UKOPA

United Kingdom Onshore Pipeline Operators' Association

UKOPA Good Practice Guide

GP 07: Management of Pipeline Illegal Tappings

100.000 liter diesel gestolen met tuinslang

TIM VAN DER ZEYPEN EN KURT WERTELAERS
10/05/16 - 05u00

Meer over Diefstal en inbraak , Fossiele brandstoffen , Bornem , Energie , Criminaliteit , Provincie Antwerpen , België

© David Legreve.

MEER VAN HLN


Zo had Michael Jackson er zonder plastische chirurgie uitgezien


Willem van 'Mijn Pop-uprestaurant' groeide op zonder mama


Christina Applegate slaapt nauwelijks

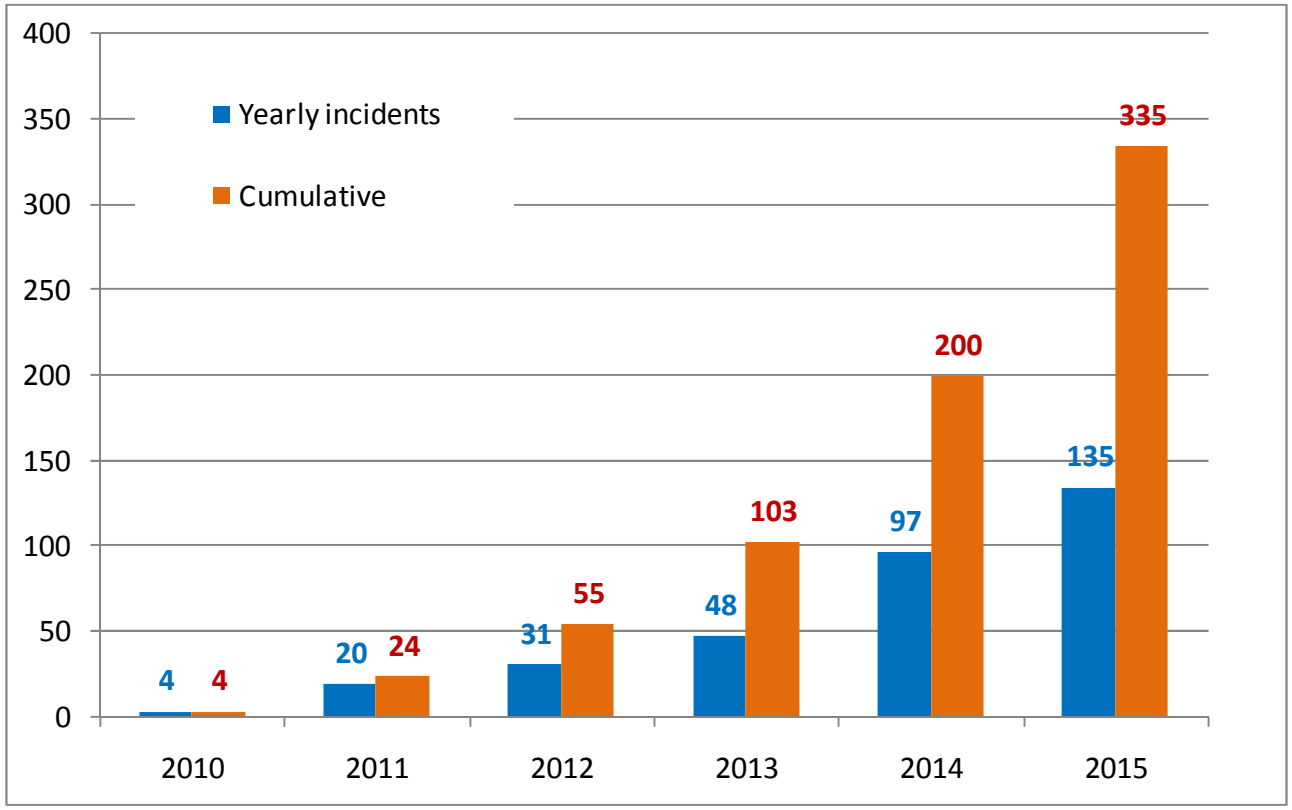

Selena Gomez vernielt 'Marry Justin' bord van fan

Contents

- Background
- Tapping methods
- Storage methods
- Summary of risks
- Detection technology
- Landowner and easement management
- Surveillance & what to look for
- Operator tools and preparations
- Inspection of tapping
- Repair techniques and lifespan

