

MOPI

EFFECTIVE MANAGEMENT SYSTEM FOR PIPELINES



Pipeline operators seek to ensure the pipeline integrity in order to prevent incidents on the employees, the environment, public and client.

The management of pipeline integrity is a process applied to all stages of the pipeline life cycle. An IT system to provide reliable and useful data is necessary for efficacious integration of pipeline information, including: design, construction, maintenance and operation data.

MOPI, exclusive of *Pipeway Engenharia*, is an IT system for managing pipeline which allows pipeline operators to plan, monitor and control the activities of pipeline system. For this reason, MOPI applications aim to improve decision-making through data integration, updating of integrity threats and the unified view of multi-source data.

Through MOPI, the user can:

- Collect, review and integrate the pipeline data and have access to pipeline operational, contract, design, maintenance and construction information;
- Follow the evolution of reported anomalies in the pipelines;
- Compare the inspection results of different techniques and suppliers;
- Plan and control inspections, repairs and contracts;
- Manage documents such as procedures, reports, meeting minutes, contracts.

Furthermore, the MOPI allows:

- Check the pipeline route through Google Maps, complementing simple and economic the GIS.
- Independence between internal systems.
- Secure data access on internet, intranet or extranet from a standard web browser.
- Access by multiple users without limitation of time.
- Customization and development of new modules or special features.

MOPI

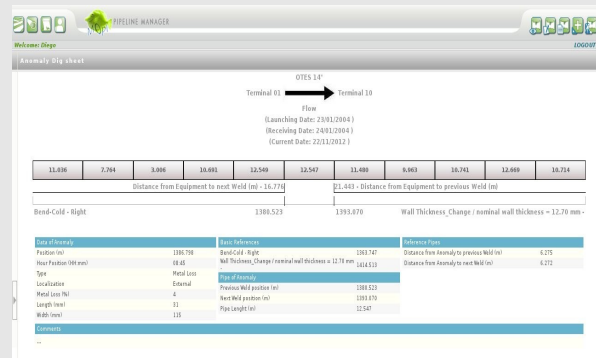
EFFECTIVE MANAGEMENT SYSTEM FOR PIPELINES



Key Features



Multi-user System
Data access on Internet, Intranet or Extranet
Available in English, Portuguese and Spanish



Creation Dig Sheets

Planning and monitoring inspections, reports and contracts

| Table Inspections | | | | | | | | | | | | |
|-------------------|--|--------|------------|------------|--------------|----------------------------|---------------|---|-----------------|---------------------|-------------------|----------------|
| | | Status | Start Date | Due Date | Release date | Contract | Vendor | Tool | Nº of Anomalies | Nº of Geo Anomalies | Nº of Attachments | Nº of Comments |
| | | | 17/12/2003 | 18/12/2003 | 18/12/2003 | GT PIPE - 17/12/2003 | GT PIPE | Pig (Geométrico) | 0 | 68 | 4 | 0 |
| | | | 23/01/2004 | 24/01/2004 | 24/01/2004 | GT PIPE - 17/12/2003 | GT PIPE | Pig (MFL) | 13408 | 0 | 4 | 0 |
| | | | 22/04/2004 | 01/06/2005 | 01/06/2005 | OG - 22/04/2004 | OG | Correlação em campo (Instrumentos básicos, Ultra-som) | 187 | 0 | 2 | 2 |
| | | | 03/10/2007 | 04/10/2007 | 04/10/2007 | THT Solutions - 03/10/2007 | THT Solutions | Pig (Geométrico) | 0 | 0 | 3 | 0 |
| | | | 08/10/2007 | 09/10/2007 | 09/10/2007 | THT Solutions - 03/10/2007 | THT Solutions | Pig (MFL) | 2439 | 0 | 5 | 1 |
| | | | 30/11/2007 | 14/03/2008 | 14/03/2008 | OG - 30/11/2007 | OG | Correlação em campo (Instrumentos básicos, Ultra-som) | 14 | 0 | 2 | 2 |
| | | | 04/02/2009 | 23/07/2009 | 23/07/2009 | PC Duto - 04/02/2009 | PC Duto | Proteção Catódica (Corrente Impressa) | 0 | 0 | 7 | 1 |

