

## ACTIVATION ORDER

<b>CONTRACT CONTROL #:</b>	See Contract Control # Above	<b>DATE OF THIS ORDER:</b>	04/01/2011
<b>MASTER PROJECT #:</b>	N/A	<b>WORK ORDER #:</b>	E07601370
<b>ACTIVATING COMPANY:</b>	Texas Eastern Transmission, LP		

This Activation Order gives notice and activates the Standing Agreement, [Contract Control # of Standing Agreement 3573], between NDT System & Services (America) Inc., ("Contractor"), and Spectra Energy Transmission, LLC, ("Company") dated 03/29/2011 ("Agreement"). Terms defined in the Agreement have the same meaning in this Activation Order. Contractor is hereby authorized to proceed with the specific Work described hereunder in accordance with the terms and conditions set forth in the Agreement.

**SCOPE OF WORK:** Provide equip., tools and technicians for hard-spot inspection with INS of TOMP-DANV Line 15, provide 12 AGM boxes, provide final report 60days after inspection. Also see attached Scope of Work & EHS 7T-311.

**COST/PRICING:** See attached Contractor's Proposal.

**TERMS OF PAYMENT:** Payment will be determined with reference to the Agreement and the Activation Order. The authorized limit in relation to this Activation Order is (\$ 91,600.00) Ninety One Thousand Six Hundred Dollars and Zero Cents. In accordance with the Agreement, this authorized limit must not be exceeded without Activating Company's prior written approval.

**ADDITIONAL INSTRUCTIONS AND CONDITIONS:** Applicable instructions, conditions, drawings, specifications, and other pertinent information are attached to this Activation Order.

**SCHEDULE:** This Activation Order must be fully executed by both parties and no Work is to begin earlier than Start Date: 04/04/2011. The Work is to end no later than Completion Date: 07/31/2011.

### INVOICES:

- 1 Invoices will not be accepted for more than one Contract Control # per invoice and must be submitted within thirty (30) days of the completion of the Work to be invoiced.
- 2 Invoices must include:
  - a Contract Control # 4257 for this Activation Order
  - b Estimated and authorized total of this Activation Order
  - c Amount of this invoice
  - d Previous amounts invoiced
  - e Authorized amounts remaining
  - f All invoices must indicate "Partial" or "Final"
  - g Expense Job # E07601370 for the Work
  - h Invoice costs broken down by Work Order/Exp Job number E07601370

- 3 Each invoice must state:
  - a "Contractor certifies that the amount invoiced includes all applicable taxes, including all state and local sales and use taxes, required to be paid under this Activation Order."
- 4 Invoices must be accompanied by applicable support documentation: (e.g. signed daily time sheets, expense reports, and receipts for those items being invoiced).
- 5 Invoices are to be sent to:

**Texas Eastern Transmission, LP**  
 1745 Airport Road, Hwy 1273  
 Danville, KY 40422

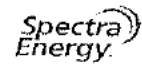
Attention: Ann Smith

**DESIGNATED FIELD REPRESENTATIVES:**

For Contractor:		For Activating Company:	
Name:	Kyle Fogleman	Name:	Adam Kutschinski
Title:		Title:	Engr Div
Address:		Address:	
	Houston, TX 77051-		LEBANON OH 45036
Phone:		Phone:	

**EXECUTED BY AUTHORIZED SIGNATORY:**

For Contractor:		For Activating Company:	
Signature:		Signature:	
Name:		Name:	Roy Taylor - NE Region Mgr.
Date:	4/21/11	Date:	



This form is to be completed by the Spectra Energy Transmission (SET) Project Manager\* and Contractor during the bid process.

- Project Manager\* will identify and communicate general and project-specific EHS risk to the contractor.
- Contractor will provide mitigation controls

This form and associated SET and Contractor documentation comprises part of the contractual agreement with SET in the event that a contract or Purchase Order is issued. This form is to be used by all stakeholders as a component of Project Oversight.

Note: Contractor acknowledges that the information regarding specific risks provided by SET is not intended to be exhaustive and shall not diminish Contractor's Health and Safety obligations.

**SET Project / Service Information**

(SET Contract Administrator\* to complete)

Date:		3/28/2011		Evaluation Completed By:		Final Revision Date:	
SET Contact Name:		Adam Kutschinski		Location:		Lebanon, OH	
Email Address:		[REDACTED]		Phone #:		[REDACTED]	
Project # / Service Name:							
Description of Project / Service:		Hard-spot ILLI of TOMP-DANV Line 15					
Contractor EHS Status:		Approved: <input checked="" type="checkbox"/> Conditional: <input type="checkbox"/> Conditions from EHS must be identified on Scope of Work					
Contractor Company Name:		NDT Systems & Services		Location:		Houston, TX	
Contractor Contact Name:		Kyle Fogleman					
Email Address:		[REDACTED]					
Contractor EHS Rep Name:							
Phone #:		[REDACTED]		Fax #:		[REDACTED]	

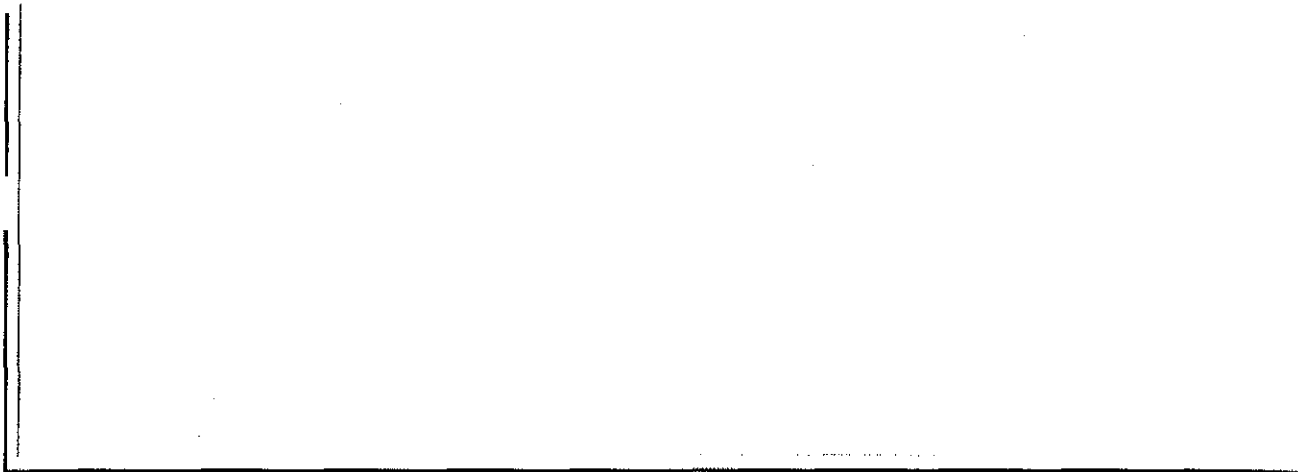
**Project Manager and Contractor should be aware of any communication barriers that may exist in performance of this work and plan to mitigate to ensure all involved individuals are aware of the hazards.**

A) Scope of Work

The Project Manager must prepare the Scope of Work and indicate (with an X in the list below) the known hazards associated with the work to be performed. The Contractor should acknowledge the hazard and indicate the controls used as needed to mitigate the hazard. The contractor should also indicate any known hazards not indicated by the project manager they may be aware of.