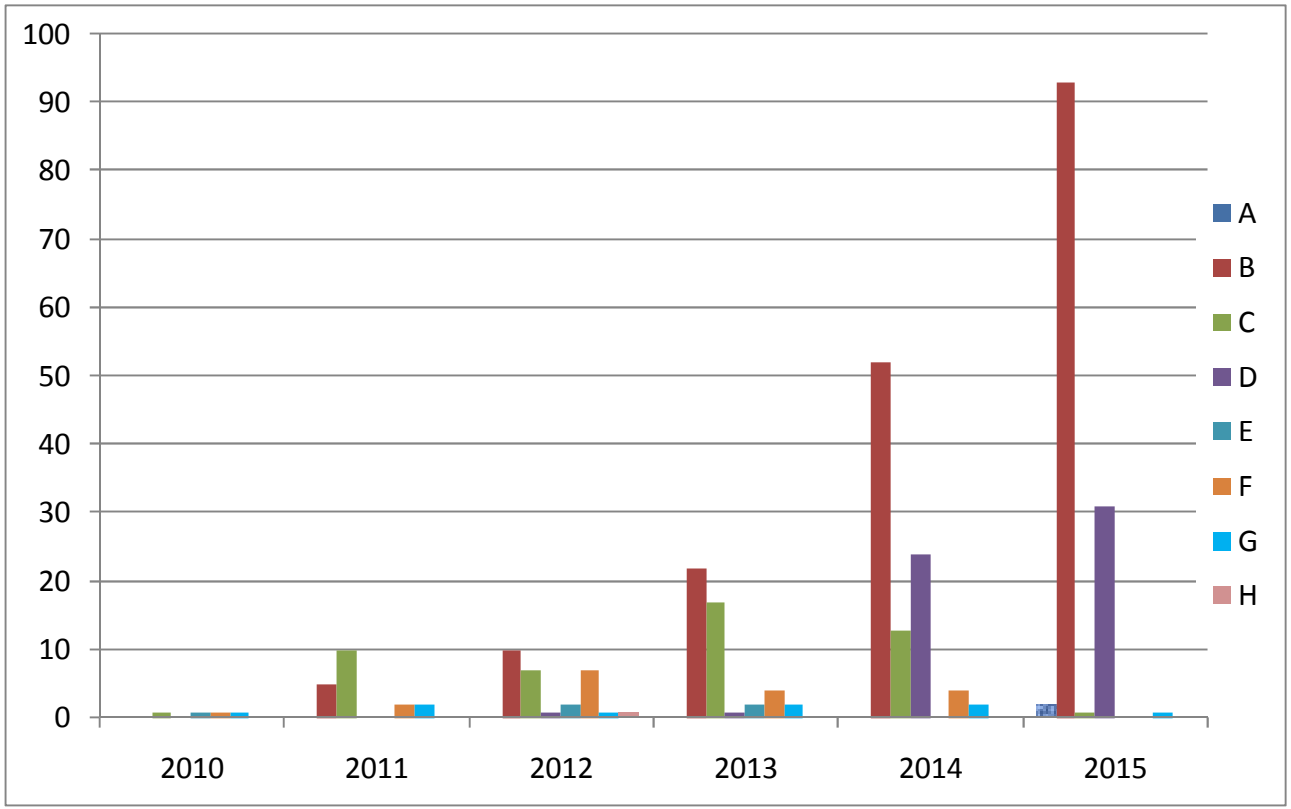
For full details refer to
Good Practice Guide GP07: Management of Pipeline Illegal Tappings

