLM crew drained the launch trap on the east line and the cleaning tool was loaded and launched at 08:40. The tool as received at Mackinaw at 10:10. The flow rate was 200 c/m per hour and the flow was 37% in the east line and 63 in the west line. While the cleaning tool was in the line the PLM crew drained the east launch trap and loaded the C-tool. The tool was launched at 10:15 and after about 30 minutes, we pinched down the valve on the west line to 1/3 open the speed of the tool in the east line increased by 33%. The tool was received @ 11:30, the crew pulled the tool and the technician from Axiom checked data on the tool. At 12:45 were given the go ahead to launch the PII tool. The PLM crew started to load the tool in the trap, @ 13:00 while pulling the tool into the trap the winch cable snapped, about 8 feet of the tool was in the trap. We spent about 1.5 hours fishing to hook on the cable or tool in the line, we were successful in hooking the line. We tried to winch the tool in again and moved the tool about 4" when the second cable broke. After several discussions we were given permission from the PII Calgary group to pull the tool out backwards. The PLM crew set up the tray and the tool was pulled out backward using come-a-long equipment. The tool was removed at 17:00 and taken back into the shop. The PLM crew left the site and me and the PII technicians stayed to access the damage to the tool, @ 18:45 we locked up the returned to our hotels

PII Crew	**Leonard J. Garcia Jr. James Simmons**
BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck**
PWI	**Don Demich**
Escanaba PLM Crew	**Leo Zalaznik Foreman (St. Ignace Site)**
Ironwood PLM Crew	**John Grotberg Foreman (Mackinaw Site)**
Electricians	**Mike Burnis, Peter Olson**

March 19, 2003

Meet with BJ crew at 05:00 and travel to the St. Ignace trap site, the PLM Foreman issued a work permit for the crews. Open East line trap and feed pulling cable to the trap door, attach to BJ tool and start pulling in the tool at 06:40, the tool was pulling into the trap and the cable released and trap closed and pressured up, all air was bled on of the trap. The tool was launched at 07:18 and was received at Mackinaw at 08:37. The west line was pinched down to the same position as the C-tool run, but the flow rate was 2350 C/M/H. The tool speed was 3.13 MPH; the tool was surging in the line. The trap was isolated and drained, the BJ tool was removed. The PLM crews closed the trap and re-pressured the trap; all valves were returned to the normal operating position. The pinched valve the west line was re-opened. The tool was returned to the St. Ignace work site and the BJ crew down loaded data. We informed that the tool Inertia has not worked for any of the run. The crew worked with the data while the PLM crew drove the tool around the area for approximately one hour. We then unloaded he tool and put it back in the work shop, the tool was re checked and the Inertia was working. After several discussions with scheduling, we would not be able to run the tools till late Sunday night or early Monday morning. The remainder of the day was spent repairing tools by both BJ and PII. The crews were the same as yesterday.

Cont: March 19th.
Contacted Corrpro crew and the started the GPS survey on the AGM sites in Superior and completed sites to MP 1120.

Corrpro	**Jess Landals, Martin Racicot**

March 20, 2003
Call line 5 operator to inform them of the work in progress
06:30 open up the St. Ignace site and issue a Safe Work Permit to the BJ, PII crews at this site, add Corrpro GPS crew to the permit that are working on line # 5 from MP 1120- towards Iron R Call line 5 operator to inform them of the work in progress
iver. Tailgate safety meeting was held at St. Ignace with BJ and PII crews. The line # 5 operator was informed of all crews working locations. The PII crew was finished rebuilding the tool and traveled to Escanaba to pick up gear. The BJ crew finished rebuilding the Geo tool and they left the tool on test for the night.

PII Crew	**Leonard J. Garcia Jr. James Simmons**
BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck travel to Superior, WI**
PWI	**Don Demich**
Corrpro	**Jess Landals, Martin Racicot**

NOTE: parts for PII tools arrived in St. Ignace @ 2:00 AM Local time.

March 21, 2003
Call line 5 operator to inform them of the work in progress
06:15 open up the St. Ignace site and issue a Safe Work Permit to the PII crew at this site, add Corrpro GPS crew to the permit that are working on line # 5 from MP 1142- towards Iron River. Tailgate safety meeting was held at St. Ignace with PII crew. Line # 5 operator was called and informed of contract personal on the line. The BJ crew downloaded test from the Geo tool. The tool had worked for 3 hours and then failed again. The technicians took the tool apart and replaced the recorder board, the tool was put on test for one hour, and the test was good. They left the tool running for the night.

Corrpro crew completed the GPS on the Line # 5 AGM sites from MP 1142-1172.
Axiom prepared the C-tool in the Superior shop.

BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck working on C-tool at Superior shop.**
PWI	**Don Demich**
Corrpro	**Jess Landals, Martin Racicot**

March 22, 2003
Call line 5 operator to inform them of the work in progress.
06:15 open up the St. Ignace site and issue a Safe Work Permit to the BJ crew at this site, add Corrpro GPS crew to the permit that are working on line # 5; moved from Superior to Iron River, worked on paperwork for the day. Axiom on stand-by till the scheduled cleaning/c-tool runs on March 24th. The BJ tool worked over night and the crew put the tool back together. The tool was assembled and put back on test at 08:30. I met with the PII crew to discuss the schedule for March 23rd. The BJ crew arrived back at St. Ignace at 14:45 and the BJ crew checked the tool again, everything was working normally. The facility was secured and the crew left for the day.

BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck on Stand-by**
PWI	**Don Demich**
Corrpro	**Jess Landals, Martin Racicot**

March 23, 2003
Call line 5 operator to inform them of the work in progress.
08:30 open up the St. Ignace site and issue a Safe Work Permit to the PII/BJ crews at this site, add Corrpro GPS crew to the permit that are working on line # 5 from MP 1174-1202. Axiom on stand-by till the scheduled cleaning/c-tool runs on March 24th. BJ checked out the geo tool and confirmed everything was working properly; they left the site at 09:30. The PII crew checked out the MFL tool and prepared the tool to be launched on March 24th. The crew left the St. Ignace site at 10:30; I called to let the Line 5 operator know we had left the site for the day. Late in the afternoon I returned to the St. Ignace site to check out the road as it had started washing out at noon. A portion of the road was washed away, drove in two 4 foot stakes and flagged the hazard. I traveled to the Sheriff's department and reported the road condition; I indicated that the access from the west was closed. They contacted the road department and said they would be out to check out the situation. (The culvert was blocked or frozen). Called Jordan with Axiom and told him to meet the Superior PLM crew at 06:30, to load and launch the cleaning and C-tool. The rate will be about 2000 C/M/H. I informed Jordan that we would be slowing down the rate to 1200 while we inspect the east line across the straits.

PII Crew	**Leonard J. Garcia Jr. James Simmons**
BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck on Standby in Superior.**
PWI	**Don Demich**
Corrpro	**Jess Landals, Martin Racicot**

March 24, 2003
Call line 5 operator to inform them of the work in progress.
04:45 open up the St. Ignace site and issue a Safe Work Permit to the PII/BJ crews at this site, add Corrpro GPS crew to the permit that are working on line # 5 from MP 1202 towards Iron River. Axiom launched and track cleaning and C-tool from Superior.

Cont: March 24th.

The launch trap at St. Ignace was flushed and then drained, the PII tool was loaded, the rate had been reduced to 1400 cu/m/h and the west line was shut in for the tool runs. The tool was launched at 09:55 and received at Mackinaw at 10:46. The trap was isolated and we waited for the PLM crew and equipment to arrive at the receive site. The trap was drained and the tool removed; there was some damage to the tool which occurred in the receiving trap. While the tool was being removed the BJ tool was loaded into the launch trap at St. Ignace. After we had closed and pressured up the Mackinaw trap the BJ tool was launched with the same flow rates @ 13:49. The tool was received at Mackinaw at 14:39, the trap was drained and the tool removed. Line 5 operator was informed of all times for launches and receiving of the tools. When we were done with the BJ tool run the west line was re-opened and the operator was inform that we were done with the tool runs at the straits. The flow was increased to 2100 cu/m/h. The tools were taken back to the shop at St. Ignace and both inspection companies downloaded data. We were informed later that both runs were successful. I called the operator at 17:15 to inform him that the crew was leaving the St. Ignace facility for the day.