7 Inspections found, showing all Inspections. 1

| Table Contracts | | | | | | | | | | |
|-----------------|--|----------------------------|---------------|----------|--------|------------|----------|--------------|-------------------|----------------|
| | | Code | Vendor | Lines | Status | Start Date | Due Date | Release date | Nº of Attachments | Nº of Comments |
| | | 4600004252 | THT Solutions | OTES 14" | | 03/10/2007 | --- | --- | 0 | 2 |
| | | Cathodic Protection - 2009 | PC Duto | OTES 14" | | 04/02/2009 | --- | --- | 0 | 1 |
| | | Correlação 2005 | OG | OTES 14" | | 22/04/2004 | --- | 01/06/2005 | 0 | 1 |
| | | Correlação 2007 | OG | OTES 14" | | 30/11/2007 | --- | 14/03/2008 | 0 | 1 |
| | | Geo/MFL 2003/2004 | GT PIPE | OTES 14" | | 17/12/2003 | --- | --- | 0 | 1 |

5 Contracts found, showing all Contracts. 1

Export Options: CSV | Excel | XML

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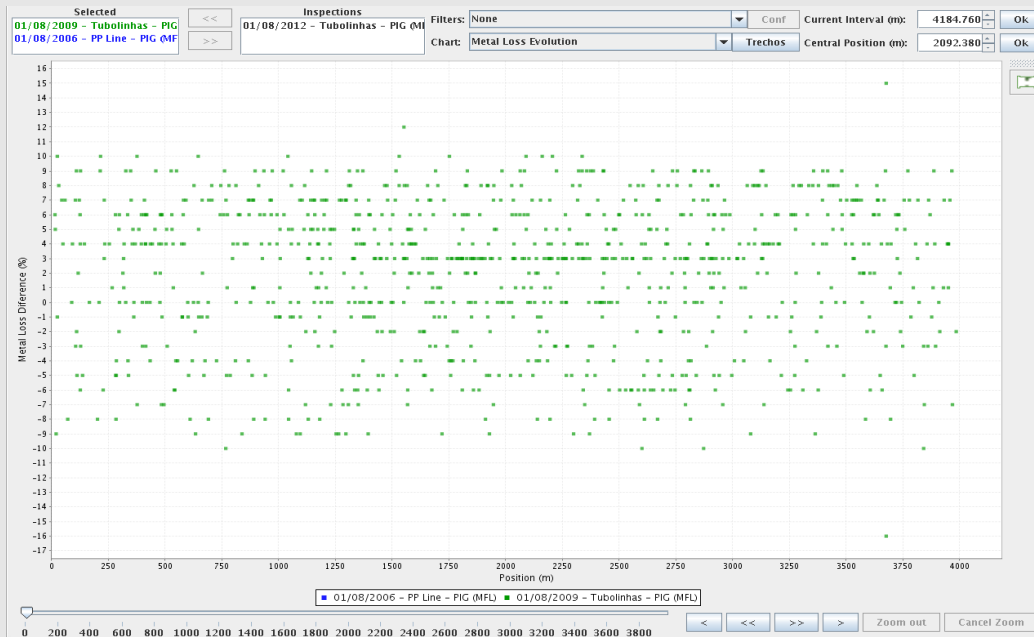
Anytime the evolution of the reported anomalies in the several inspections carried out, maintenance and repairs services can be easily found and identified.

PIPELINE MANAGER

Welcome: Diego

List of Anomalies - OTES 14"