MAGNITUDE



- Cases few and far between until 2010
- “Exponential” growth since then

GEOGRAPHY

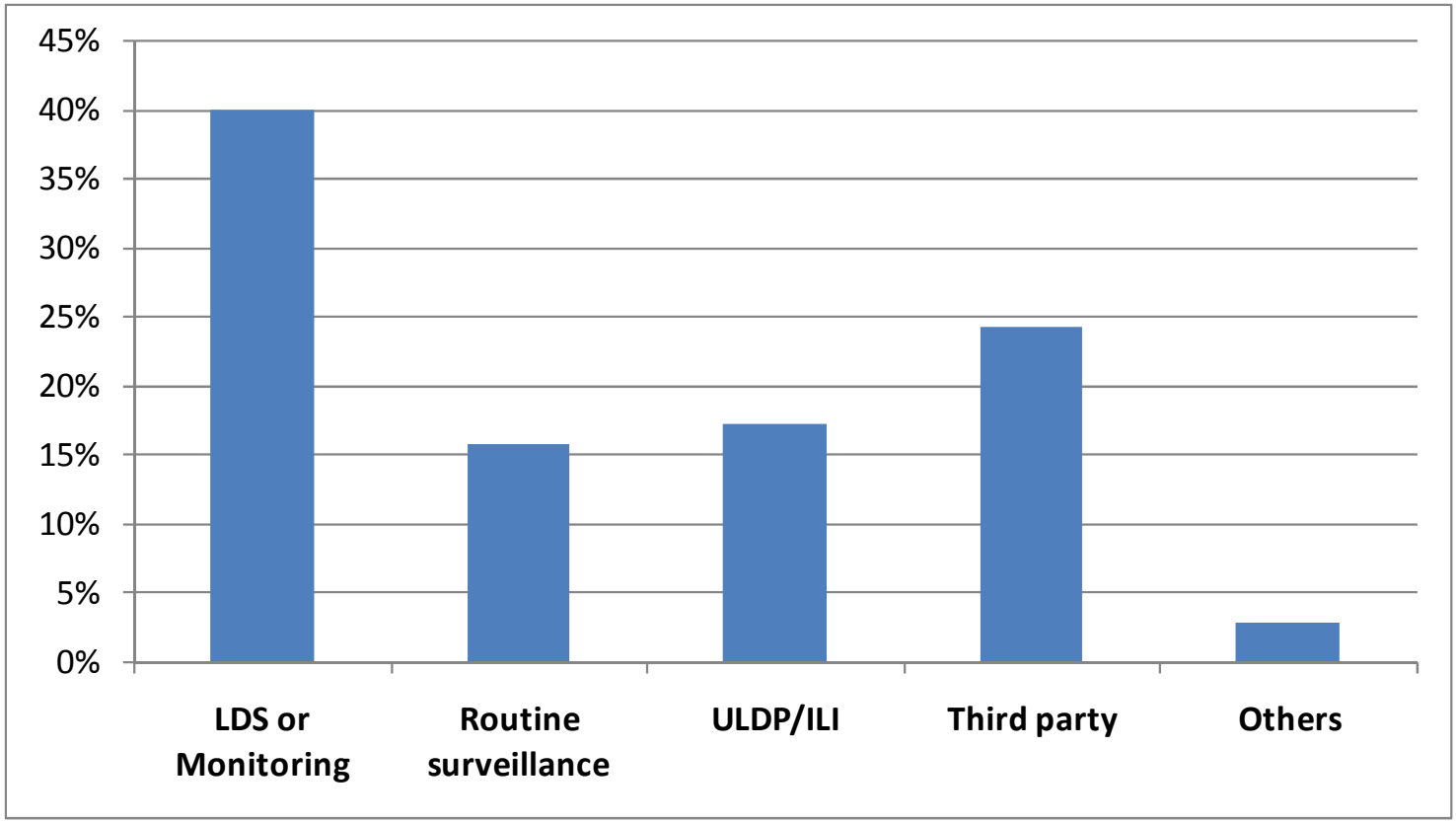


- Some countries are particularly targeted
- 3 countries account for 84% of all cases