PII Crew	**Leonard J. Garcia Jr. James Simmons**
BJ Crew	**Richard Fawcett and Geoff Hurd**
PWI	**Don Demich**
Escanaba PLM Crew	**Leo Zalaznik Foreman (St. Ignace Site)**
Ironwood PLM Crew	**John Grotberg Foreman (Mackinaw Site)**
Electricians	**Mike Burnis, Peter Olson**
Axiom	**Jordan Dyck tracking the 30" cleaning & c-tool.**
Corrpro	**Jess Landals, Martin Racicot**


24 10:21



Don L Engen
03/24/2003 01:15 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: (FMS Message from: FM Edmonton Control Centre) <PRG.LINE05.30".pe-ma.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 03/24/2003 01:15 PM -----

FM Edmonton Control Centre
Sent by: Vincent MacIntyre

03/24/2003 10:54 AM
Please respond to FM Edmonton Control Centre

To: DAN W KLARNER/LPL@LPL, MIKE D GOMAN/LPL@LPL, LEO M ZALAZNIK/LPL@LPL, DON L ENGEN/CNPL/ENBRIDGE@IPL, DAVE B MCNEILL/CNPL/ENBRIDGE@IPL, CCO Field Work, ESCANABA PLM CREW@LPL, ADAM J ERICKSON/LPL@LPL, Christine L Neff/CNPL/Enbridge@IPL
cc:
Subject: (FMS Message from: FM Edmonton Control Centre)
Expire On:

STRAITS

5MA3 - MFL TOOL WAS LAUNCHED AT 09:56 MST / MARCH 24

5MA3 - MFL TOOL LANDED AT MA STATION AT 10:46 MST / MARCH 24

Thank You
Vincent MacIntyre
Edmonton Control Centre



Don L Engen

03/24/2003 01:13 PM

To: Pipeline Integrity DMS
cc:
cc:
Subject: (FMS Message from: FM Edmonton Control Centre) <PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 03/24/2003 01:13 PM -----

FM Edmonton Control Centre
Sent by: Vincent MacIntyre

03/24/2003 08:34 AM
Please respond to FM Edmonton Control Centre

To: CCO Field Work, DON L ENGEN/CNPL/ENBRIDGE@IPL, SUPERIOR PLM CREW@LPL, GREG C SCHELIN/LPL@LPL, DAN W KLARNER/LPL@LPL, MIKE D GOMAN/LPL@LPL, BOB D GRANQUIST/LPL@LPL, BRUCE A HASFORTH/LPL@LPL, TODD D VINOPAL/LPL@LPL, GARY L MATTSON/LPL@LPL, SCOTT A OSTERN/LPL@LPL, NEIL R IGO/LPL@LPL, DALE F NELSON/LPL@LPL, DAVE P FRIBORG/LPL@LPL, TODD R HENDRICKS/LPL@LPL, BILL E CLARK/LPL@LPL, RICKY E SAARI/LPL@LPL, RICK K AUNET/LPL@LPL, DENNIS M WEDAN/LPL@LPL, JOE M SHAFER/LPL@LPL, MIKE J SKAGGS/LPL@LPL, BLAKE C OLSON/LPL@LPL, FRED W KLUMPP/LPL@LPL, IRONWOOD PLM CREW@LPL
cc:
Subject: (FMS Message from: FM Edmonton Control Centre)
Expire On:

Exit
PR:

CLEANING TOOL 5IR1 WAS LAUNCHED AT 08:17 MST

CALIPER TOOL 5IR2 WAS LAUNCHED AT 08:17 MST

THANK YOU
Vince MacIntyre
Edmonton Control Centre

Don L Engen
03/24/2003 08:43 AM

To: Dave B McNeill/CNPL/Enbridge,
cc:
cc:
Subject: March 23rd Report for Line # 5
Expire On:

Line 5 updates from Don Demich to March 23rd. The 30" cleaning and CTool were launched from Superior at 0817 MST today. The PII MFL tool was launched on the East Leg of the Straits of Mackinac at 0955 MST today.
----- Forwarded by Don L Engen/CNPL/Enbridge on 03/24/2003 08:43 AM -----

"Don Demich" <pwicons@earthlink.net>
03/23/2003 06:08 PM
Please respond to pwicons

To: "Don Engen" <don.engen@enbridge.com>
cc:
Subject: March 23rd Report for Line # 5
Expire On:

Find attached the work performed on March 23rd. It looks good that we will get both inspection runs in on the east line. The 30" program is on schedule and we will launch tools in the morning. I will keep you updated tomorrow as things occur.

PWI Consultants Ltd.
Don Demich
pwicons@earthlink.net
pwicons@yahoo.com
Cell: 612 940-1040

LINE 5 DAILY WORK SUMMARY.doc

Don L Engen
03/24/2003 08:38 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: March 23rd Report for Line # 5 <PRG.LINE05.20.straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 03/24/2003 08:38 AM -----

"Don Demich" <pwicons@earthlink.net>
03/23/2003 06:08 PM
Please respond to pwicons

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LINE 5 DAILY WORK SUMMARY.doc

LINE 5 DAILY WORK SUMMARY

Report prepared by Don Demich, PWI Consultants Ltd.

March 11, 2003

Pre-Job meeting in Duluth Minnesota with Don Engen running the meeting, Enbridge PLM foreman and Supervisor, PII, PWI were present. BJ and Corrpro were on a conference call.

March 12, 2003

Take all the AGM site drawings from the 1996 survey and make copies courier them to Aaron Roberie with Corrpro in Edmonton. I e-mailed a list of the AGM site spreadsheet including the new sites that we would like to add to the project. Aaron was to past on all the data to the GPS Crew, That was scheduled to arrive in Superior on March 18th.

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Travel from Minneapolis to Escanaba, BJ crew from Calgary flew o Green Bay and then drove to Escanaba. PII crew had been in Escanaba since last Friday, Jordon with Axiom was in Duluth.

March 17,2003

PII and BJ crews met at Escanaba PLM shop and I put them through the safety indoctrination training. The BJ equipment arrived at the shop and was unloaded, by the PLM crew. Talked with Jordon from Axiom and was informed that the C-Tool had not arrived in Superior as yet. Talked with line 5 operator and was informed we would have crude across the straits for the March 18-19th. The PLM crew was in Hazmat training for the day, the PII and BJ crews worked on preparing there tools. Jordon from Axiom picked up his tool and traveled from Superior, WI to St. Ignace, MI. About 6:00PM local time we started loading the inspection equipment on the PLM trucks and drove from Escanaba to St. Ignace. We were instructed to inspect the east line with all four tools, and the west line we were to run the cleaning, c-tool and the PII inspection tool. The BJ geo tool was only to be run in the east line.

PII Crew	**Leonard J. Garcia Jr. James Simmons**
BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck**
PWI	**Don Demich**
Escanaba PLM Crew	**Leo Zalaznik Foreman (St. Ignace Site)**
Ironwood PLM Crew	**John Grotberg Foreman (Mackinaw Site)**

March 18, 2003

Meet with BJ crew at 05:00 and travel to the St. Ignace trap site, the PLM Foreman issued a work permit for the crews, we then held a tailgate safety meeting prior to starting work. PLM crew drained the launch trap on the east line and the cleaning tool was loaded and launched at 08:40. The tool as received at Mackinaw at 10:10. The flow rate was 200 c/m per hour and the flow was 37% in the east line and 63 in the west line. While the cleaning tool was in the line the PLM crew drained the east launch trap and loaded the C-tool. The tool was launched at 10:15 and after about 30 minutes, we pinched down the valve on the west line to 1/3 open the speed of the tool in the east line increased by 33%. The tool was received @ 11:30, the crew pulled the tool and the technician from Axiom checked data on the tool. At 12:45 were given the go ahead to launch the PII tool. The PLM crew started to load the tool in the trap, @ 13:00 while pulling the tool into the trap the winch cable snapped, about 8 feet of the tool was in the trap. We spent about 1.5 hours fishing to hook on the cable or tool in the line, we were successful in hooking the line. We tried to winch the tool in again and moved the tool about 4" when the second cable broke. After several discussions we were given permission from the PII Calgary group to pull the tool out backwards. The PLM crew set up the tray and the tool was pulled out backward using come-a-long equipment. The tool was removed at 17:00 and taken back into the shop. The PLM crew left the site and me and the PII technicians stayed to access the damage to the tool, @ 18:45 we locked up the returned to our hotels

PII Crew	**Leonard J. Garcia Jr. James Simmons**
BJ Crew	**Richard Fawcett and Geoff Hurd**
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Electricians	**Mike Burnis, Peter Olson**

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Meet with BJ crew at 05:00 and travel to the St. Ignace trap site, the PLM Foreman issued a work permit for the crews. Open East line trap and feed pulling cable to the trap door, attach to BJ tool and start pulling in the tool at 06:40, the tool was pulling into the trap and the cable released and trap closed and pressured up, all air was bled on of the trap. The tool was launched at 07:18 and was received at Mackinaw at 08:37. The west line was pinched down to the same position as the C-tool run, but the flow rate was 2350 C/M/H. The tool speed was 3.13 MPH; the tool was surging in the line. The trap was isolated and drained, the BJ tool was removed. The PLM crews closed the trap and re-pressured the trap; all valves were returned to the normal operating position. The pinched valve the west line was re-opened. The tool was returned to the St. Ignace work site and the BJ crew down loaded data. We informed that the tool Inertia has not worked for any of the run. The crew worked with the data while the PLM crew drove the tool around the area for approximately one hour. We then unloaded he tool and put it back in the work shop, the tool was re checked and the Inertia was working. After several discussions with scheduling, we would not be able to run the tools till late Sunday night or early Monday morning. The remainder of the day was spent repairing tools by both BJ and PII. The crews were the same as yesterday.

Cont: March 19th.
Contacted Corrpro crew and the started the GPS survey on the AGM sites in Superior and completed sites to MP 1120.

