
When Pipelines Become Targets

Costing the Consequences

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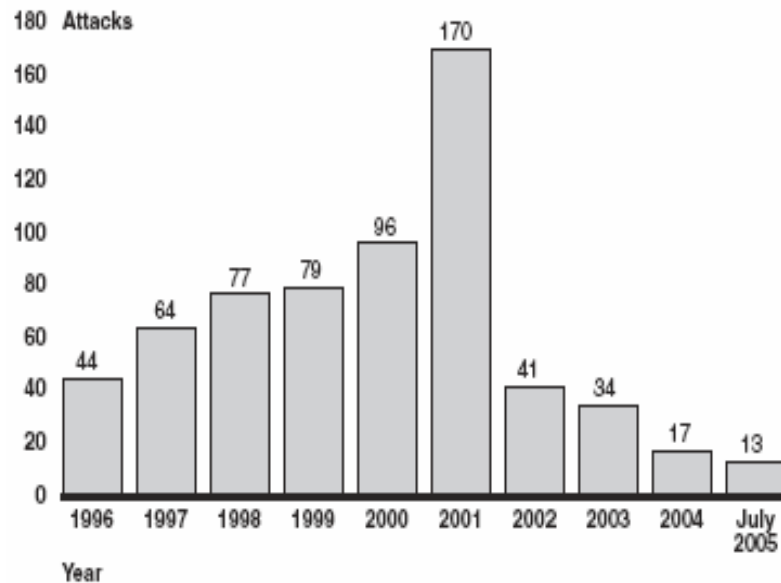
When pipelines become targets ...

- Costing the consequences
 - Annualized revenue losses/gains (\$/?)
 - Iraq (\$7.1b); Nigeria (\$11.9b); Colombia (\$2.5b)
 - Replacement/displacement costs (\$/?)
 - Georgia (?); World Bank (500m urban poor); Guinea, Nepal, etc. (?); Egypt (\$7b)
 - Defensive/security costs (\$/?)
 - U.S.-Iraq (\$630b); U.S.-Middle East (\$20b); U.S.-Nigeria (?); U.S.-Colombia (\$250m+)
 - Repair/safeguarding costs (U.S.-Iraq: \$3b/?)
 - Environmental losses/costs (\$10's-\$100's/gallon)
 - Avoidance/substitution costs (IEA: \$120b/year?)

When pipelines become targets ...

- Observations ...
 - Pipelines are easy prey ...

Caño Limón-Coveñas Oil Pipeline Attacks, 1996–July 2005



Source: Occidental Petroleum Corporation.

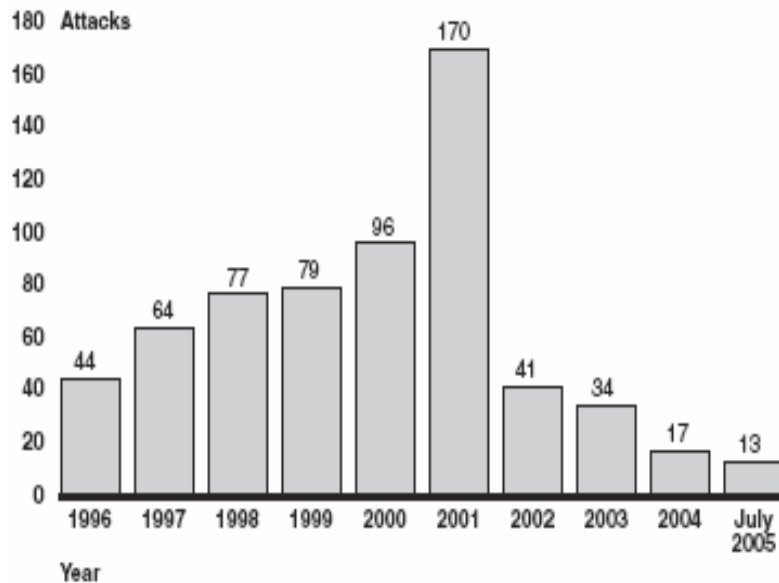
Caño-Limón-Coveñas pipeline.
Source: GAO, 2005.