Modus Operandi

- 77% of cases are in buried sections, 23% near accessible valves
- Location (reported for 35% of cases)
  - Majority of cases were in open land (65%) or shrub area (19%)
  - A few cases involving lay-bys or buildings
- Distance (reported for 29% of cases)
  - varies from <10 m (46%), 10-100 (26%), 100-1000 (27%)
- Estimated flow rate is often unknown (reported for 22% of cases)
  - < 1 m^3/h (57%), 1-5 m^3/h (43%)
- 30%+ are leaking (various amounts)

DETECTION


45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
LDS or Monitoring
Routine surveillance
ULDP/ILI
Third party
Others

TYPES OF ILLEGAL TAPPINGS

Directly connected valve - threaded / welded / soldered

TYPES OF ILLEGAL TAPPINGS

Clamp

Driven spike

TYPICAL STORAGE METHODS

Van in lay-by

Buried IBCs

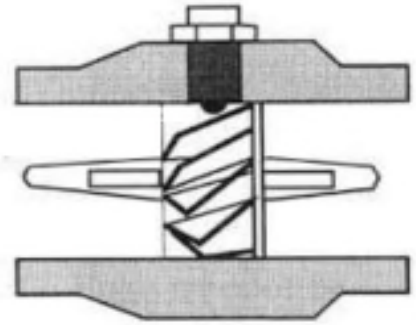
Milk storage tank in trailer

Pillow tanks in barn

RISKS TO BUSINESS

- High risk of leak during illegal tapping
- Significant risk to people and the environment
- Non standard installations on pipeline with limited integrity
- On average 25% are leaking when discovered
- High financial cost
    - Value of stolen fuel
    - Cost of temporary and permanent repairs
    - Clean-up costs if significant leak
- Unplanned shutdown for draindown and repair
- Damage to Operator reputation

DETECTION TECHNIQUES



Leak Detection:

- Line balance and static monitoring.
- Statistical and hydraulic modelling.
- Pressure wave detection.

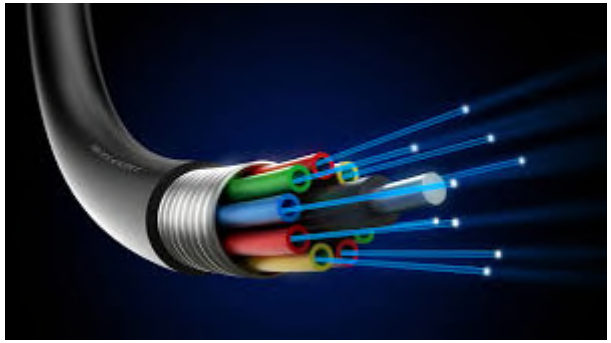
In-Line Inspection:

- MFL presently most suitable for tapping detection.

DETECTION TECHNIQUES

Coating Surveys:
- Assists search
- May detect normal degradation

Leak Detection Dogs:
- Full audit of line
- Localised searches



Fibre Optic Cable:
- Intruder detection
- Leak detection

EASEMENT AND LANDOWNERS

Increased landowner liaison
- Includes extra correspondence
- Raise awareness
Note: Occupiers could be involved

Easement maintenance
- Assists surveillance
- Increases operator presence

INCREASED SURVEILLANCE

Security patrols:
- Increased easement vigilance
- Increased visibility is a deterrent