**Scope of Work:**

Provide equipment, tools and technicians for hard-spot inspection with INS of TOMP-DANV Line 15. Provide 12 AGM boxes. Provide final report 60 days after inspection. Spectra Energy will track the tool and provide sub-meter coordinates of the AGM locations.



**B) Project Specific EHS Risk Identification and Mitigation**

For the risks identified below, the Contract Administer should indicate whether the mitigation control will be provided by SET or the Contractor. For the mandatory mitigation and controls, the Contractor must indicate their EHS strategies to meet the identified minimum EHS risk mitigation controls. The Contractor should include the page references to the manual if multiple page documents are submitted.

Specific EHS Documentation and Risks	Mitigation or Controls (Planned)	Provided by		SET or Contractor EHS Risk Mitigation Control(s) Comments
		SET	Contractor	
1 PPE (Impact/Control)	PPE Program		X	
	PPE Use Training		X	
	Training Records		X	
	Safety Glasses (sideshields)		X	
	Hard Hats		X	
	Work Boots		X	
	Other: _____			
4 Noise Exposure (>85 dba)	Hearing Conservation Program		X	
	Personal Protective Equipment (i.e. muffs, plugs, etc.)		X	
	Hearing Conservation Training		X	
	Training Records		X	
	Other: _____			
16 PCB's (Polychlorinated Biphenyl)	Personal Protective Equipment		X	
	Health & Safety Plans (site specific)	X	X	
	Safe Handling and Storage Procedures	X	X	
	Emergency Response Plan	X		
	Other: _____			
33 Cranes/Hoists/Mobile Lifting Equipment	Lifting Requirements		X	
	Inspection Records	X		
	Maintenance Records	X		
	List of Cranes/Hoists/Mobile Lifting Equipment	X		
	Qualified Equipment Operators	X		
	Flagging/Signaling Procedures	X	X	
	Reflective PPE	X	X	
	Training (Operators)	X		
	Training Records	X		
Other: _____				
36 Fleet Vehicles	Safe Driver Program / Training	X	X	
	Training Records	X	X	
	Other: _____			
42 Fire or Explosion	Personal Protective Equipment	X		
	Fire Extinguishers	X		
	Fire Extinguisher Training	X		
	Emergency Response Plan	X		
	Training Records	X		
	Other: _____			
45 Pipeline Liquids	Personal Protective Equipment	X	X	
	Safe Handling and Storage Procedures	X		
	Other: _____			

## Section 2 Vendor Questions

This section pertains to information about your company and your proposed solution.

Please complete each of the tables in this section by filling in the Bidders Response section. Where the Bidder wishes to include a chart or figure or a brief (half-page) attachment to explain further the capability provided or customization required, please attach the chart or figure or text immediately following the associated response table. Please identify the attachment by referring to the Requirement ID (Req. ID) listed in the response table. More voluminous attachments should be appended to the end of the document, referring to the associated Requirement ID.

Please ensure your responses are from a total solution perspective. In other words, if your proposal includes the use of 3<sup>rd</sup> Party Partners, your responses must speak to not only your capabilities, but also those of the 3<sup>rd</sup> Party Partner.

**Spectra Energy strongly discourages the Bidder from using generic marketing material to respond to these questions. Spectra Energy will mark a question not answered if the “Bidder Response” box of the table is not filled in. Spectra Energy will not search through generic marketing material in search of answers.**

### 1 Vendor Questions

#### 1.1.1 Background Information

Req. ID	Background Questions	Bidder Response
CI-1	Please provide pertinent information about your company including but not limited to: Legal Name, Primary Contact Information, Years in Business, Parent Company Name (if applicable), Privately owned? Publicly traded? Etc.	NDT Systems & Services America Inc. NDT Systems & Services Canada Inc. Parent: NDT Systems & Services AG NDT Americas & Canada: Since 2007. Tuboscope Pipeline Services: Since 1965 Private Company
CI-2	Please provide total number of employees? Number of employees providing inspection services? Are these employees unionized?  Please indicated for both Canada and the USA	USA: 123 (90 insp.); Canada: 27 (20 insp.)  No union.
CI-3	Are background checks performed on all new employees including contract employees? If so, what does it include (e.g. criminal, education, experience, etc.)?	Background checks: criminal, motor vehicle, education, previous experience, drug & alcohol, social security confirmation.  Background checks are completed so specified employees are bondable.
CI-4	Are all employees required to sign confidentiality or non-disclosure agreements?	Yes.



Req. ID	Background Questions	Bidder Response
CI-5	Please provide pertinent information about your company's financial status including but not limited to: Annual revenue for the past three years related to the inspection services proposed, consecutive profitable quarters for your in-line inspection services division, Describe any recent acquisitions or mergers? Describe any growth plans for the next 3 to 5 years? etc.	On September 9, 2008 NDT Systems and Services AG acquired Tuboscope Pipeline Services world-wide from NOV. All equipment, employees & locations became NDT Systems and Services America, Canada, Mexico, Argentina. See Attached Financial Report. Planned growth is 17% over next 3 years.
CI-6	Describe your current customer base where you provide in-line inspection services including but not limited to: Number, Size, Industry, Top Clients and Volumes, where would Spectra Energy fit in size / importance within your customer base? Etc.	All major Liquid and Gas Transmission Operators. All diameters 3"-48" Spectra would become a top core account based on size and requirements.
CI-7	Provide three client references that are currently using your In-line Inspection services. Include the company name, contact name, contact title, phone number, email address, types of service, and dates of service?	See Attachment CI-7
CI-8	What industry recognition and/or awards has your organization received from industry sources and clients?	Standard recognition from technical papers presented at Industry Conferences. Contractor safety awards, ISO certifications.
CI-9	Do you have full-service operations in Canada and the US? Where are the inspection tools mobilized from for inspections based in the US? Where are the inspection tools mobilized from for inspections based in Canada?	Yes, in both countries. In the US all mobilizations occur from Houston Texas, our North American headquarters. In Canada all mobilizations occur from Nisku, AB.
CI-10	How does your company provide services to organizations with multinational operations?	By providing additional operating points in Mexico City, Buenos Aires, Dubai, Germany.
CI-11	Please describe your employee retention rate – how often do you have turnover for Account representative that will be dealing with the Spectra Energy Account?	Canada: No turnover since 2005. Lee Pollard, Acct. Rep.; 18 yrs. service. US: Recent change from Chad Stutz to Rick Raleigh, Reg. Acct. Rep.; 8 yrs. Pipeline, 5 yrs. corr. engr. & software, 24 yrs. down-hole insp. & coating systems.

### 1.1.2 Customer Service

Req. ID	Customer Service Questions	Bidder Response
CI-12	What is the turnaround time of your company's final report? And where is the analysis carried out?	Generally speaking 30-60 days for MFL & COMBO reports <50 miles. This also depends on the amount of corrosion encountered and what level of reporting the customer requires. All MFL & COMBO analysis takes place in either Houston or Nisku. UT crack pre-lim: 60 days; final 120 days thereafter. Analysis: Houston; Calgary.