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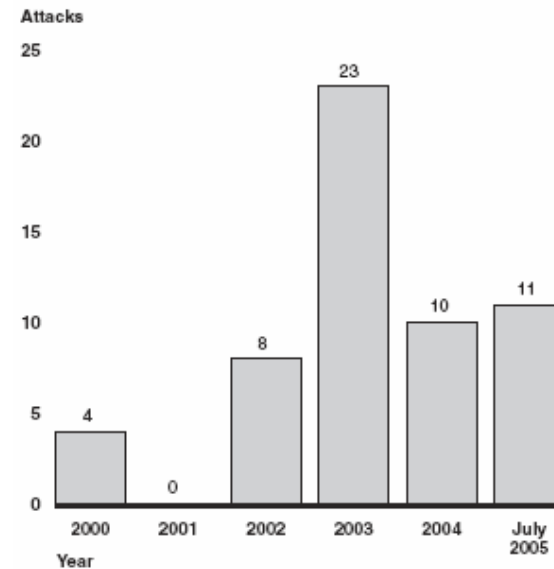
■ Observations ...

- Pipelines are easy prey ...
- ... target substitution is also easy ...

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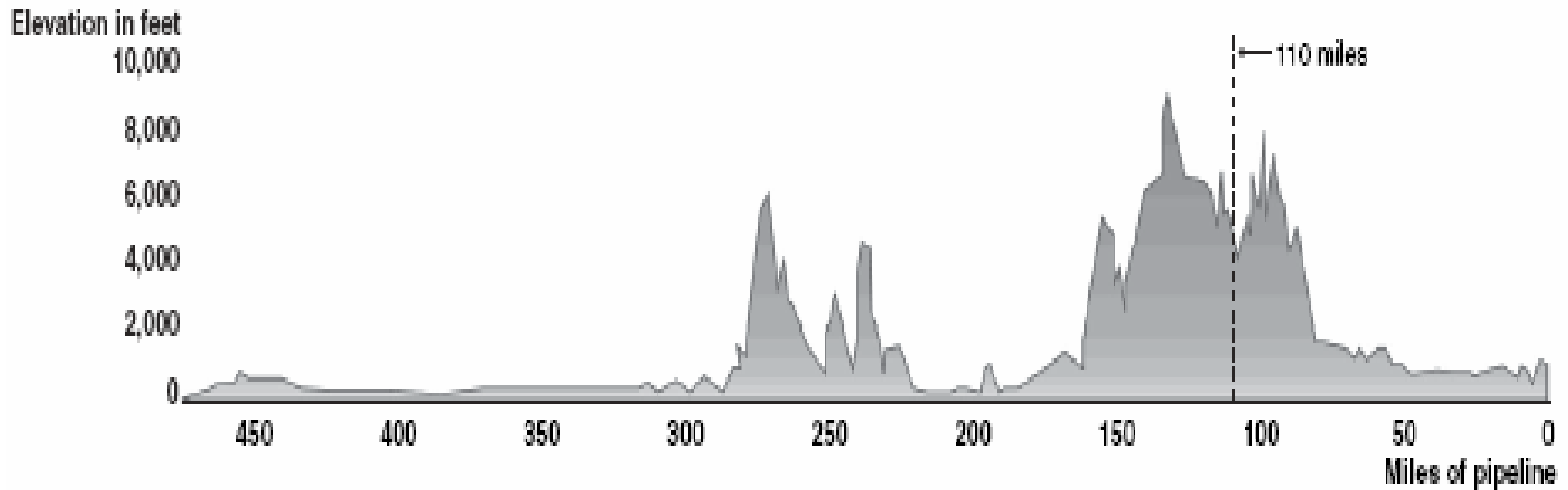


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 - ... as is substitution of target location



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- Observations ...
 - Pipelines are easy prey ...
 - ... target substitution is also easy ...
 - ... as is substitution of target location
- Counter-strategy ...
 - Minimize “effective mileage of exposure”
 - Enlarge the “optimization set”
 - Multiply attack points
 - Convert local populations into allies, not enemies
 - Contrast Iraq-Iran; Nigeria-Angola; Colombia-Venezuela