Corrpro	**Jess Landals, Martin Racicot**

March 20, 2003
Call line 5 operator to inform them of the work in progress
06:30 open up the St. Ignace site and issue a Safe Work Permit to the BJ, PII crews at this site, add Corrpro GPS crew to the permit that are working on line # 5 from MP 1120- towards Iron R Call line 5 operator to inform them of the work in progress
iver. Tailgate safety meeting was held at St. Ignace with BJ and PII crews. The line # 5 operator was informed of all crews working locations. The PII crew was finished rebuilding the tool and traveled to Escanaba to pick up gear. The BJ crew finished rebuilding the Geo tool and they left the tool on test for the night.

PII Crew	**Leonard J. Garcia Jr. James Simmons**
BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck travel to Superior, WI**
PWI	**Don Demich**
Corrpro	**Jess Landals, Martin Racicot**

NOTE: parts for PII tools arrived in St. Ignace @ 2:00 AM Local time.

March 21, 2003
Call line 5 operator to inform them of the work in progress
06:15 open up the St. Ignace site and issue a Safe Work Permit to the PII crew at this site, add Corrpro GPS crew to the permit that are working on line # 5 from MP 1142- towards Iron River. Tailgate safety meeting was held at St. Ignace with PII crew. Line # 5 operator was called and informed of contract personal on the line. The BJ crew downloaded test from the Geo tool. The tool had worked for 3 hours and then failed again. The technicians took the tool apart and replaced the recorder board, the tool was put on test for one hour, and the test was good. They left the tool running for the night.

Corrpro crew completed the GPS on the Line # 5 AGM sites from MP 1142-1172.
Axiom prepared the C-tool in the Superior shop.

BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck working on C-tool at Superior shop.**
PWI	**Don Demich**
Corrpro	**Jess Landals, Martin Racicot**

March 22, 2003
Call line 5 operator to inform them of the work in progress.
06:15 open up the St. Ignace site and issue a Safe Work Permit to the BJ crew at this site, add Corrpro GPS crew to the permit that are working on line # 5; moved from Superior to Iron River, worked on paperwork for the day. Axiom on stand-by till the scheduled cleaning/c-tool runs on March 24th. The BJ tool worked over night and the crew put the tool back together. The tool was assembled and put back on test at 08:30. I met with the PII crew to discuss the schedule for March 23rd. The BJ crew arrived back at St. Ignace at 14:45 and the BJ crew checked the tool again, everything was working normally. The facility was secured and the crew left for the day.

BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck on Stand-by**
PWI	**Don Demich**
Corrpro	**Jess Landals, Martin Racicot**

March 23, 2003
Call line 5 operator to inform them of the work in progress.
08:30 open up the St. Ignace site and issue a Safe Work Permit to the PII/BJ crews at this site, add Corrpro GPS crew to the permit that are working on line # 5 from MP 1174-1202. Axiom on stand-by till the scheduled cleaning/c-tool runs on March 24th. BJ checked out the geo tool and confirmed everything was working properly; they left the site at 09:30. The PII crew checked out the MFL tool and prepared the tool to be launched on March 24th. The crew left the St. Ignace site at 10:30; I called to let the Line 5 operator know we had left the site for the day. Late in the afternoon I returned to the St. Ignace site to check out the road as it had started washing out at noon. A portion of the road was washed away, drove in two 4 foot stakes and flagged the hazard. I traveled to the Sheriff's department and reported the road condition; I indicated that the access from the west was closed. They contacted the road department and said they would be out to check out the situation. (The culvert was blocked or frozen). Called Jordan with Axiom and told him to meet the Superior PLM crew at 06:30, to load and launch the cleaning and C-tool. The rate will be about 2000 C/M/H. I informed Jordan that we would be slowing down the rate to 1200 while we inspect the east line across the straits.

PII Crew	**Leonard J. Garcia Jr. James Simmons**
BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck on Standby in Superior.**
PWI	**Don Demich**
Corrpro	**Jess Landals, Martin Racicot**

Don L Engen
03/23/2003 10:17 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Field report <PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 03/23/2003 10:17 AM -----

rfawcett@bjservices.ca
03/22/2003 11:53 PM

To: don.engen@enbridge.com
cc:
Subject: Field report
Expire On:

Don,

Just to keep the paperwork in order here is the field report for the first Geopig run.

(See attached file: Enbridge Mackinac East Geopig Field Report.doc)

Regards

Richard Fawcett
Project Leader
BJ Pipeline Inspection Services
403 531 5046
rfawcett@bjservices.ca

Enbridge Mackinac East Geopig Field Report.doc

—Pipeline Inspection Services

Field Operations Report

Enbridge Pipelines Inc.
10201 Jasper Ave
Edmonton, AB
T5J 3N7

March 21, 2003

Attention: Don Engen

Re: Field Operations Report for 20" Mechanical Caliper Inspection of Enbridge NPS 20 Pipeline (Line 5 Straits of Mackinac - East)

Dear Mr. Engen,

The following field report describes the preliminary analysis of the data collected by the BJ Geopig tool during the inspection of Enbridge Pipelines' NPS 20 Line 5 – Straits of Mackinac (East) on March 19th, 2003.

The Geopig was launched at 09:17 on March 19th and arrived at the receive trap about 1 hour later. After removal from the receive trap the tool was taken to the shop for data downloading and analysis.

The Geopig collected good quality caliper and odometer data for the entire run, but the inertial stopped recording data prior to the launch. While we are still in the process of correcting this problem a re-run has been scheduled for March 24, 2003. The preliminary analysis of the caliper data revealed no pipe wall anomalies larger than 5% O.D

We would like to take this opportunity to thank Enbridge Pipelines for their outstanding support during this job. If you have any comments or questions please feel free to contact us at your convenience.

Sincerely,
Per. BJ Pipeline Inspection Services

Richard Fawcett
Project Leader

BJ Pipeline Inspection Services
(a Division of BJ Services Company Canada)

P.O. Box 1028 Station T, Calgary, Alberta T2H 2H4
4839 - 90th Avenue S.E., Calgary, Alberta, Canada T2C 2S8
Telephone (403) 531-5300 Facsimile (403) 236-8740

Don L Engen
03/23/2003 10:15 AM

To: Pipeline INtegrity DMS
cc:
cc:
Subject: BJ Tool Status<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 03/23/2003 10:15 AM -----

"Don Demich" <pwicons@earthlink.net>
03/22/2003 09:11 AM
Please respond to pwicons

To: "Don Engen" <don.engen@enbridge.com>
cc:
Subject: BJ Tool Status
Expire On:

Dear Don

March 22,2003

I meet with the BJ crews early this morning and we went back to the shop at St. Ignace. The tool had worked all night, Richard re-assembled the tool and we put the tool back on test. The test started at 08:30 MST, the plan is to go back at 15:00 and re-check the tool. I will send you an email later today with the results.

PWI Consultants Ltd.
Don Demich
pwicons@earthlink.net
pwicons@yahoo.com
Cell: 612 940-1040

"Don Demich" <pwicons@earthlink.net>
03/22/2003 04:52 PM
Please respond to pwicons

To: "Don Engen" <don.engen@enbridge.com>
cc:
Subject: DAILY WORK REPORT MARCH 22,2003
Expire On:

Dear Don

The BJ crew appears to have fixed the problem with the Geo tool and it has pasted two test periods as of this evening. I will meet the PII crew at the St. Ignace facility at 08:30 tomorrow and we will prepare the tool to be loaded into the trap. The BJ crew will arrive and check out the tool one more time. Hopefully we can complete the east line on Monday.

I will talk to Jordan in the morning and discuss the schedule for the LIne 5 30' inspection program.

I will be at the St. Ignace facility most of Sunday (906 643-8212)

PWI Consultants Ltd.
Don Demich
pwicons@earthlink.net
pwicons@yahoo.com
Cell: 612 940-1040

LINE 5 DAILY WORK SUMMARY.doc

LINE 5 DAILY WORK SUMMARY

Report prepared by Don Demich, PWI Consultants Ltd.

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Corrpro	**Jess Landals, Martin Racicot**

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Corrpro	**Jess Landals, Martin Racicot**

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Axiom	**Jordan Dyck working on C-tool at Superior shop.**
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Corrpro	**Jess Landals, Martin Racicot**

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for March 23rd. The BJ crew arrived back at St. Ignace at 14:45 and the BJ crew checked the tool again, everything was working normally. The facility was secured and the crew left for the day.

Cont: March 22.

BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck on Stand-by**
PWI	**Don Demich**
Corrpro	**Jess Landals, Martin Racicot**

Blake C Olson@LPL

03/21/2003 06:38 AM

To: Don L Engen/CNPL/Enbridge@IPL
cc:
Subject: Re: Line 5 (20"/30") Superior to Iron River, Iron River to North Straits, Straits of Mackinac In - Line Inspections - March \ April, 2003 - Contact List<PRG.LINE05.20".straits.mi-03>
Expire On:

I have been alerted to one mistake in the phone numbers I provided. Mike Skaggs home phone is 265-5086 and not 265-5806. I double checked the rest of the numbers and they look OK. I'm sorry for the inconvenience.

Line 5 Contacts.doc

Greg Montgomery
02/20/2003 06:50 AM

To: Leanne M Thomson/CNPL/Enbridge@IPL
cc: Don L Engen/CNPL/Enbridge@IPL, Tanis J Elm/CNPL/Enbridge@IPL, Scott Laird/LPL@LPL, Elizabeth Roland/US/Enbridge@LPL
Subject: Re: Pipeline Integrity - Request for SCN<AF.BUD.op>

Leanne,

These will need to be requested through Rick Johnson's group. I have copied them on my reply.