Req. ID	Customer Service Questions	Bidder Response												
CI-13	Is there an additional cost for a report required in 30 days? IF so please indicate	A flat rate of \$3500 for all sections <21 miles if > 100 reportable indications are encountered. >21 miles 15% of the minimum mileage charge per tool size applies or \$3500 whichever is greater.												
CI-14	Spectra Energy expects three (3) copies of the final report, is there a cost for additional copies?	NO												
CI-15	Define what information you include in a final report.	SEE ATTACHED FINAL REPORT CI-15 & CI-15a												
CI-16	Please describe the software that will be included in your standard service pricing and any restrictions related to its use or the number of installations.	Linaview is NDT's standard software package that can digitally display and export all typical reporting requirements of Spectra. Specialized spreadsheets are available which are a compilation of data exported from Linaview and macro processing, particularly for RSTRENG and specialized reporting. No limit on number of software installations, but individual software site keys are required.												
CI-17	What onsite equipment is provided with your standard mobilization?	Launch and receive trays, boom or lift truck to offload inspection equipment, plus all associated equipment to insert and extract inspection tools.												
CI-18	What is your first run success percentage? <ul style="list-style-type: none"> <li>Geometry Success rate</li> <li>MFL too success rate</li> </ul>	<table border="1"> <thead> <tr> <th></th> <th>Canada</th> <th>USA</th> </tr> </thead> <tbody> <tr> <td>CAL</td> <td>80%</td> <td>80%</td> </tr> <tr> <td>HMFL</td> <td>90%</td> <td>89%</td> </tr> <tr> <td>UC</td> <td>N/A</td> <td>81%</td> </tr> </tbody> </table>		Canada	USA	CAL	80%	80%	HMFL	90%	89%	UC	N/A	81%
	Canada	USA												
CAL	80%	80%												
HMFL	90%	89%												
UC	N/A	81%												
CI-19	Does your company provide detailed anomaly analysis according to the ASME B31G 0.85dL methodology? Does your company provide Effective Area anomaly analysis and if so, at what cost?	Yes to B31G 0.85dL and yes to Effective Area Anomaly analysis. Minimum charge is \$1,000 Per KM rate is \$1,000 per 50KM and/or 500 clusters whichever is encountered first prior to the first analysis of the section. Post final Rstreng report is \$2500 minimum charge and \$1000 per 50 KM and/or 500 clusters whichever is encountered first. <b>See Attachment CI-51</b>												
CI-20	Does your company have the capability of integrating historical in-line inspection data detail into the present run analysis? If so please outline this process and any associated costs it may require.	Yes. NDT has the ability to compare spreadsheet data from either NDT/TPS or other vendors and provide a growth analysis between the 2 runs. NDT can compare raw data between 2 runs that have been collected by either TPS or NDT via MFL, DEF, CAL, UM or UC technologies. <b>See attachment CI-20</b>												



Req. ID	Customer Service Questions	Bidder Response
CI-21	Please describe your company's policy with regards to re-runs and the associated cost where applicable.	Reruns of live tools required due to Pipeline conditions unsuitable for a satisfactory Survey will be charged to Company in accordance with the price schedule set forth in the applicable Delivery Order. If Company elects not to perform cleaning tool/cleaning runs in accordance with NDT recommendations, Company agrees to pay price schedule set forth in the applicable Delivery Order/quotation plus one hundred percent (100%) of the mobilization fee for the rerun if required. If Company successfully performed two cleaning tool/cleaning runs, rerun shall be charged to Company in accordance with the price schedule set forth in the applicable Delivery Order or quotation.
CI-22	Is there any advantage in scheduling inspection runs during particular times of the year from a service and price perspective?	1 <sup>st</sup> & 4 <sup>th</sup> quarter runs have the most flexibility for MOB & tool availability selections.
CI-23	Please provide a complete list of the type and number of tools, as well as their mobilization location.	All tool sizes are mobilized from Houston Texas. Nisku, AB can mobilize NPS <=12" at all times. >12" is shipped from Houston then mobilized from Nisku, AB. See Tool Specs for type. Number of tools is confidential.
CI-24	What tools are equipped with flow bypass speed control and what are the flow bypass capability and characteristics?	None until 2010. Variable bypass unit planned availability 4 <sup>th</sup> Q 2010, size: 36" first, then 30".
CI-25	Are your tools equipped with ID/OD discriminating sensors?	Yes
CI-26	What additional information do you require in order to properly calibrate the data listed in the final report?  - Calibration digs, previous excavations?	Both are helpful and will only increase the accuracy of the final results below the typical +/- 10% threshold but they are not required as NDT has a large dig data base upon which tool setup, processing and analysis procedures and parameters are have been established. UC digs necessary.
CI-27	Please complete Performance Specifications in Schedule D	Attached
CI-28	Describe how you measure customer satisfaction.	Based on Customer Market Surveys; Customer Feedback Reports.
CI-29	What customer surveys do you conduct? What are the results of your most recent surveys?	Customer satisfaction surveys. Results showed overall satisfaction with all services offered.
CI-30	Describe how you will manage our account. Please include the regional resources you will assign to our account.	Account operations and coordination to be managed by exclusive Project Managers (1-Canada, 1-US). Account legal, admin, pricing to be managed by Reg. Account Reps (Lee Pollard-Canada; Rick Raleigh-US).
CI-31	Provide examples of recent process improvements that have delivered value for your clients.	Addition of core customer dedicated Project Managers; In progress-ISO Certification USA & Mexico.



Req. ID	Customer Service Questions	Bidder Response
CI-32	How do you establish and measure key performance indicators (KPIs) and critical success factors?	1 <sup>st</sup> run success, on-time delivery, cycle time delivery; measured weekly.
CI-33	How often will you provide formal reviews of your performance? What form will these reviews take?	Based on quarterly performance. Quarterly review and status meetings.
CI-34	How do you ensure that new products and services align with your customers' needs?	Customer surveys and inquiries. Joint NDT/Customer engineering discussions.
CI-35	What approach are you taking to the development of new products and services?	NDT is taking a very aggressive approach since the merger of TPS and NDT as we now are a smaller private company but a larger ILI company with increased assets and personnel in all critical areas of the company. <b>See attachment CI-35</b>
CI-36	Does your company do run to run comparisons? For example	Yes. See attachment CI-20
CI-37	What speeds do your tools record un-degraded data? HMFL; CAL	HMFL: .5 mph-7 mph; 8-14 mph-degraded, but will grade per customer spec; > 15 mph-not gradable.
CI-38	What are the limitations of your pigs ability? ie → fitting capabilities	See ATTACHMENT CI-23 for applicable tool size and amount of collapsibility.
CI-39	Do you have the technology to calculate strains in dents?	Yes <b>see attached STRESS STRAIN REPORT CI-39</b>
CI-40	Can your company do effective area calculations?	Yes