| | | | Position (m) | Hour Position (HH:mm) | Metal Loss (%) | Width (mm) | Length (mm) | Localization | Type | Status | ERF - Reported | First Inspection | Nº of Visualization | Nº of Attachments | Nº of Comments |
|--------------------------|--------------------------|--------------------------|--------------|-----------------------|----------------|------------|-------------|--------------|--|--------|----------------|--|---------------------|-------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 24.490 | 00:30 | 12 | 43 | 34 | External | Metal Loss | | 0,919 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 36.568 | 11:45 | 7 | 217 | 58 | External | Metal Loss | | 0,921 | 23/01/2004 - GT PIPE - Pig (MFL) | 2 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 36.962 | 11:26 | 15 | 66 | 112 | External | metal loss-corrosion / further indications | | 0,96 | 08/10/2007 - THT Solutions - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 36.965 | 00:00 | 9 | 153 | 63 | External | Metal Loss | | 0,926 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 89.238 | 06:30 | 4 | 225 | 44 | External | Metal Loss | | 0,914 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 101.683 | 07:15 | 3 | 289 | 48 | External | Metal Loss | | 0,913 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 104.582 | 06:45 | 9 | 117 | 56 | External | Metal Loss | | 0,924 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 105.991 | 06:08 | 21 | 23 | 65 | External | metal loss-corrosion / further indications | | 0,95 | 08/10/2007 - THT Solutions - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 106.019 | 03:00 | 12 | 25 | 35 | External | Metal Loss | | 0,919 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 106.029 | 05:15 | 9 | 129 | 56 | External | Metal Loss | | 0,924 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 120.246 | 01:30 | 24 | 11 | 9 | Internal | Metal Loss | | 0,911 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 125.022 | 08:00 | 5 | 136 | 63 | External | Metal Loss | | 0,918 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 140.213 | 03:15 | 11 | 57 | 67 | External | Metal Loss | | 0,932 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 142.456 | 00:15 | 4 | 283 | 68 | External | Metal Loss | | 0,917 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 146.280 | 03:15 | 5 | 204 | 53 | External | Metal Loss | | 0,917 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 156.936 | 10:30 | 10 | 116 | 119 | External | Metal Loss | | 0,944 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 165.821 | 09:30 | 13 | 40 | 51 | External | Metal Loss | | 0,929 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 165.887 | 01:00 | 17 | 25 | 26 | External | Metal Loss | | 0,918 | 23/01/2004 - GT PIPE - Pig (MFL) | 2 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 165.996 | 02:15 | 10 | 62 | 42 | External | Metal Loss | | 0,92 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 171.748 | 02:30 | 5 | 95 | 24 | External | Metal Loss | | 0,911 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 212.066 | 04:30 | 5 | 124 | 54 | External | Metal Loss | | 0,917 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 219.620 | 01:45 | 9 | 70 | 105 | External | Metal Loss | | 0,938 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 233.863 | 05:00 | 13 | 36 | 27 | External | Metal Loss | | 0,916 | 23/01/2004 - GT PIPE - Pig (MFL) | 1 | 0 | 0 |



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Table Attachments

| Type | Name | Description | Creation Date | Author | Notes | Size | Attached on | Attached by |
|------|--------------------------|---|---------------|--------|-------|-----------|-------------|-------------|
| --- | QUESTIONÁRIO PADRÃO.pdf | --- | --- | --- | --- | 72.384 KB | 03/09/2009 | Anne Aguiar |
| --- | Lista Reparos - 2002.xls | Lista contendo informações de reparos realizados em 2002. | --- | --- | --- | 156 KB | 20/10/2009 | Anne Aguiar |
| --- | Lista Reparos - 2007.xls | Lista contendo informações de reparos realizados em 2007. | --- | --- | --- | 79 KB | 20/10/2009 | Anne Aguiar |
| --- | Lista Reparos - 2004.xls | Lista contendo informações de reparos realizados em 2004 | --- | --- | --- | 87.5 KB | 03/11/2009 | Anne Aguiar |