Leanne M Thomson@IPL



Leanne M Thomson@IPL
02/19/2003 06:35 PM

To: Greg Montgomery/US/Enbridge@LPL
cc: Don L Engen/CNPL/Enbridge@IPL, Tanis J Elm/CNPL/Enbridge@IPL
Subject: Pipeline Integrity - Request for SCN<AF.BUD.op>

Hi Greg,

The following Pipeline Integrity programs will need Special Cost Numbers. I am not too sure of the process involved to request the SCNs or all the information you may need so please contact me at (780)420 8459 or via e-mial if I have missed any information or to let me know of the proper process to go through.

Thanks,
Leanne.

91204SC0099
Line 2 (26") Inhibitor Program (* *Note that in Canada this is Terrace budget work, but has been included here as operating and would apply to Terrace costs for the year anyways.)*

Task	Discription	Exp. Type	Amount
01	Chemical	62007-01	$310,000
02	O/S	62008-01	$ 58,000
03	Foil Placements (New)	62008-01	$84,000
04	Foil Replacements	62008-01	$121,000
05	Labor		

91204SC0098
Line 4 (48") Inhibitor Program

Task	Discription	Exp. Type	Amount
01	Chemical	62007-01	$160,000
02	O/S	62008-01	$100,000
03	Foil Placements (New)	62008-01	$10,500
04	Labor		

91204SC0097
Line 6B (30") Inhibitor Program

Task	Discription	Exp. Type	Amount
01	Chemical	62007-01	$230,000
02	O/S	62008-01	$82,000
03	Foil Placements (New)	62008-01	$155,000

04	Labor		

91204SC0096
Consultant Foil Review

Task	Discription	Exp. Type	Amount
01	Consultant Foil Review	62008-01	$20,000
02	Labor		

91204SC0095
Monitoring Fees

Task	Discription	Exp. Type	Amount
01	All locations	62008-01	$3,100
02	Labor		

91204SC0094
Line 2 (26") CR to PW

Task	Discription	Exp. Type	Amount
01	ILI Vendor	62010-01	$435,000
02	Caliper	62010-01	$30,000
03	Tool Tracking	62010-01	$45,000
04	3rd Party Expense	62010-01	$10,000
05	Labor		

91204SC0093
Line 5 (20") Straits of Mackinac A and B

Task	Discription	Exp. Type	Amount
01	ILI Vendor	62010-01	$250,000
02	Caliper	62010-01	$219,000
03	Tool Tracking	62010-01	$2,000
04	3rd Party Expense	62010-01	$10,000
05	Labor		

91204SC0092
Line 5 (30") PE to MA

Task	Discription	Exp. Type	Amount
01	ILI Vendor	62010-01	$861,000
02	Caliper	62010-01	$40,000
03	Tool Tracking	62010-01	$58,000
04	3rd Party Expense	62010-01	$10,000
05	Labor		

Don L Engen
03/20/2003 12:14 PM

To: pwicons@yahoo.com, landals@attglobal.net, jordan@axiompipe.com
cc: Pipeline integrity DMS
cc:
Subject: Line 5 (30") Cleaning and Caliper Tool Run - PR to IR <PRG.LINE05.30".pe-ma.mi-03> >
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 03/20/2003 12:14 PM -----

Dean G Rawson
03/20/2003 10:23 AM

To: CCO Field Work, Don L Engen/CNPL/Enbridge@IPL, Superior PLM Crew@LPL, Greg C Schelin/LPL@LPL, Dan W Klamer/LPL@LPL, Mike D Goman/LPL@LPL, Bob D Granquist/LPL@LPL, Bruce A Hasforth/LPL@LPL, Todd D Vinopal/LPL@LPL, Gary L Mattson/LPL@LPL, Scott A Ostern/LPL@LPL, Neil R Igo/LPL@LPL, Dale F Nelson/LPL@LPL, Dave P Friborg/LPL@LPL, Todd R Hendricks/LPL@LPL, Bill E Clark/LPL@LPL, Ricky E Saari/LPL@LPL, Rick K Aunet/LPL@LPL, Dennis M Wedan/LPL@LPL, Joe M Shafer/LPL@LPL, Mike J Skaggs/LPL@LPL, Blake C Olson/LPL@LPL, Fred W Klumpp/LPL@LPL, Ironwood PLM Crew@LPL
cc:
Subject: Line 5 (30") Cleaning and Caliper Tool Run - PR to IR <5>
Expire On:

ed CCO Coordinator
Line 5 Operator

Line 5 (30") Cleaning and Caliper Tool Run - PR to IR
{0800 MST March 24 to 1915 MST March 26}

Proceed with plans to run a cleaning and a caliper tool in the 30" Line 5 pipe from PR to IR. The tools will be launched 1 hour apart, and cannot be launched within a bacth of NGL. Continuous flow is preferred, but is not entirely necessary.

Stations are to be bypassed 0.5 hours prior to the arrival of a tool, and taken off bypass once it has been confirmed that the tool has passed the station. When bypassing stations that do not have mainline suction transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting a valid readback to LPM. Station discharge valves must be completely closed during the bypass. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

Responsibilities
~ ~ ~ ~ ~ ~ ~ ~ ~ ~

Tool trackers shall report to the Line operator when a tool is launched and received, when a tool is 1/2 hour upstream of a station or landing location, when a tool has passed a station, and every two hours in between. The information to be provided to the operator shall include the position of a particular tool (MP) and the associated time and date. Tool trackers shall also provide the line operator with appropriate contact names and numbers (including off hours contact numbers in case of an emergency) prior to the start of the tool run.

Tool Tracker 1:
Cel:
Pager:
Other:

Tool Tracker 2:
Cel:
Pager:
Other:

Field personnel responsible for bypassing stations or landing tools are requested to provide the Line operator with appropriate contact information. This can be provided anytime after the beginning of the run, but no later than 1 day prior to the estimated time of the responsible person's activity (for runs less than 1 day, the notification should no less than 4 hours). Field personnel are encouraged to contact the line operator during the run for tool positions and estimated arrival times/dates (line operators will not be issuing tool position messages during the run). Where applicable, field personnel are requested to contact the line operator to confirm launch times after 1700 MST of the day preceding the run (to ensure that the next day's pump orders have been received). Field personnel are responsible for operating valves to launch and receive each tool. Station bypasses shall be initiated by field personnel in coordinator with the Line operator and tool trackers.

The line operator is responsible for issuing a message (to the recipients of this message) indicating the launch and arrival times of each tool. This message shall be issued twice: immediately after launch time of a tool train, and immediately after arrival time of a tool train. The line operator is responsible for contacting the appropriate field personnel for bypassing stations and landing the tools 2 hours prior to the arrival of the tool at the particular site. If estimated arrival times change significantly during a run, the line operator is responsible for contacting the appropriate field person. The line operator is also requested to contact tool trackers in the event that line rates and schedules change (eg. durations of shut down times).

~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~

Below is a tentative schedule of launch and arrival times. Field personnel are requested to contact the Line operator for updated arrival times.

			Cleaning Tool 5IR1		Caliper Tool 5IR2	
Station	**MP**	**Responsible Person and Contact Information**	**Estimated Time**	**Actual Time**	**Estimated Time**	**Actual Time**
PR	1098.1	Name: Cel: Pager Other:	0800/24		0900/24	
IO	1137.3	Name: Cel: Pager: Other:	2015/24		2115/24	
SN	1183.6	Name: Cel: Pager: Other:	1100/25		1200/25	
GO	1226.2	Name: Cel: Pager:	0015/26		0115/26	

		Other:				
IR	1272.2	Name: Cel: Pager: Other:	1815/26		1915/26	

Please contact me with any questions.

Dean Rawson (780) 420-8285.



"Don Demich" <pwicons@earthlink.net>
03/19/2003 08:20 PM
Please respond to pwicons

To: "Don Engen" <don.engen@enbridge.com>
cc:
Subject: March 19th Line 5 Report
Expire On:

You probable know all there is to know about today from our conversations, I have attache the Daily work summary for your information. I have also included some more pictures. The PII & BJ crews will be working at the St. Ignace trap site cold storage facility tomorrow, I will send Jordan back to Superior in the morning to start preparing the 30" C-tool for the scheduled Monday March 24th launch.

Talk to you in the morning.

PWI Consultants Ltd.
Don Demich
pwicons@earthlink.net
pwicons@yahoo.com
Cell: 612 940-1040


LINE 5 DAILY WORK SUMMARY.doc


BJ Tool Rec Trap-1.JPG


BJ Rec Trap.JPG


BJ Tool After First Run.JPG


BJ Tool After Run-1.JPG


BJ Tool After Run-2.JPG


BJ Tool on Tray @ Mackinaw.JPG

LINE 5 DAILY WORK SUMMARY

Report prepared by Don Demich, PWI Consultants Ltd.

March 11, 2003

Pre-Job meeting in Duluth Minnesota with Don Engen running the meeting, Enbridge PLM foreman and Supervisor, PII, PWI were present. BJ and Corrpro were on a conference call.