### 1.1.3 Pricing

Req. ID	Pricing Questions	Bidder Response
CI-41	Please fill in the attached pricing template?	
CI-42	Does your organization agree that a continuous improvement program will result in year-over-year cost reductions for Spectra? If not, why do you feel this is not achievable? Describe your approach to capturing and sharing cost savings?	Yes. Cost savings are achieved by customer with lower volume pricing and Contractor by assured volume revenue.
CI-43	Indicate if the prices you have provided are subject to any annual inflationary factor or are they fixed for the length of the agreement (3 to 5 years)?	Fixed
CI-44	Provide your pricing strategy and service levels for other related or optional service offerings?	Based on volume of award.
CI-45	Does your company provide additional pricing discounts for multiple inspections of the same pipeline diameter within a single mobilization? If so, please outline such price discounts.	Yes, see attached pricing
CI-46	Please indicate your company stand-by rate schedule for equipment and personnel.	See attached pricing

### 1.1.5 Consulting Services – Transition and Implementation

Req. ID	Consulting Questions	Bidder Response
	<b>In-line Inspection Consulting and Analysis</b>	
CI-47	How will you help us improve our total operating costs in both the near term and over time?	NDT will ensure that all necessary preparation steps to ensure first run success are taken and that data delivered is of the highest quality
CI-48	What benchmarking information do you provide?	1 <sup>st</sup> run success; on time delivery of data and accuracy of results; process review.
CI-49	Provide examples of process improvements and/or cost savings initiatives that your company has successfully implemented with current clients. Describe the benefits to the clients.	After project, go thru each process of survey, grade each process, action items for correction & implementation. Example: New sensor carrier design.

### 1.1.6 Technology and Information Management

Req. ID	Technology and Information Management Questions	Bidder Response
CI-50	Describe your company's technology strategy and vision as it relates to customer service.	NDT Corp. Goal: 1 <sup>st</sup> in Technology; expand those benefits to better meet customer needs. Partner w/Customer for specialized projects. Examples: SD Combo w/radial/circumferential input, MAX Low Friction, upgraded electronics & capacities, gas HMFL-EMAT tool (40" first). <b>See attachment CI-35</b>
CI-51	Describe your system's reporting capabilities.	<b>Please see report capabilities attached CI-15 &amp; CI-15a</b>
CI-52	Do you have a technology customer support team for your clients?	Yes. Core Competency Teams to support NDT technologies.

### 1.1.11 Additional Information

Req. ID	Additional Information Questions	Bidder Response
CI-53	Please identify any additional value that your company believes will benefit this business relationship in any of the above categories or in any new and innovative categories not mentioned in this document.	Deliverable format can be in pipeline specialized software; customer-driven data integration, GIS format, etc. Example: NDT HMFL-EMAT Gas Low Friction 3T Tools <b>See attachment CI-35</b>
CI-54	Please provide specific examples of ways in which your services have benefited your clients, citing cost savings, productivity enhancements, and/or process improvements.	Flexible scheduling & advance reporting.
CI-55	Are your tools capable of running in H2S and CO2.	Yes



Req. ID	Additional Information Questions	Bidder Response
CI-56	Indicate the frequency of marker boxes. Are you able to provide sufficient marker boxes for 1 mile spacing without moving boxes during a run.	Yes. 6 units per set.
CI-57	Indicate your companies policy when runs are delayed due to road conditions or weather.	Standby charges are waived due to Acts of God
CI-58	Indicate if there were occurrences where your tools could not be run due to excessive tool length relative to barrel dimensions.	Yes it has occurred but is rare if the lead time prior to mobilization allows for a site visit to ensure this condition will not be present or can be modified by either tool setup or barrel dimensions could be adjusted.



# NDT Systems & Services (America) Inc.

## ILI Survey Questionnaire



NDT Systems & Services

This questionnaire is used for all aspects of the project including ILI setup, ILI calibration, run scheduling, mapping accuracy, and safety concerns. Please complete this form being as accurate as possible. Clients are asked to complete the following questionnaire for each pipeline section.

**CLIENT INFORMATION** 3/7/11 Company Name: Spectra Energy

Client Contact: Adam Kutschinski Telephone: [REDACTED]

Address: [REDACTED] Lebanon OH 45036 Fax: [REDACTED]

E-mail: [REDACTED] Mobile: [REDACTED]

**FIELD CONTACT INFORMATION**

Client Contact: Bart Johnson Telephone: [REDACTED]

Address: [REDACTED] Danville KY 40422 Fax: [REDACTED]

E-mail: [REDACTED] Mobile: [REDACTED]

**SAFETY**

Do any site or Company specific safety or security issues (e.g., Confined space, offshore survival, scaffolding, etc.) exist that require specific training? YES  NO

Please describe: \_\_\_\_\_

Are any hazardous contaminants present in the pipeline section? YES  NO

If yes, please explain the contaminants and the hazardous materials procedures that are required:

*PCB's in pipeline. Will decontaminate ILI tool with diesel wash and remove and dispose of rubbers.*

**GENERAL PIPELINE DESCRIPTION:**

Line/System Name: TOMP-DANV Line 15

Launch Name/State: Tompkinsville Compressor Station, KY

Trap Name/State: Danville Compressor Station, KY

Section Length: 75 Ft., Mile, Mtr. Miles Is pipeline section located:  Onshore  Offshore

Normal Product Transported: Natural Gas

Has this pipeline section been surveyed before? YES  NO

If yes, furnish date of previous inspection and inspection company. MFL & Caliper in 2010 by GE/PII

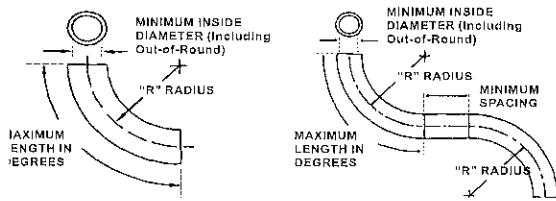
Pipe Diameter	Wall Thickness	Length of this Wall Thickness	Grade	Mfg. Type*	Minimum Bend Radius	Minimum I.D. of Bends	Length of Straight Pipe Between Bends
30	0.375		X-52		3D		

\*Please specify ERW, DSAW, SMLS

# NDT Systems & Services (America) Inc. ILI Survey Questionnaire



NDT Systems & Services



Bend Radius is usually described as multiples of the nominal pipe Diameter. For example, a 5R (5D) 90 Degree Bend in a 12 inch (12.75" O.D.) line has a radius of 60 inches. If the line has miter bends with angle deviation greater than 12 degrees, please furnish drawings or consult Pipeline Services Engineering in Houston, Texas.