4 Attachments found, showing all Attachments. 1

Document Management

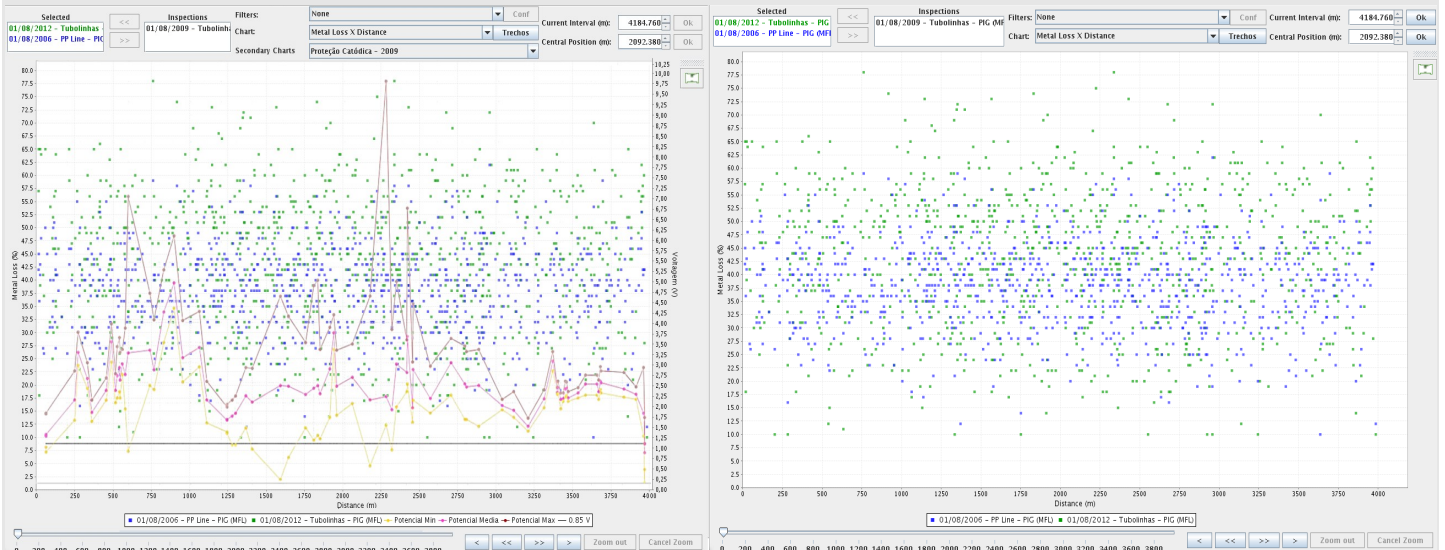
Table Inspections

| Status | Start Date | Due Date | Release date | Contract | Vendor | Tool | Nº of Anomalies | Nº of Geo Anomalies | Nº of Attachments | Nº of Comments |
|--------|------------|------------|--------------|----------------------------|---------------|---|-----------------|---------------------|-------------------|----------------|
| ✓ | 17/12/2003 | 18/12/2003 | 18/12/2003 | GT PIPE - 17/12/2003 | GT PIPE | Pig (Geométrico) | 0 | 68 | 4 | 0 |
| ✓ | 23/01/2004 | 24/01/2004 | 24/01/2004 | GT PIPE - 17/12/2003 | GT PIPE | Pig (MFL) | 13408 | 0 | 4 | 0 |
| ✓ | 22/04/2004 | 01/06/2005 | 01/06/2005 | OG - 22/04/2004 | OG | Correlação em campo (Instrumentos básicos, Ultra-som) | 187 | 0 | 2 | 2 |
| ✓ | 03/10/2007 | 04/10/2007 | 04/10/2007 | THT Solutions - 03/10/2007 | THT Solutions | Pig (Geométrico) | 0 | 0 | 3 | 0 |
| ✓ | 08/10/2007 | 09/10/2007 | 09/10/2007 | THT Solutions - 03/10/2007 | THT Solutions | Pig (MFL) | 2439 | 0 | 5 | 1 |
| ✓ | 30/11/2007 | 14/03/2008 | 14/03/2008 | OG - 30/11/2007 | OG | Correlação em campo (Instrumentos básicos, Ultra-som) | 14 | 0 | 2 | 2 |
| ✓ | 04/02/2009 | 23/07/2009 | 23/07/2009 | PC Duto - 04/02/2009 | PC Duto | Proteção Catódica (Corrente Impressa) | 0 | 0 | 7 | 1 |

7 Inspections found, showing all Inspections. 1

Collect, review and integration data - one of the steps of the pipeline integrity management.

Comparison between different inspections and technologies



Comparison between ILI inspections and Cathodic Protection

Comparison between ILI inspections

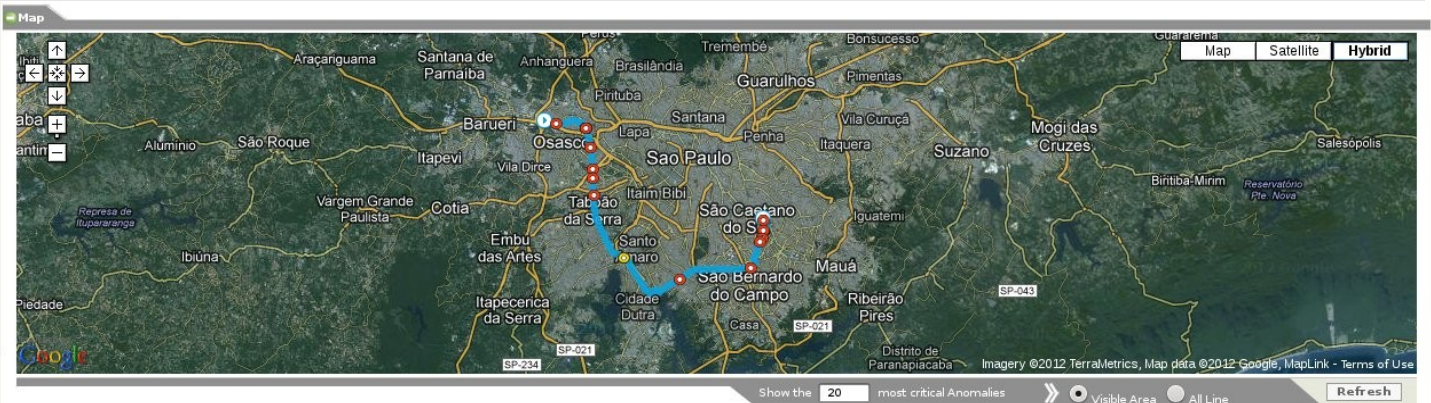
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Complementation of GIS