March 12, 2003

Take all the AGM site drawings from the 1996 survey and make copies courier them to Aaron Roberie with Corrpro in Edmonton. I e-mailed a list of the AGM site spreadsheet including the new sites that we would like to add to the project. Aaron was to past on all the data to the GPS Crew, That was scheduled to arrive in Superior on March 18th.

March 16, 2003

Travel from Minneapolis to Escanaba, BJ crew from Calgary flew o Green Bay and then drove to Escanaba. PII crew had been in Escanaba since last Friday, Jordon with Axiom was in Duluth.

March 17,2003

PII and BJ crews met at Escanaba PLM shop and I put them through the safety indoctrination training. The BJ equipment arrived at the shop and was unloaded, by the PLM crew. Talked with Jordon from Axiom and was informed that the C-Tool had not arrived in Superior as yet. Talked with line 5 operator and was informed we would have crude across the straits for the March 18-19th. The PLM crew was in Hazmat training for the day, the PII and BJ crews worked on preparing there tools. Jordon from Axiom picked up his tool and traveled from Superior, WI to St. Ignace, MI. About 6:00PM local time we started loading the inspection equipment on the PLM trucks and drove from Escanaba to St. Ignace. We were instructed to inspect the east line with all four tools, and the west line we were to run the cleaning, c-tool and the PII inspection tool. The BJ geo tool was only to be run in the east line.

PII Crew	**Leonard J. Garcia Jr. James Simmons**
BJ Crew	**Richard Fawcett and Geoff Hurd**
Axiom	**Jordan Dyck**
PWI	**Don Demich**
Escanaba PLM Crew	**Leo Zalaznik Foreman (St. Ignace Site)**
Ironwood PLM Crew	**John Grotberg Foreman (Mackinaw Site)**

March 18, 2003

Meet with BJ crew at 05:00 and travel to the St. Ignace trap site, the PLM Foreman issued a work permit for the crews, we then held a tailgate safety meeting prior to starting work. PLM crew drained the launch trap on the east line and the cleaning tool was loaded and launched at 08:40. The tool as received at Mackinaw at 10:10. The flow rate was 200 c/m per hour and the flow was 37% in the east line and 63 in the west line. While the cleaning tool was in the line the PLM crew drained the east launch trap and loaded the C-tool. The tool was launched at 10:15 and after about 30 minutes, we pinched down the valve on the west line to 1/3 open the speed of the tool in the east line increased by 33%. The tool was received @ 11:30, the crew pulled the tool and the technician from Axiom checked data on the tool. At 12:45 were given the go ahead to launch the PII tool. The PLM crew started to load the tool in the trap, @ 13:00 while pulling the tool into the trap the winch cable snapped, about 8 feet of the tool was in the trap. We spent about 1.5 hours fishing to hook on the cable or tool in the line, we were successful in hooking the line. We tried to winch the tool in again and moved the tool about 4" when the second cable broke. After several discussions we were given permission from the PII Calgary group to pull the tool out backwards. The PLM crew set up the tray and the tool was pulled out backward using come-a-long equipment. The tool was removed at 17:00 and taken back into the shop. The PLM crew left the site and me and the PII technicians stayed to access the damage to the tool, @ 18:45 we locked up the returned to our hotels

PII Crew	**Leonard J. Garcia Jr. James Simmons**
BJ Crew	**Richard Fawcett and Geoff Hurd**
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PWI	**Don Demich**
Escanaba PLM Crew	**Leo Zalaznik Foreman (St. Ignace Site)**
Ironwood PLM Crew	**John Grotberg Foreman (Mackinaw Site)**
Electricians	**Mike & Pete**

March 19, 2003

Meet with BJ crew at 05:00 and travel to the St. Ignace trap site, the PLM Foreman issued a work permit for the crews. Open East line trap and feed pulling cable to the trap door, attach to BJ tool and start pulling in the tool at 06:40, the tool was pulling into the trap and the cable released and trap closed and pressured up, all air was bled on of the trap. The tool was launched at 07:18 and was received at Mackinaw at 08:37. The west line was pinched down to the same position as the C-tool run, but the flow rate was 2350 C/M/H. The tool speed was 3.13 MPH; the tool was surging in the line. The trap was isolated and drained, the BJ tool was removed. The PLM crews closed the trap and re-pressured the trap; all valves were returned to the normal operating position. The pinched valve the west line was re-opened. The tool was returned to the St. Ignace work site and the BJ crew down loaded data. We informed that the tool Inertia has not worked for any of the run. The crew worked with the data while the PLM crew drove the tool around the area for approximately one hour. We then unloaded he tool and put it back in the work shop, the tool was re checked and the Inertia was working. After several discussions with scheduling, we would not be able to run the tools till late Sunday night or early Monday morning. The remainder of the day was spent repairing tools by both BJ and PII. The crews were the same as yesterday.

Cont: March 19th.
Contacted Corrpro crew and the started the GPS survey on the AGM sites in Superior and completed sites to MP 1120.

LINE 5 DAILY WORK SUMMARY

Report prepared by Don Demich, PWI Consultants Ltd.

March 11, 2003

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Ironwood PLM Crew	**John Grotberg Foreman (Mackinaw Site)**

March 18, 2003

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Ironwood PLM Crew	**John Grotberg Foreman (Mackinaw Site)**
Electricians	**Mike & Pete**



"Don Demich" <pwicons@earthlink.net>
03/17/2003 08:12 PM
Please respond to pwicons

To: "Don Engen" <don.engen@enbridge.com>
cc:
Subject: Line # 5 Daily Updates
Expire On:

I have attached the Daily Work Summary for the work preformed on Line # 5 and the Straits. Thanks for the calls today I appreciate the updates.

We will have a good day tomorrow as everyone is ready to work.

PWI Consultants Ltd.
Don Demich
pwicons@earthlink.net
pwicons@yahoo.com
Cell: 612 940-1040



LINE 5 DAILY WORK SUMMARY.doc

LINE 5 DAILY WORK SUMMARY

Report prepared by Don Demich, PWI Consultants Ltd.

March 11, 2003

Pre-Job meeting in Duluth Minnesota with Don Engen running the meeting, Enbridge PLM foreman and Supervisor, PII, PWI were present. BJ and Corrpro were on a conference call.

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PWI	**Don Demich**
Escanaba PLM Crew	**Leo Zalaznik Foreman (St. Ignace Site)**
Ironwood PLM Crew	**John Grotberg Foreman (Mackinaw Site)**

March 18, 2003

Don L Engen
03/18/2003 08:50 AM

To: Pipeline iNtegrity DMS
cc:
cc:
Subject: Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinaw - MP 1075 to MA - East leg <PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 03/18/2003 08:50 AM -----

Christine L Neff
03/14/2003 04:08 PM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL
cc:
Subject: Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinaw - MP 1075 to MA - East leg <5>
Expire On:

ed CCO Coordinator
Line 5 Operator

Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinaw - MP 1075 to MA - **East** leg
{1400 MST March 19 to 1700 MST March 19}
~ ~

Proceed with plans to run a Geopig tool and an MFL tool in the 20" Line 5 **East** leg of the straits crossing to MA. This run does require continuous flow.

The Geopig tool (5MA3) will be launched from MP 1475 at 1400/19. The MFL tool (5MA4) will be launched 2 hours later. The tools cannot be launched in an NGL or buffer batch.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

Field personnel shall report to the Edmonton Control Center the location of the pigs upon launching and prior to the pig landing.

Provided below is the estimated schedule for the run.

			5MA1 - Cleaning Tool		5MA2 - Caliper Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time	Estimated Time	Actual Time
	1475		1400/19		1600/19	
MA	1479	1300 m3	1500/19		1700/19	

*All times are listed in MST.

Please contact me with any questions.

Christine Neff (780)420-5204.



Don L Engen

03/18/2003 08:52 AM

To: Pipeline INtegrity DMS
cc:
cc:
Subject: Line 5 (20")Cleaning and Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - East leg *Rev.1 <PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 03/18/2003 08:52 AM -----

Christine L Neff

03/17/2003 10:53 AM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL
cc:
Subject: Line 5 (20")Cleaning and Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - East leg <5> *Rev.1
Expire On:

*Revision 1 - issued to change times
ed CCO Coordinator
Line 5 Operator

Line 5 (20")Cleaning and Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - **East** leg
{1300 MST March 18 to 1600 MST March 18}
~ ~

Proceed with plans to run a cleaning tool and a caliper tool in the 20" Line 5 **East** leg of the straits crossing to MA. The run is in preparation for the upcoming MFL/geopig tool run. The cleaning/caliper run does require continuous flow.

The cleaning tool (5MA1) will be launched from MP 1475 at 1300/18. The caliper tool (5MA2) will be launched 2 hours later. The tools cannot be launched in an NGL or buffer batch.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

Field personnel shall contact the Edmonton Control Center in the morning of the launch to confirm that the line will be running during the pig run. Times can be adjusted as required.

Field personnel shall report to the Edmonton Control Center the location of the pigs upon launching and prior to the pig landing.

Provided below is the estimated schedule for the run.

			5MA1 - Cleaning Tool		5MA2 - Caliper Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time	Estimated Time	Actual Time

	1475		0500/18		0700/18	
MA	1479	1300 m3	0600/18		0800/18	

*All times are listed in MST.

Please contact me with any questions.

Christine Neff (780)420-5204.