## PROPOSED LINE CONDITIONS DURING PROJECT

Proposed product during ILI survey Natural Gas Proposed flow velocity during ILI survey As required

Volumetric flow rate or flow velocity: Minimum \_\_\_\_\_ Maximum \_\_\_\_\_

Pressure: Minimum 700psi Maximum 1000psi

Maximum Temp: 120F Maximum H2S PPM/% < 7ppm Maximum CO2 PPM/% < 3%

Paraffin Content: 0 Saltwater Content 0

MAOP: 1000psi MOP: 1000psi

## PIPELINE CLEANLINESS

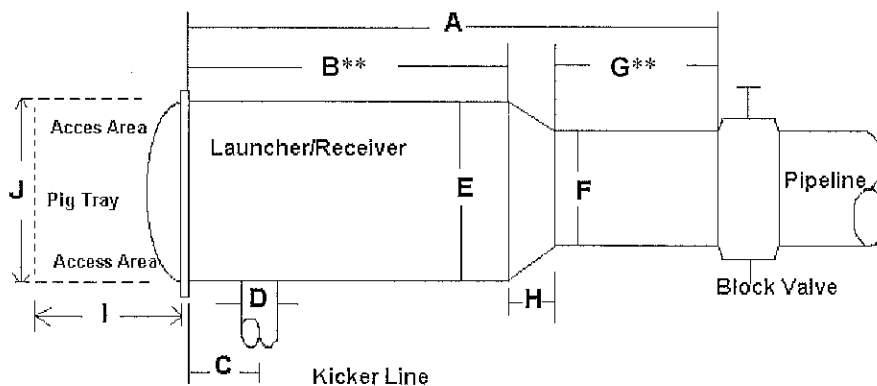
Does this system have an established cleaning program? YES  NO

How often are cleaning pigs run? Twice/yr What types of cleaning pigs are used? Brush & Scraper

What is the estimated amount and type of debris brought out? < 5 gallons of liquids & sludge typical

Do you require NDT's Line Cleaning Services? YES  NO

## LAUNCHER AND RECEIVER DESIGN



Please supply the following details that outline the Launcher and Receiver Design

		LAUNCHER	RECEIVER
Total Length from Valve to Closure	(A)	90.2'	69.2'
Length of Oversize	(B)**	7'	6.9'
Location of Bypass/Kicker	(C)		
Diameter of Bypass/Kicker	(D)	8"	10"
I.D. of Oversize	(E)	32"	32"

# NDT Systems & Services (America) Inc. ILI Survey Questionnaire



NDT Systems & Services

I.D. of Nominal Pipe (F)	30"	30"
Length of Nominal Pipe (G)**	81.7'	60.5'
Type/Length of Reducer (H)	18"	22"
Working Access Area (I/J)*	12' x 14'	10.8' x 11.5'
Height (Ground to Bottom of Closure)	31"	27"
Closure Type	Yale	Yale

\*An unobstructed working area equal to the survey tool length is required in front of all Launcher and Receiver doors.

\*\* Actual tool length is required / recommended on launcher and receiver.

## MAINLINE VALVES

Type: (Gate, Ball, etc.) Gate Minimum I.D. of Valve 30"

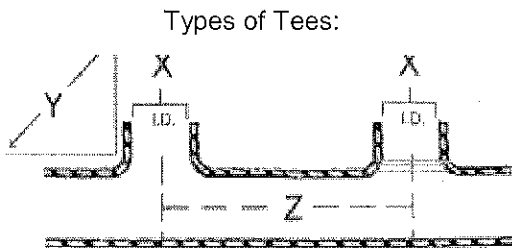
## CHECK VALVES

Type: N/A Minimum I.D. of Valve \_\_\_\_\_

Manufacturer: \_\_\_\_\_

If present, can check valves be locked down? YES  NO

## TEES AND BRANCHES



Types of Tees:

Hot Tap  Forged Fittings

Opening I.D. (X)  Side  Top  Bottom

Angle to pipe run (Y) 90

Are guide bars installed? YES  NO

Size of Bar \_\_\_\_\_ Spacing \_\_\_\_\_

If less than 10 ft (Z), the distance between two adjacent tees? \_\_\_\_\_

## PIPELINE HISTORY

Section Age / Date Installed 1957 Type of Corrosion Expected I.D.  O.D.

Has this line experienced any failures, leaks, ruptures, etc? YES  NO

Please indicate any of the internal irregularities as present in this pipeline section.

- |  |  |  |
|--|--|--|
| Thread and Collar Couplings <input type="checkbox"/> | Chill Rings <input type="checkbox"/>       | Acetylene Welds <input type="checkbox"/>     |
| Bell and Spigot Couplings <input type="checkbox"/>   | Dresser Couplings <input type="checkbox"/> | Mitre Bends <input type="checkbox"/>         |
| Drips <input type="checkbox"/>                       | Internal Probes <input type="checkbox"/>   | Cathodic Protection <input type="checkbox"/> |
| Questionable Problem Valves <input type="checkbox"/> | Darling Valves <input type="checkbox"/>    | Kerotest Valves <input type="checkbox"/>     |

Please indicate any type of repairs performed or external irregularities on this pipeline section.

Sleeves Full Wrap  Puddle Weld

# NDT Systems & Services (America) Inc. ILI Survey Questionnaire



NDT Systems & Services

Half Sole   
Composite

Clamps   
Other

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

Please describe any other line conditions present that may cause pipeline pigging problems:

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

## MAPPING AND SURVEYING INFORMATION

Survey requires INS mapping services (check if required)?

What type of deliverable is required (check one)?

XYZ appended to Pipeline Register   
Standard\* LinaView® Pro Data Integration   
Custom\*\* LinaView® Pro Data Integration

\* For standard LinaView® Pro Data Integration description (LinaView® GIS Workspace Standards)  
\*\* For custom LinaView® Pro Data Integration, there will be a separate contract addendum.

What are the customer's accuracy requirements for centerline and pipeline feature coordinates?

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

Who is surveying/providing Marker (AGM) coordinates (check one)?

NDT  Client  3<sup>rd</sup> Party

### If Client/3<sup>rd</sup> Party

Has NDT's Survey & AGM placement specifications been provided to client?

YES  NO

Who is the customer contact for technical info regarding the Surveying/AGM placement?

Name: \_\_\_\_\_ Title: \_\_\_\_\_  
E-Mail: \_\_\_\_\_ Phone: \_\_\_\_\_

## SCHEDULING AND REPORTING INFORMATION

Cleaning tool run or runs Between \_\_\_\_\_ and \_\_\_\_\_  
Gauging tool run dates Between \_\_\_\_\_ and \_\_\_\_\_  
Desired live tool run dates Between 4/11/11 and 4/14/11  
Recommended Set Up Location Personnel Tompkinsville Station Equipment Tompkinsville Station



# NDT Systems & Services (America) Inc. ILI Survey Questionnaire



NDT Systems & Services

Is workshop space available? YES  NO

## DATA ANALYSIS INFORMATION AND REPORTING

Is Pressure Based Report Required? YES  NO

Assessment Code Required		.85DL <input checked="" type="checkbox"/>	B31G <input type="checkbox"/>
P=1.39MP <input type="checkbox"/>	DVN-RP-F101 <input type="checkbox"/>		NG-18 <input type="checkbox"/>
Shell 92 <input type="checkbox"/>	PFAIL/MAOP <input checked="" type="checkbox"/>	RSTRENG (Additional Cost) <input type="checkbox"/>	
Ratio Required	ERF <input type="checkbox"/>	RPR <input type="checkbox"/>	PRR <input type="checkbox"/>
Interaction Rule Required		1 inch X 6T <input checked="" type="checkbox"/>	3T Box <input type="checkbox"/>
LW Min <input type="checkbox"/>	Other <input type="checkbox"/>		

Is Preliminary Report Required? YES  NO

Report Delivery Time Preliminary Report Days Required \_\_\_\_\_ Final Report Days Required 60

Please supply shipping address of survey tool if different than those previously listed.