SURVEILLANCE - WHAT TO LOOK FOR

Markers:
- **Tape on CP post**
- **Stake in ground**
- **Dead bird tied to tree**
- **Bag tied to gate**

Disturbed ground
- **Paths**
- **Slit trenches**

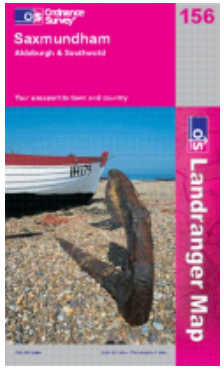
SURVEILLANCE - WHAT TO LOOK FOR

Fake roadworks

Sticks used to detect disturbance

Hose and rubbish pile

TOOLS FOR LOCAL SEARCHES



Route maps GIS, GPS etc.

Examples of search tools to look for metallic hoses, slit trenches, spilt fuel etc.

SURVEILLANCE – Prioritising Higher Risk Locations

- Areas of previous illegal activity.
- Above ground sections
- Shut down sections
- Leak detection or other intelligence indications
- Secluded areas.
- Areas similar to previous tappings. Profile previous tappings:
  - Geographical location.
  - Location type
  - Access
  - Product
  - Ground cover.
  - Proximity to previous tappings
  - Type of facility
  - Buildings/structures involved

SURVEILLANCE – Highest Consequence Locations

- Rank higher risk locations on consequence:
  - Environmental sensitivity
  - Proximity to people
  - Schools
  - Sporting venues
  - Major roads and railways
- Prioritise surveillance of highest risk & consequence locations

SUSPECTED TAPPINGS – Surveillance Risks

- Manage personnel safety:
  - Risk assessment (possibility of violent criminals)
  - Survey from a distance
  - Survey from vantage points
  - Drive-past survey, unmarked vehicles.
  - Searching in groups.
  - Maintain contact
  - **Police assistance where required (Crime and Crime Scene)**

INSPECTION OF ILLEGAL TAPPINGS

Risk Assessment – unknown pipeline integrity

Prior to excavation / inspection consider:

- Risk of disturbing tapping
- Reduce operating pressure
- Controlled shutdown (i.e. low pressure)
- Depressurise
- Emergency response on standby
- Assess pipeline details
  - Profile & isolation valves
  - Drain-down calculations
  - Logistics & access in case of leak
  - Temporary repair options
  - Assessment local area (environment, population etc.)
  - Assessment by qualified personnel

MAIN REPAIR TYPES (Tapping removed)

Stand-off clamp

Composite wrap

Pinhole Clamp

MAIN REPAIR TYPES (Tapping Still in Place)

Grouted tee (by DNV)

Welded tee

Epoxy filled tee (by Team Inc)

TEMPORARY REPAIR CONSIDERATIONS

- Limited lifespan of repairs
  - Technical risk assessment
  - Periodic review
- Quality assurance and inspection during repair.
- Degradation of the repair (internal / external corrosion)
- Compatibility of elastomer seal with hydrocarbons
- Ability to monitor elastomer seal performance.
- Pressure fluctuations & fatigue life
- Structural integrity of the tapping / pipeline / the repair
- Weakening of pipe (adjacent to a weld, pipe deformation, grinding, high temps due to welding, multiple adjacent tapping attempts)
- Timescale for permanent repair.
- Life of epoxy / composites and seals
- Will tapping leak into repair and cause degradation?
- Access for periodic inspection / maintenance / leak monitoring (e.g. boreholes)

SUMMARY - Tapping Management

- Prioritise tapping preparedness
- Implement all reasonable detection techniques
- Response management (e.g. set up working group, industry liaison)
- Tapping response procedures
- Training (e.g. leak detection, tapping surveillance, tapping response
- Technical support for assessment and repair
- Safety of personnel during searches
- Crime – report to Police Report to authorities – HSE/EA/DECC/Police (Local and National)
- Prioritise emergency preparedness
  - Leak equipment
  - Training
  - Procedures
  - Police and other liaison