Don L Engen
03/18/2003 08:53 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinaw - MP 1075 to MA - East leg*Rev. 1 <PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 03/18/2003 08:53 AM -----

Christine L Neff
03/17/2003 10:55 AM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL
cc:
Subject: Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinaw - MP 1075 to MA - East leg <5> *Rev. 1
Expire On:

*Revision 1 - issued to change timing

ed CCO Coordinator
Line 5 Operator

Line 5 (20")Geopig and MFL Tool Run - Straits of Mackinaw - MP 1075 to MA - **East** leg
{1100 MST March 18 to 1400 MST March 18}
~~~~~~

Proceed with plans to run a Geopig tool and an MFL tool in the 20" Line 5 **East** leg of the straits crossing to MA. This run does require continuous flow.

The Geopig tool (5MA3) will be launched from MP 1475 at 1400/19. The MFL tool (5MA4) will be launched 2 hours later. The tools cannot be launched in an NGL or buffer batch.

Stations are to be bypassed 0.5 hours prior to arrival of a tool at a station and taken off bypass after it has been confirmed to have passed the station. When bypassing stations that do not have mainline suction transmitters, the station suction valve is to remain open to ensure that the suction transmitter is reporting valid readback to LPM. The station discharge valve is to remain closed. Field personnel are responsible for ensuring that a mainline suction transmitter exists.

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Provided below is the estimated schedule for the run.

			5MA1 - Cleaning Tool		5MA2 - Caliper Tool	
Station	MP	Volume to U/S Stn	Estimated Time	Actual Time	Estimated Time	Actual Time
	1475		1100/18		1300/18	
MA	1479	1300 m3	1200/18		1400/18	

*All times are listed in MST.
~~~~~~

Please contact me with any questions.

Christine Neff (780)420-5204.

Don L Engen
03/18/2003 08:54 AM

To: Pipeline Integrity DMS
cc:
cc:
Subject: Line 5 (20")Cleaning and Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - East leg *Rev.2 <PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 03/18/2003 08:54 AM -----

Christine L Neff
03/17/2003 10:56 AM

To: Dan W Klarner/LPL@LPL, Mike D Goman/LPL@LPL, Leo M Zalaznik/LPL@LPL, Don L Engen/CNPL/Enbridge@IPL, Dave B McNeill/CNPL/Enbridge@IPL, CCO Field Work, Escanaba PLM Crew@LPL, Adam J Erickson/LPL@LPL
cc:
Subject: Line 5 (20")Cleaning and Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - East leg <5> *Rev.2
Expire On:

*Revision 2 - issued to correct times in header
*Revision 1 - issued to change times
ed CCO Coordinator
Line 5 Operator

Line 5 (20")Cleaning and Caliper Tool Run - Straits of Mackinaw - MP 1075 to MA - **East** leg
{0500 MST March 18 to 0800 MST March 18}
~~~~~~

Proceed with plans to run a cleaning tool and a caliper tool in the 20" Line 5 **East** leg of the straits crossing to MA. The run is in preparation for the upcoming MFL/geopig tool run. The cleaning/caliper run does require continuous flow.

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Station	MP	Volume to U/S Stn	Estimated Time	Actual Time	Estimated Time	Actual Time
	1475		0500/18		0700/18	
~~~~~~

MA	1479	1300 m3	0600/18		0800/18	

*All times are listed in MST.

Please contact me with any questions.

Christine Neff (780)420-5204.



rfawcett@bjservices.ca

03/14/2003 10:54 AM

To: don.engen@enbridge.com
cc:
Subject: Contact list
Expire On:

Don,

here is a contact sheet for those involved with the project

NAME	PHONE	EMAIL
DAN JUNGWIRTH	(403) 531 5409	DJUNGWIRTH@BJSERVICES.CA
DAVE LATTO	(403) 531 7625	DLATTO@BJSERVICES.CA
RICHARD FAWCETT	(403) 531 5046 (403) 813 4361	RFAWCETT@BJSERVICES.CA
GEOFF HURD	(403) 531 5332	GHURD@BJSERVICES.CA

Regards

Richard Fawcett
Project Leader
BJ Pipeline Inspection Services
403 531 5046
rfawcett@bjservices.ca



Don L Engen
03/17/2003 08:36 AM

To: Pipline Integrity DMS
cc:
cc:
Subject: GPS CREW FOR LINE # 5<PRG.LINE05.20".straits.ml-03>
Expire On:

----- Forwarded by Don L Engen/CNPL/Enbridge on 03/17/2003 08:36 AM -----



"Don Demich" <pwicons@earthlink.net>
03/15/2003 01:51 PM
Please respond to pwicons

To: jim.mckone@enbridge-us.com
cc: "Don Engen" <don.engen@enbridge.com>, "Aaron Roberie" <aaron.roberie@corrpro.ca>
Subject: GPS CREW FOR LINE # 5
Expire On:

Dear Jim

I talked with Corrpro on Friday and was informed the two man crew will arrive in Superior on March 18th in the afternoon. Can you arrange for them to have a safety indoctrination on Wednesday morning, I believe the crew has 2002 sticker on their hard hats but will need to watch the safety film for 2003.

After the indoctrination they will start the GPS on all the AGM sites from Superior working towards St. Ignace.

I will be in the Escanaba PLM shop all day on Monday working with the BJ and PII crews prior to the inspection of the two 20" lines across the straits.

I have informed Jesse Landal the foreman with Corrpro about the Hard Hats, Nomek, Steel toes, work permits, etc. I will issue them a safe work permit starting March 20th, if you can take care of the 19th.

Thanks and I will talk to you on Monday.

I will have the jerk and run radio # 3006.

PWI Consultants Ltd.
Don Demich
pwicons@earthlink.net
pwicons@yahoo.com
Cell: 612 940-1040

Don

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00007 -03

LOCATION: Edmonton, Alberta

TO: Axiom Pipeline Solutions Inc.
11339 – 111 Avenue
Edmonton, Alberta
T5G 0C8
Attention: Brian Powlousky

DATE: March 10, 2003

COMMENCEMENT DATE: March 10, 2003

COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To provide personnel, material and equipment to prepare the 20-inch CTool and inspect Line 5 (20-inch), two sections at the Straits of Mackinac, Michigan. Each section 4.2 miles (6.7 km) long. Some GPS surveying is also required at the Straits. A field report of the CTool inpsection is required as soon as possible after each inspection. A final report is required within 30 days of the completion of the inspection.

Company Information Only

91204SC0093 / 02 / 62010-01	US $34,000
91204SC0093 / 03 / 62010-01	US $ 2,000

Courier to Houston March 28

Estimated Value $

	Project #	Task #	Exp Type #	Exp. Organization #
Capital Cost	91204SC0093	02	62010-01	91204
	91204SC0093	03	62010-01	91204

	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #
Operating Costs						

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc. – Edmonton, Alberta
IT'S AGENT

APPROVAL 29/3/14

Name of Contractor: Axiom Pipeline Solutions Inc.

By: _____ Date: _____
SIGNATURE

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

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ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc. – Edmonton, Alberta 3176
IT'S AGENT

APPROVAL 7944

Name of Contractor: Axiom Pipeline Solutions Inc.

By: _____ Date: 20/MAR/03
SIGNATURE

DONSA INC.
15139 RAMSAY CRESCENT
EDMONTON ALBERTA, CANADA
T6H 5R1
PHONE 780 430 6901
FAX 780 430 6901

INVOICE

INVOICE NO244-WP91002-00011-03
DATE:MAR 19, 2003

To: ENBRIDGE PIPELINES INC.
10201 JASPER AVENUE
P.O. BOX 398
EDMONTON, ALBERTA
T5J 2J9

Ship To:

SALESPERSON	P.O. NUMBER	DATE SHIPPED	SHIPPED VIA	F.O.B. POINT	TERMS
D SAVARD	RE:WP91002-00011-03 ~~WP41144-000116~~				NET 30

QUANTITY	DESCRIPTION	UNIT PRICE	AMOUNT
2	30" CTOOL RUNS – SUPERIOR TERMINAL TO MACKINAW		4691.74
1	20' CTOOL RUN – STRAITS OF MACKINAC		2345.87
	(see attached)		
	****NOTE : TOTAL IS IN US CURRENCY**		

APPROVED
BY _____
EMP # 3176 DATE 03/31/03 MM / DD / BY
TOTALS CHECKED _____ ORDER # WO91002-00011-03
PROJECT CHARGE
PROJECT TASK EXP TYPE COST CTR
91204SC00921 04 16200-101 91204 ← $2341.06
91204SC00978 04 16200-10 91204 ← $2341.06
OPERATING COST
LOB CONT. SEG. COST CTR. ACCOUNT SUBACCOUNT INTER-LOB

SUBTOTAL	CD7037.61
US CONVERSION RATE (.6653)	
TOTAL DUE	**US4682.12**

GST #88119 6745 RT0001

Make all checks payable to: DONSA INC.
If you have any questions concerning this invoice, call: DON SAVARD 780 430 6901

THANK YOU FOR YOUR BUSINESS!