One written report is standard. Are more reports required? YES\*  NO  How many total? 3

\*Additional charges may apply based on contract.

Please furnish addresses for extra report copies. Please specify how many reports for each recipient.

Adam Kutschinski \_\_\_\_\_ Lebanon OH 45036

Bart Johnson \_\_\_\_\_ Danville KY 40422

Gary Vervake \_\_\_\_\_ Houston TX 77056

## COMMENTS OR CONCERNS

## ADDITIONAL SERVICES OR PRODUCTS OF INTEREST

- NDT Total Project Management
- NDT AGM Site Survey (GPS)
- NDT ILI Tracking Services
- NDT Pipeline Cleaning Services
- ILI Inspection Caliper

# NDT Systems & Services (America) Inc. ILI Survey Questionnaire



NDT Systems & Services

- ILI Inspection MFL Conventional
- ILI Inspection Hi-Resolution
- ILI Inspection Deformation
- ILI Inspection with Combined Technologies
- ILI Inspection Ultrasonic Wall Thickness
- ILI Inspection Ultrasonic Crack Detection
- ILI Inspection INS Mapping

## CONTACT INFORMATION

Contact the nearest NDT operation location for more information.

### United States

NDT Systems & Services (America) Inc.  
2835 Holmes Road  
Houston, Texas 77051  
Phone +1 713 799 5400  
Fax +1 713 799 5406  
Toll Free: 800.LINALOG  
E-Mail (pipelinesales@ndt-global.com)

### Canada (Edmonton)

NDT Systems & Services  
604 – 19<sup>th</sup> Avenue  
Nisku, Alberta, Canada T9E 7W1  
Phone +1 780 955 8611  
Fax +1 780 955 8615  
E-Mail ( [REDACTED] )

### Canada (Calgary)

NDT Systems & Services  
7915 – 46<sup>th</sup> Street S.E.  
Calgary, Alberta, Canada  
Phone +1 403.258.2233  
Fax +1 403 258 1123  
Toll Free: 888.764.2082  
E-Mail ( [REDACTED] )

### Mexico

NDT Systems & Services  
Baltimore No. 92  
Col. Nochebuena  
C.P. 03720 Mexico, D.F.  
Phone +52 55 5563 1920  
Fax +52 55 5615 3492  
E-Mail ( [REDACTED] )

### South America

NDT Systems & Services  
Uruguay 5058, San Isidor  
Buenos Aires, Argentina  
CP: B1643ELZ  
Phone +54 11-4115-4148  
Fax +54 11-411-53574

### Asia Pacific

NDT Systems & Services  
389 Bedok Rd, Changi Complex  
Singapore 469558  
Phone +65 6243 6058  
Fax +65 6243 6082  
E-Mail (Zainol.Abidin@ndt-global.com)

### Germany

NDT Systems & Services  
Am Hasenbiel 6  
D-76297 Stutensee  
Germany  
Phone +49 (0) 7244 74129-0  
Fax +49 (0) 7244 7412-99  
E-Mail ( [REDACTED] )

### Middle East

NDT Systems & Services  
ZH-01,R/A 13, P.O.Box 261 651  
Jebel Ali, Dubai  
United Arab Emirates  
Abu Dhabi  
United Arab Emirates  
Phone +971 4 883 77 41  
Fax +971 4 883 77 91  
E-Mail ( [REDACTED] )

# Analyst

## Reporting Checklist

Customer Name: Spectra Energy Gas Transmission

Project No.:

Control Point – Preliminary Report	Date	Initials
<p><b>1. Preliminary Reporting Criteria</b> – Spectra Energy does not require a preliminary report but we will provide them with information on defects when the following conditions are present:</p> <ul style="list-style-type: none"> <li>• Metal Loss Anomaly &gt;80% wall loss (notify if any &gt;70%)</li> <li>• Metal Loss Anomaly whose FPR <math>\leq</math> 1.100. (FPR is calculated as Failure Pressure/MAOP)</li> <li>• Other Anomalous Conditions that in the opinion of the vendor would pose a significant integrity concern.</li> </ul> <p>Notification will be initially by phone to Bob Travers, followed up by an email to Paul Sinclair, Rod Rheaume, and the appropriate Regional Representative. - <i>Contacts - Shannon to send</i></p>		
<b>2. Defects reported in the Preliminary stage will be Manually Sized.</b>		
<b>3. Distance's to the nearest upstream and downstream AGM's, Marker Plates, and or hard references such as Valves will be provided on the inspection sheets along with 2 joint lengths upstream and 2 joint lengths downstream of the joint to be evaluated as location references for excavation purposes.</b>		
<b>4. A design factor of 1.0 will be used in the Segtable for all wall thicknesses in Pipeimage for Spectra Energy lines regardless of the calculated Design Pressure. This will provide Spectra Energy Gas Transmission with a true Failure pressure.</b>		
<b>5. If a section of pipe does not match the client provided Wall Thickness Data, Spectra should be notified upon discovery, i.e. the entire line segment is said to be 0.375" however a section is found and calculated to be roughly 0.250".</b>	?	

<b>Control Point - Final Report</b>	<b>Date</b>	<b>Initials</b>
<b>1. Interaction Rule - 1 inch x 6t</b> Interaction between two or more metal loss boxes occurs to produce a cluster if the longitudinal separation of the boxes is less than one inch and the circumferential separation of the boxes is less than 6t ( 6 times the wall thickness).		



## Control Point - Final Report

Date

Initials

**2. Pressure Specification: Failure Pressure Ratio (FPR) - The calculated Failure Pressure Ratio value of the metal loss feature. (Cluster Using Modified B31G)**

Calculated Failure Pressure Ratio - 
$$FPR = \frac{FP}{MAOP^*}$$

**For Modified B31G – FPR is calculated as follows:**

Flow stress = SMYS + 10000 psi

$S$  = Hoop stress level at failure

$$A = \frac{L^2}{Dt}$$

If the value of  $A$  is greater than 50

$$M_{085} = 3.3 + 0.032A$$

If the value of  $A$  is less than or equal to 50

$$M_{085} = \sqrt{1 + 0.6275A - 0.003375A^2}$$

$$T = \frac{1 - \frac{0.85d_{\%}}{100}}{1 - \frac{0.85d_{\%}}{100M_{085}}}$$

$$S = F_{stress} T \qquad RPR_{085} = \frac{S}{SMYS}$$


$$\text{Calculated Failure Pressure} = FP = \frac{S * 2 * t}{D}$$

- d = Sentenced Depth = Peak depth of the cluster
- t = Nominal wall thickness of pipe for each Component Line major section as defined in Paragraph 1.9.
- L = Axial length of the Cluster. Note the individual metal loss boxes will have been clustered according to the specified Interaction Rules of Paragraph 1.5 of this Appendix.
- D = Nominal outside diameter of the pipe.