- **Checking the pipeline route through Google Maps**
- **Showing the most critical anomalies in the pipeline route.**

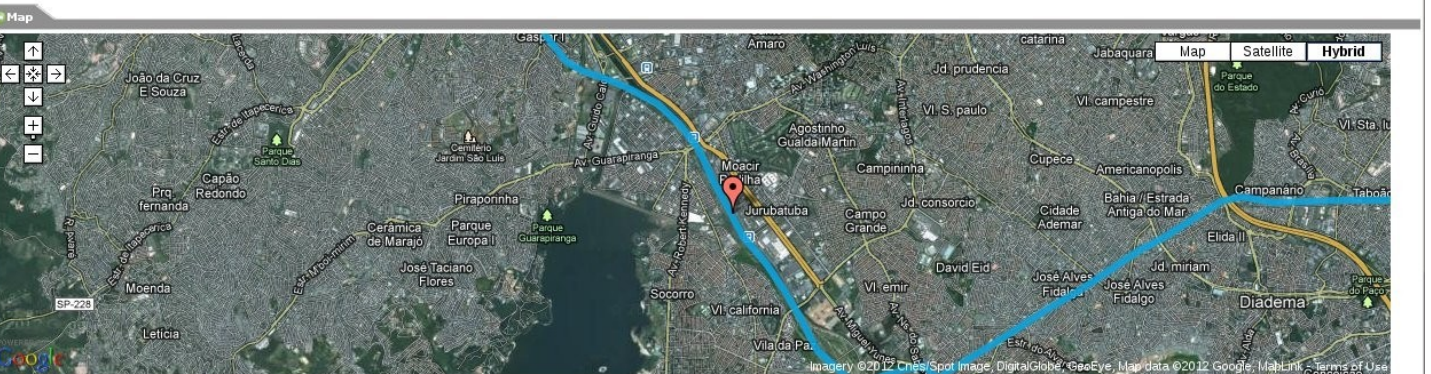


| Anomaly Details | | | | | |
|-----------------|--------------|-----------------------|----------------|------------|-------------|
| | Position (m) | Hour Position (HH:mm) | Metal Loss (%) | Width (mm) | Length (mm) |
| | 23507.347 | 06:15 | 41 | 69 | 25 |

Anomaly

General Data

- Line: OTES 14"
- First Inspection: 23/01/2004 - GT PIPE - Pig (MFL)
- Position (m): 25545.079
- Hour Position (HH:mm): 10:30
- Longitude: -46.7051570647334
- Latitude: -23.6743733922968
- Metal Loss (%): 30
- Width (mm): 110
- Length (mm): 92
- Localization: External
- Type: Metal Loss
- Status: Removed



| Table Anomaly Visualizations | | | | | | | | | | | | | |
|------------------------------|--------------|-------------------------|-----------------------|----------------|------------|-------------|--------------|------------|----------------|----------------------------------|-------------------|----------------|--|
| | Position (m) | Normalized Position (m) | Hour Position (HH:mm) | Metal Loss (%) | Width (mm) | Length (mm) | Localization | Type | ERF - Reported | Inspection | Nº of Attachments | Nº of Comments | |
| | 25545.079 | 25545.079 | 10:30 | 30 | 110 | 92 | External | Metal Loss | 1.018 | 23/01/2004 - GT PIPE - Pig (MFL) | 0 | 0 | |
| | 25545.079 | 25545.079 | 10:30 | 20 | 470 | 1100 | --- | --- | --- | 04/01/2001 - GT PIPE - Pig (MFL) | 0 | 0 | |