Invoice.doc

WORK ORDER
91002-00011-03

	30" Superior to Mackinaw	30" Superior to Mackinaw	20 Straits of Mackinac
Refurbishinng	1470.00	1470.00	1470.00
Pig Cups			
Sealer Disc			
Machining Cost	200.55	200.55	200.55
Odometer Cable	157.50	157.50	157.50
Size Disc (6% $52.50 each)	**259.35**	**259.35**	**259.35**
Size Disc (4% $52.50 each)	52.50	52.50	52.50
	52.50	52.50	52.50
SUB TOTAL	2192.40	2192.40	2192.40
GST	153.47	153.47	153.47
TOTAL	2345.87	2345.87	2345.87
TOTAL INVOICE CDN	7037.61		
TOTAL INVOICE US (.6653)	4682.12		

Don

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00011 -03

LOCATION: Edmonton, Alberta

TO: Donsa Inc.
15139 Ramsay Crescent
Edmonton, Alberta
T6H 5R1
Attention: Don Savard

DATE: March 10, 2003
COMMENCEMENT DATE: March 10, 2003
COMPLETION DATE: September 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To provide services and materials to prepare, refurbish and maintain the Ctools for inspections on Line 2 (26") Clearbrook to Superior, Line 5 (30") from Superior Terminal to Mackinaw and Line 5 (20") Straits of Mackinac.
Per Agreement C2000-12 and Bill of Sale between Enbridge Pipelines Inc. and Donsa Inc. and 2003 Pricing Guideline.

Company Information Only Estimate
91204SC0094 / 02 / 62010-01 US $8,000
91204SC0093 / 02 / 62010-01 US $4,000
91204SC0092 / 02 / 62010-01 US $8,000

Emailed Copy to Houston March 24

Estimated Value $

	Project #	Task #	Exp Type #	Exp. Organization #
Capital Cost	91204SC0094	02	62010-01	91204
	91204SC0093	02	62010-01	91204
	91204SC0092	02	62010-01	91204

	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #
Operating Costs						

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ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc. – Edmonton, Alberta
IT'S AGENT

APPROVAL 3/26

Name of Contractor: Donsa Inc

By: _____ Date: _____
SIGNATURE

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00011 -03

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TO: Donsa Inc.
15139 Ramsay Crescent
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T6H 5R1
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Estimated Value $

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Capital Cost	91204SC0094	02	62010-01	91204
	91204SC0093	02	62010-01	91204
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ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY. Don Engen – Enbridge Pipelines Inc. – Edmonton, Alberta
IT'S AGENT

Name of Contractor: Donsa Inc.

By. _____ Date. MAR 21 03

SIGNATURE

APPROVAL 3176

Don

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

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Edmonton, Alberta
T6H 5R1
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Company Information Only Estimate
91204SC0094 / 02 / 62010-01 US $8,000
91204SC0093 / 02 / 62010-01 US $4,000
91204SC0092 / 02 / 62010-01 US $8,000

Recalled Copy to Houston March 28

Estimated Value $

	Project #	Task #	Exp Type #	Exp. Organization #
Capital Cost	91204SC0094	02	62010-01	91204
	91204SC0093	02	62010-01	91204
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ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc. – Edmonton, Alberta
IT'S AGENT

APPROVAL 3176

Name of Contractor: Donsa Inc.

By: _____ Date: _____
SIGNATURE

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00011 -03

LOCATION: Edmonton, Alberta

TO: Donsa Inc.
15139 Ramsay Crescent
Edmonton, Alberta
T6H 5R1
Attention: Don Savard

DATE: March 10, 2003

COMMENCEMENT DATE: March 10, 2003

COMPLETION DATE: September 30, 2003

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Estimated Value $

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	91204SC0093	02	62010-01	91204
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ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc. – Edmonton, Alberta
IT'S AGENT

Name of Contractor: Donsa Inc.

APPROVAL 3176

By: _____ Date: MAR 21 03.
SIGNATURE

ORIGINAL

GE Power Systems
Oil & Gas

PII Canada Limited
1003 - 11th Street S.W.
Calgary, Alberta T2R 1G2
Canada
Tel (403) 262-7447

INVOICE

Enbridge Energy, Limited Partnership
Suite 3300, 1100 Louisiana
Houston, TX 77002

Attention: Mr. Don Engen

INVOICE NO.:	**CAN2248**
DATE:	March 25, 2003
TERMS:	Thirty (30) Days Upon Receipt
GST NO.:	872167978RP
LAUNCHING PROVINCE:	Michigan USA

Any questions concerning your invoice? **Call Maureen Miller (403) 298- 0240**

Name of Job:	20" Strait of Mackinac - Mackinaw A Michigan, USA	**Inspection Length:**	20H - 6.7km
Contract No:	C2001-25	**Work Order No.**	91002-00009-03
PII Ref. No.:	101211_20H	**Technology:**	MFL

This invoice is for the following services performed under the contract between Enbridge Energy Limited Partnership and PII (Canada) Limited:

US Dollars

Total Contract Price:
Inspection: 75,000.00X0.92 69,000.00
PipeImage= 7,000.00
Total $76,000.00

Invoicing Schedule:
Mobilization (10%) 7,600.00
Inspection (65%) 49,400.00
Final Report (25%) 19,000.00
Total $76,000.00

Previously Invoiced:
None

Current Charges:

Mobilization	7,600.00
Inspection	49,400.00
TOTAL	**$57,000.00**

APPROVED
BY _____
EMP # _____ DATE _____ MM/DD/YY
TOTALS CHECKED _____ ORDER # WO-91002-00009-03
PROJECT CHARGE
PROJECT TASK COST CTR
91204SC00931 01 1620074 91204
OPERATING COST
LOB CONT SEG. COST CTR ACCOUNT SUBACCOUNT INTER...

3176
03-31-03

PLEASE WIRE PAYMENT TO:

The Toronto-Dominion Bank
Calgary, Alberta
Account of PII (Canada) Limited
Account No: 0805 0338152

Overdue accounts are subject to a 1.5% interest charge per month

Exhibit C
Pricing and Payments

Should the Company fail to pay the Vendor any amount due under the Contract at the due date of payment the Company shall be liable to pay interest on the unpaid amount from the due date of payment to the actual date of payment at a rate of interest two percentage points above the prime rate at Morgan Guaranty Trust Company in New York from time to time in force.

All payments made by the Company under this Agreement shall be paid in United States dollars. All payments to the Vendor shall be made by wire transfer or cheque into the following bank account:

The Toronto-Dominion Bank

Calgary, Alberta, Canada

Account of PII (Canada) Limited

Canadian Account No. 0805 0338152

Payment Stages

Payment of the Contract Sums shall be as follows:

For MagneScan, TranScan, UltraScan WM Inspections

Mobilization	10% of fee
Inspection	65% of fee
Report	25% of fee

For UltraScan CD and EW Inspection

Upon Mobilization	25%
Upon Inspection	50%
Upon Final Report	25%

ENBDNR0007256

Exhibit C
Pricing and Payments

Enbridge 2001- 2004 Inspection Program Pricing

Pricing can be extended to all Enbridge Inc. wholly owned subsidiaries without exclusivity terms.

Pricing for Exclusive arrangement with PII (All prices in US $)

UltraScan WM

Minimum Line Segment Inspection Price	$125,000
For every km inspected	$ 1,525
Rerun Fees + applicable Standby and consumables charge	$ 45,000
Stand-By Charges (per day rate)	
Crew	$ 3,333
Tool	$ 3,333

UltraScan WM + Scoutscan Solo

Minimum Line Segment Inspection Price	$200,000
For every km inspected	$ 1,955
Rerun Fees for UltraScan + applicable Standby and consumables charge	$ 45,000
Rerun Fees for ScoutScan Solo	$ 25,000
Stand-By Charges (per day rate)	
Each Crew	$ 3,333
Each Tool	$ 3,333

MagneScan

Minimum Line Segment Inspection Price	$ 75,000
For every km inspected	$ 1,170
Rerun Fees	$ 30,000
Stand-By Charges (per day rate)	
Crew	$ 3,333
Tool	$ 3,333

ENBDNR0007257

Exhibit C
Pricing and Payments

Tool mobilization charges do not apply for the first mobilization of any inspection project. These fees are built in to the inspection fees. These mobilization charges only apply to re-run situations.

Miscellaneous/Optional Charges

LAPA	$5000.00 per line segment
PipeImage	$7000.00 per line segment

Cleaning Services

Quote provided on an as needed basis. Prices and program will designed by Vendor cleaning experts. If a Vendor cleaning program is accepted by the Company, the Vendor assumes full responsibility for the success of the inspection due to line cleanliness.

Tracking Services

Quote provided on an as needed basis.

Discount Opportunities

Discounts apply to all previous and subsequent inspections upon reaching the $5 million annual target.

Assuming inspection revenue to the Vendor as per pricing matrix attached, the Vendor would build the following discounts in to pricing from day 1 of any year.

UltraScan CD – 4%

UltraScan WM – 0%

Magnescan – 3% (Additional 5% reduction for first quarter inspections)

Elastic Wave – 0

TranScan – 5%

ENBDNR0007258

Don

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00009 -03

LOCATION: Edmonton, Alberta

TO: PII (Canada) Limited
1003 – 11th Street SW
Calgary, Alberta
T2R 1G2
Attention: Daryl Ronsky

DATE: March 10, 2003

COMMENCEMENT DATE: March 10, 2003

COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To supply a 20-inch MagneScan 020 MFL tool, personnel, material and equipment to inspect two 20-inch sections of Line 5 at the Straits of Mackinac in Michigan. Each section is approximately 4.2 miles (6.7 km) long. A preliminary report of the inspection is due within one calendar month of the data being received at the Vendor's facility. A final report is due 60 working days from when the data is received at the Vendor's facility.