**Failure Pressure Ratio columns will be included in Pipeline Listing**

*\*Spectra may provide a lower MAOP in some instances*

Control Point - Final Report	Date	Initials
<p><b>3. Failure Pressure Ratio (Tolerance Compensated)</b></p> <p><b>Add the tolerance of the MFL tool to each graded anomaly and calculate the <math>FPR_{TC}</math> of each defect.</b></p> <p><b>For Example:</b> An anomaly that is 30% deep the following adjusted values will be used to determine the “tolerance compensated” failure pressure.</p> <p>Tolerance for High Resolution MFL (12 – 56”) - ± 10% depth  Depth:     30% + 10% = <b>40%</b></p> <p>Tolerance for High Resolution MFL (6, 8, 10”) - ± 15% depth  Depth:     30% + 15% = <b>45%</b></p> <p><b>Clarification: The columns for the data will be as follows:</b></p> <p><u>FPR</u>    <u><math>FPR_{TC}</math></u></p> <p><b>DO NOT DISPLAY THE COLUMNS SHOWING TOLERANCE COMPENSATED DEPTHS &amp; LENGTHS. THAT INFORMATION IS ONLY TO BE USED TO CALCULATE THE <math>FPR_{TC}</math>.</b></p>		
<p><b>4. LAPA – Report LAPA Failure Pressure on ALL defects &gt;10% in depth</b></p>		

Control Point - Final Report	Date	Initials
<p data-bbox="131 216 878 254"><b>5. Pipeline Listing – Custom Pipeline Listing ex.</b></p> <div data-bbox="443 323 509 386" style="text-align: center;">  </div> <p data-bbox="180 390 581 443">Standard Report      "Ili vendor - strain estimation_GTV Final"</p> <ol style="list-style-type: none"> <li data-bbox="224 474 1105 579">a. The GPS locations column will be filled in the pipeline listing manually utilizing the <b>Decimal Degree format</b> up to 8 decimal places.</li> <li data-bbox="224 600 1081 705">b. The Strain Analysis column in the Pipeline Listing must be filled in before the final report is dispatched. The Strain Analysis requirements are attached above.</li> <li data-bbox="224 726 1053 831">c. Dent lengths and widths provided by the Calipper will be added to the Dent listing manually and merged to the pipeline listing via macro.</li> <li data-bbox="224 852 1040 915">d. Distance at first weld we be zeroed after the RMB file is updated for GPS &amp; IMU purposes.</li> <li data-bbox="224 936 1086 999">e. The Due Date column in the pipeline listing must be sorted for errors.</li> <li data-bbox="224 1020 1109 1346">f. All wall thicknesses used to create pipeline segment information must be provided by Spectra Energy in excel spreadsheet and or map format. If a section of pipe does not match the client provided Wall Thickness Data, Spectra should be notified upon discovery, i.e. the entire line segment is said to be 0.375" however a section is found and calculated to be roughly 0.250". <b>DO NOT USE PIPELINE QUESTIONNAIRE INFORMATION TO CREATE WALL THICKNESS SEGMENTS.</b></li> <li data-bbox="224 1367 1114 1545">g. The Metal Loss Feature Report section of the report will be removed. Spectra Energy is only concerned with the true Failure Pressure, FPR and FPR<sub>TC</sub>. Everything referencing to ERF will be removed along with the Severity Table and Sentenced Plot</li> <li data-bbox="224 1566 1114 1640">h. Axial Defects – If any defect is decided to be treated as Axial Spectra should be notified immediately</li> </ol>		

Control Point - Final Report	Date	Initials
<p><b>6. AGM's, Fittings and Casings</b> – Use Client numbering of AGM's in Client supplied AGM sheet if supplied by Client. Also include Casings, Tee's and Valves as hard references. Spectra Energy will supply chainage for all hard references</p> <p><b>Examples: Please use all Caps</b></p> <p><b>CASING START HOLMES RD [123456] (No + sign and use square brackets so macro can grab chainage from listing)</b></p> <p><b>TEE 16 INCH [123456] (No + sign)</b></p> <p><b>FORGED OFFTAKE 24 INCH [123456] (No + sign)</b></p> <p><b>BALL VALVE 10-234 [123456] (No + sign)</b></p> <p><b>AGM 1A MARTIN RD. (No chainage)</b></p>		
<p><b>8. Reporting Dents in Final report &amp; Listings</b> – In the excel listings for the final report dents will be listed as follows if a caliper run has been provided, ex. DENT 2.5% . (In Pipelimage in the Dent comments field put DENT 2.5% dents &lt; 2.0% leave comments field blank.)</p> <p><b>Please report all dents found on the MFL inspection.</b></p>		
<p><b>9. Dents Associated with Seam Welds or Girth Welds</b> - Dents will only be classified as being associated with seam welds or girth welds if the dent signal directly impacts the seam weld or girth weld signals.</p> <p><b>Report all dents that impact the girth or seam weld.</b></p>		
<p><b>10. Dents with Associated Metal Loss</b> – Dents will only be classified as having associated metal loss if the metal loss directly impacts the dent signal. If associated ML is &lt;10%, fix at least one defect= 10% to avoid cut off.</p> <p><b>Report all dents associated with metal loss.</b></p>		
<p><b>11. Repaired M/Loss</b> – All defects found under Composite Repairs, Sleeves, Patches, etc. will be classified as "Repaired M/Loss" boxes.</p> <p><i>*Provide with GIS Data</i></p>		