Terms and conditions of Agreement C2001-25 take precedence over the Work Order Contract General Conditions

Company Information Only
Estimate US $155,000

Only executed copy to Houston Mail 21

Estimated Value $

Capital Cost	Project # 91204SC0093		Task # 01		Exp Type # 62010-01	Exp. Organization # 91204
Operating Costs	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #

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ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc. 3176 2944
IT'S AGENT

APPROVAL W. Kresin 2879

Name of Contractor: PII (Canada) Limited

By: _____ Date: _____
SIGNATURE

RIGHT-TO-AUDIT

THE COMPANY SHALL BE GRANTED THE RIGHT-TO-AUDIT CONTRACTORS AND SUB-CONTRACTORS RECORDS UPON REASONABLE NOTICE FOR ALL COST-PLUS WORK ORDER BILLINGS.

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

W.O. - 91002 - 00009 -03

LOCATION: Edmonton, Alberta

TO: PII (Canada) Limited
1003 – 11th Street SW
Calgary, Alberta
T2R 1G2
Attention: Daryl Ronsky

DATE: March 10, 2003

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Terms and conditions of Agreement C2001-25 take precedence over the Work Order Contract General Conditions

Estimated Value $

Capital Cost	Project #		Task #		Exp Type #	Exp. Organization #
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Operating Costs	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #

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ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc. 3176 - 29,414
IT'S AGENT

APPROVAL W. Kresin 2879

Name of Contractor: PII (Canada) Limited

By: _____ Date. MARCH 20, 2003
SIGNATURE

RIGHT-TO-AUDIT

THE COMPANY SHALL BE GRANTED THE RIGHT-TO-AUDIT CONTRACTORS AND SUB-CONTRACTORS RECORDS UPON REASONABLE NOTICE FOR ALL COST-PLUS WORK ORDER BILLINGS.

Don

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
0201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

ENBRIDGE™

(HEREINAFTER CALLED "THE COMPANY")

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Company Information Only
Estimate US $155,000

Only executed copy to Houston Mail 27

Estimated Value $

Capital Cost	Project #		Task #		Exp Type #	Exp. Organization #
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ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc. 3176 29144
IT'S AGENT

APPROVAL W. Kresin 2879

Name of Contractor: PII (Canada) Limited

By: _____ Date: _____
SIGNATURE

RIGHT-TO-AUDIT

THE COMPANY SHALL BE GRANTED THE RIGHT-TO-AUDIT CONTRACTORS AND SUB-CONTRACTORS RECORDS UPON REASONABLE NOTICE FOR ALL COST-PLUS WORK ORDER BILLINGS.

WORK ORDER CONTRACT

Enbridge Energy, Limited Partnership
c/o Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton, Alberta T5J 2J9 Canada

(HEREINAFTER CALLED "THE COMPANY")

ENBRIDGE™

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Calgary, Alberta
T2R 1G2
Attention: Daryl Ronsky

DATE: March 10, 2003
COMMENCEMENT DATE: March 10, 2003
COMPLETION DATE: June 30, 2003

(HEREINAFTER CALLED "THE CONTRACTOR")

Scope of Work

To supply a 20-inch MagneScan 020 MFL tool, personnel, material and equipment to inspect two 20-inch sections of Line 5 at the Straits of Mackinac in Michigan. Each section is approximately 4.2 miles (6.7 km) long. A preliminary report of the inspection is due within one calendar month of the data being received at the Vendor's facility. A final report is due 60 working days from when the data is received at the Vendor's facility.
Terms and conditions of Agreement C2001-25 take precedence over the Work Order Contract General Conditions

Estimated Value $

Capital Cost	Project #		Task #		Exp Type #	Exp. Organization #
	91204SC0093		01		62010-01	91204
Operating Costs	LOB	Cont Segment #	Exp. Org.	Account #	Sub Account #	Inte LOB #

THIS WORK ORDER IS SUBJECT TO THE CONDITIONS ON THE ATTACHMENT "A"-GENERAL CONDITIONS NO WORK SHALL BE COMMENCED ON COMPANY PROPERTY UNTIL THE CONTRACTOR HAS SIGNED THIS WORK ORDER AND HAS PROVIDED TO THE COMPANY A CERTIFICATE OF INSURANCE WHERE REQUESTED.

ENBRIDGE ENERGY PARTNERS, L.P.
BY ENBRIDGE ENERGY COMPANY, INC. AS GENERAL PARTNER

BY: Don Engen – Enbridge Pipelines Inc. 3/26
IT'S AGENT

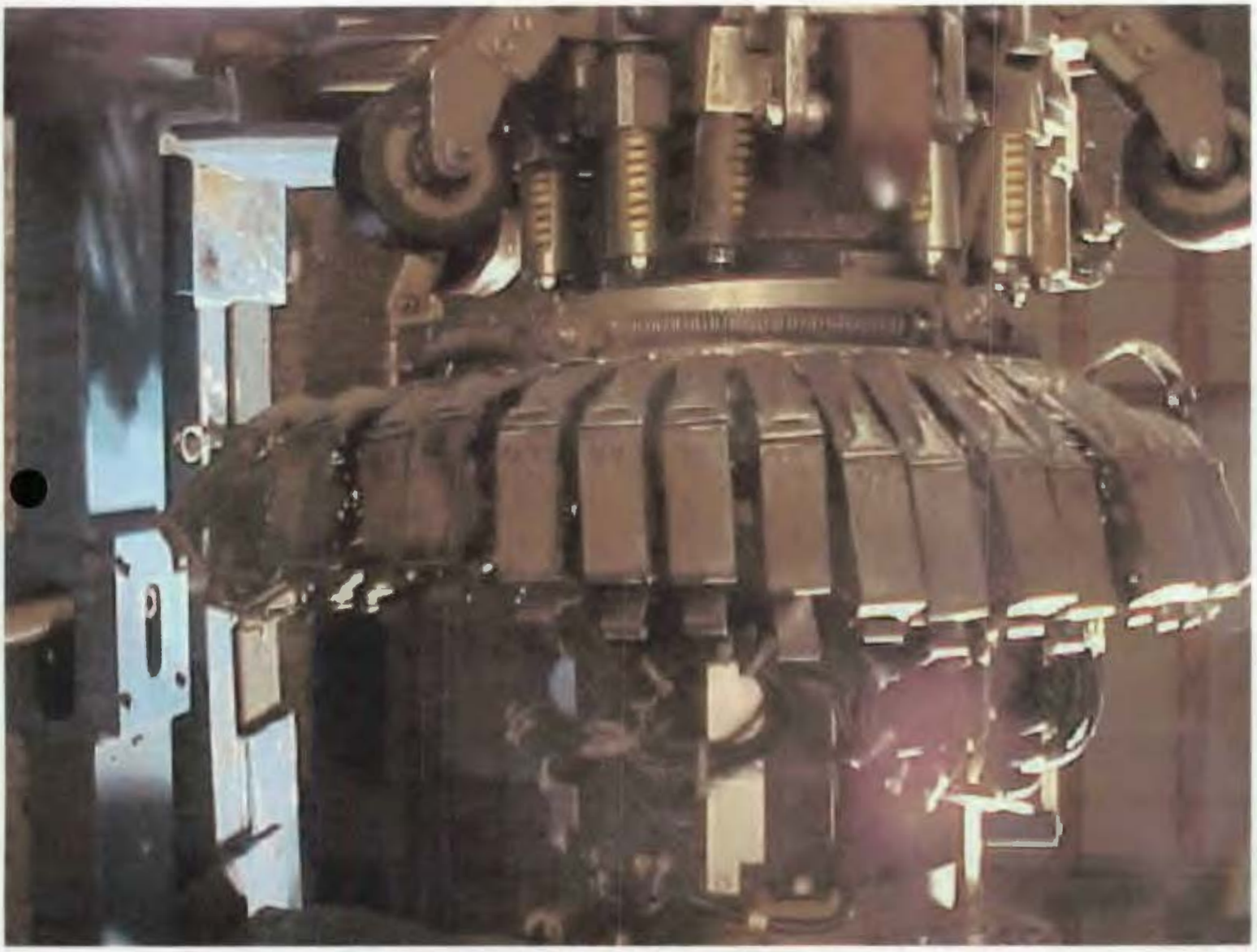
APPROVAL W. Kresin 2879

Name of Contractor: PII (Canada) Limited

By: _____ Date: MARCH 20 2003
SIGNATURE

RIGHT-TO-AUDIT

THE COMPANY SHALL BE GRANTED THE RIGHT-TO-AUDIT CONTRACTORS AND SUB-CONTRACTORS RECORDS UPON REASONABLE NOTICE FOR ALL COST-PLUS WORK ORDER BILLINGS.



LINE 5 (20") Season, Damage
East Leg - Straits of Mackinac -
TOOL HAD TO BE PULLED BACKWARDS
FROM THE SENDING TRAP. PII MFL TOOL
MARCH 18/03