Control Point - Final Report	Date	Initials									
<p><b>12. Generate DRAS Rev 4.2 file format listings and make sure the RPR values are based on: <math>RPR = \text{Burst Pressure} / \text{SMYS Pressure}</math>, where <math>\text{SMYS Pressure} = 2 \cdot \text{wt} \cdot \text{SMYS} / D</math>, which is equivalent to RPR 0.85 Sentencing Ration.</b></p> <p><b>E-mail the files to the following individuals upon completion:</b></p> <table border="1" data-bbox="82 417 1130 680"> <tr> <td data-bbox="82 417 610 548">Spectra Energy [Redacted] TX 77056</td> <td data-bbox="610 417 1130 548">Dynamic Risk Assessment Systems, Inc. [Redacted] Calgary, Alberta, Canada-T2T</td> </tr> <tr> <td data-bbox="82 548 610 680"></td> <td data-bbox="610 548 1130 680">[Redacted] <i>all copies</i></td> </tr> </table> <p style="text-align: center;"><i>to 3 Albert Liles</i></p>	Spectra Energy [Redacted] TX 77056	Dynamic Risk Assessment Systems, Inc. [Redacted] Calgary, Alberta, Canada-T2T		[Redacted] <i>all copies</i>							
Spectra Energy [Redacted] TX 77056	Dynamic Risk Assessment Systems, Inc. [Redacted] Calgary, Alberta, Canada-T2T										
	[Redacted] <i>all copies</i>										
<p><b>13. Deliverables – <del>three</del> hard copies of the report with Pipelimage Data and client software in DVD format will be issued to the Integrity Engineer responsible for the ILI run unless otherwise specified.</b></p> <p><b>Send one copy to</b></p> <table border="1" data-bbox="131 963 1081 1026"> <tr> <td>Shannon Wilson, [Redacted] Houston, TX 77056</td> </tr> </table> <p><b>Send two copies to the appropriate Region Representative:</b></p> <table border="1" data-bbox="128 1136 1089 1570"> <tr> <td><b>Southeast Region (Houston) -</b> [Redacted]</td> </tr> <tr> <td>Albert Liles, [Redacted] Houston, TX 77056</td> </tr> <tr> <td><b>Southeast Region (Nashville) -</b> [Redacted]</td> </tr> <tr> <td>James Bell, [Redacted] Nashville, TN 37214</td> </tr> <tr> <td><b>Northeast Region (Harrisburg) -</b> [Redacted]</td> </tr> <tr> <td>Charlie Shuckhart, [Redacted] Harrisburg, PA 17110</td> </tr> <tr> <td><b>Northeast Region (Waltham, MA) -</b> [Redacted]</td> </tr> <tr> <td>Colin Bradley, [Redacted] Waltham, MA 02451</td> </tr> </table>	Shannon Wilson, [Redacted] Houston, TX 77056	<b>Southeast Region (Houston) -</b> [Redacted]	Albert Liles, [Redacted] Houston, TX 77056	<b>Southeast Region (Nashville) -</b> [Redacted]	James Bell, [Redacted] Nashville, TN 37214	<b>Northeast Region (Harrisburg) -</b> [Redacted]	Charlie Shuckhart, [Redacted] Harrisburg, PA 17110	<b>Northeast Region (Waltham, MA) -</b> [Redacted]	Colin Bradley, [Redacted] Waltham, MA 02451		
Shannon Wilson, [Redacted] Houston, TX 77056											
<b>Southeast Region (Houston) -</b> [Redacted]											
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Charlie Shuckhart, [Redacted] Harrisburg, PA 17110											
<b>Northeast Region (Waltham, MA) -</b> [Redacted]											
Colin Bradley, [Redacted] Waltham, MA 02451											
<p><b>14. Matt Thomas – Maps and Excel Spreadsheets</b></p> <p>[Redacted] Houston, TX 77056</p>											
<p><b>15. James Harshman – GPS Coordinates contacts.</b></p> <p>Diamond Edge Services [Redacted] [Redacted] ytle, TX 78052</p>											



## Spectra Energy Gas Transmission ILI Report Template

Name	Description	Excel		Printed Report
		Format	Column	
Event Name	This is a standard description** - Marker, Weld, Fixture, Anomaly, etc. ✕	Text - 10	A	Hide
Type	This is a short description of the Event - LAUN, WELD, TAP, TEE, BCAS, ECAS, WTC, MLOS, DENT, etc.	Text - 8	B	Show
Description	Describes the attributes of the event - AGM #7 - Hwy 332, MLV 10-234, Tap MR 75432, etc.	Text - 100	C	Show
Feature Key	Feature Number supplied by Spectra Energy ✕	Numerical	D	Hide
Survey Station*	The Survey Station of the feature - from facility information and verified by vendor ✕	Numerical	E	Hide
Diameter*	The diameter (OD) of the pipeline - from facility information and verified by vendor ✕	Numerical	F	Hide
WT*	The wall thickness of the pipeline - from facility information and verified by vendor ✕	Numerical	G	Hide
SMYS*	The SMYS of the pipeline divided by 1000 - from facility information (i.e. 52, 65, 35, etc) ✕	Numerical	H	Hide
MAOP*	The MAOP of the pipeline - from facility information and verified by the vendor ✕	Numerical	I	Hide
GIS Description	GIS Description - provided by Spectra Energy ✕	Text - 10	J	Hide
Wheel Count*	The Wheel Count or Absolute Distance from Launch in feet. Set Wheel Count to zero (0) at Launch Valve.	Numerical	K	Show
Dist to US Weld	The distance to the upstream weld in feet	Numerical	L	Show
Peak Depth	The depth of the metal loss defect (%)	Numerical	M	Show
Defect Length*	The length of the metal loss defect in inches	Numerical	N	Show
Defect Width*	The width of the metal loss defect in inches	Numerical	O	Show
Clock	The clock position of the defect	hh:mm	P	Show
Dent Depth (%)	The depth of the dent (%)	Numerical	Q	Show
Dent Length*	The length of the dent in inches	Numerical	R	Show
Dent Width*	The width of the dent in inches	Numerical	S	Show
Dent Assoc. Metal Loss	Yes or No Comment	Text	T	?
Dent Assoc. Girth Weld	Yes or No Comment	Text	U	?
Dent Assoc. Seam Weld	Yes or No Comment	Text	V	?
Strain (%)	The calculated strain value	Numerical	W	Show
ID/OD	Indicates whether defect is external or internal (I, E, U)	Text - 1	X	Show
Failure Pressure*	The calculated failure pressure based on metal loss dimensions and pipe information (truncated)	Numerical	Y	Show

FPR		Failure Pressure Ratio - Failure Pressure divided by MAOP (MAOP given to vendor)	Numerical	Z	Show
FPR <sub>TC</sub>		Failure Pressure Ratio Tolerance Compensated - The Tolerance Compensated Failure Pressure divided by MAOP (This is only used for determining Due Date)	Numerical	AA	Show
Due Date		The date the anomaly becomes an "Immediate"	MM-DD-YYYY	AB	Show
Comments	*	Any additional comments	Text - 256	AC	Hide
Weld Number	*	Weld number of the Upstream Girth Weld	Numerical	AD	Hide
Joint Length*	*	The length of the joint of pipe	Numerical	AE	Hide
Latitude	*	Latitude (WGS 84)	DD.ddddd	AF	Hide
Longitude	*	Longitude (WGS 84)	DD.ddddd	AG	Hide
Elevation*	*	Elevation of pipe (Mean Sea Level) - in feet	Numerical	AH	Hide
LAPA	*	The LAPA pressure	Numerical	AI	Hide

\* For ILI runs in Canada, use metric SET supplied

\* - Information will be provided by Spectra



## ***Spectra Energy***

**Date:** March 27, 2007

**Subject:** Criteria for When Strain Estimation is Required of ILI Vendor

**Prepared by:** Gary Vervake, Principal Metallurgical Engineer

HRMFL and HR Geometry ILI tools are currently being used to assess the DEGT system for dents. An ILI analyst assesses the data and reports to DEGT the location and characteristics of dents found during the ILI run. In the case of HR Geometry tools, DEGT requests estimation of strain for dents with certain characteristics. The purpose of this document is to provide the ILI vendor with guidance regarding when strain estimates are to be performed.

DEGT's document IMP 510 "Dent Management Plan" contains the company's methods and criteria for assessing dents as an integrity threat to the system. In accordance with IMP 510, typically the ILI vendor should perform strain estimations for dents that meet the following criteria:

- All dents having a depth greater than 6% OD
- Dents having a depth greater than 2% OD that affect girth or seam welds.
- Bottom side dents with metal loss that have an FPR > 1.1

The criterion in this document is applicable to onshore pipelines. In the case of offshore pipelines, Metallurgical Services should be consulted for strain estimation recommendations.

Please contact me if you have any questions or comments.

Gary Vervake  
Principal Metallurgist  
Office [REDACTED]  
Cell [REDACTED]