Risk Assessment Work Group Report – UKOPA/03/0073

1 Met June 26 to consider approach at 9 July meeting of WGP, and ongoing work programme

2 Met Sept 10 along with FDMG

Meanwhile

- Risk Assessment Group View is to continue with planned programme of development work for Risk Assessment methodology, and where helpful to move the process

- Publish findings and results for Land Use Planning Zones through WGP route
- Taking each of the 6 planned areas for development:-

Main Influencing Route

- **P5 group – consistent evaluation of existing methodologies**

"fitness for purpose"

- **due to meet soon**
- **Has 6 members, Dave Carter Andy Rushton, + MSDU topic specialist + Ian Lines + RAMcC (for pipelines)**
- **Program due out by end of September (Richard Thomas, Policy Group is organising)**

- **Ongoing work programme for methodology developments:-**

1 Failure Rate Contribution from Ground Movement

1 Complete joint study with British Geological Survey — **Done**

2 Obtain areas / location where risk of Ground Movement exists — **Done**

3 Transpose to map of Transco's gas Network — **Done**

4 Define which systems are affected by possible Ground Movement

5 Assess whether revision to LUPZ HSE advice to Local Areas is worthwhile
- likelihood of pipeline failure – change to risk levels

YES

6 Re-assess LUPZs for pipelines not affected by Ground Movement

~~7 Re-issue reduced LUPZs to Local Area Offices~~

PUBLISH Results?

NO

8 Pass listing of areas ~~and~~ pipelines ~~affected~~ by Ground ~~Movement~~ to HSE

PUBLISH Results?

2 Third Party Damage Predictive Model

1 Advantica are revising their proposal to review and update Limit State model for fracture mechanics £40k

2 Advantica/ UKOPA to **PUBLISH** new modelling approach

3 New Computer coding to solve equations and provide Predictive Failure Rates for Pipelines
(Note HSE Gasoline model has option to use Predictive Data)

4 More up-to-date Predictive Model available to UKOPA

5 Publish revised LUPZs based on updated modelling if required

3 Mitigation – Risk Reduction Factors for Physical Protection of Pipelines.

1 Fault Tree assessment of 3rd party damage to derive risk reduction factors for slabbing over pipelines

2 Publish deliverable - Fault Tree report on Risk Reduction Factors (RRF)

HSE Contract Research Report CRR 372/2001 by W S Atkins

Table 32
Type of machinery causing damage to pipelines

Type of Machine	Number of damage incidents	Number of pipeline failures
Back Acter	165	3
Bull Dozer Blade	4	2
Digger	137	6
Dragline	4	-
Drain Layer	9	1
None	7	-
Other	60	4
Plough	11	3
Power Drill	21	9
Scraper	4	1
Spike	6	-
Tracks	6	1
Trencher	10	2
Unknown	110	0
Total	564	32

Basis of Fault Tree Analysis

Probability back-acter causes pipeline failure = 1.8%

digger ..... = 4.4%
plough ..... = 27.3%
Power drill ..... = 42.9%

Probability back-acter would stop with marker tape and slabbing over pipeline = 0.03
So probability of pipeline failure reduces to 0.05%

Probability Power drill would stop with marker tape and slabbing over pipeline = 0.3
So probability of pipeline failure reduces to 12.8%

Taking whole population in proportion slabbing + marker tape reduces probability of pipeline failure by 89.7%

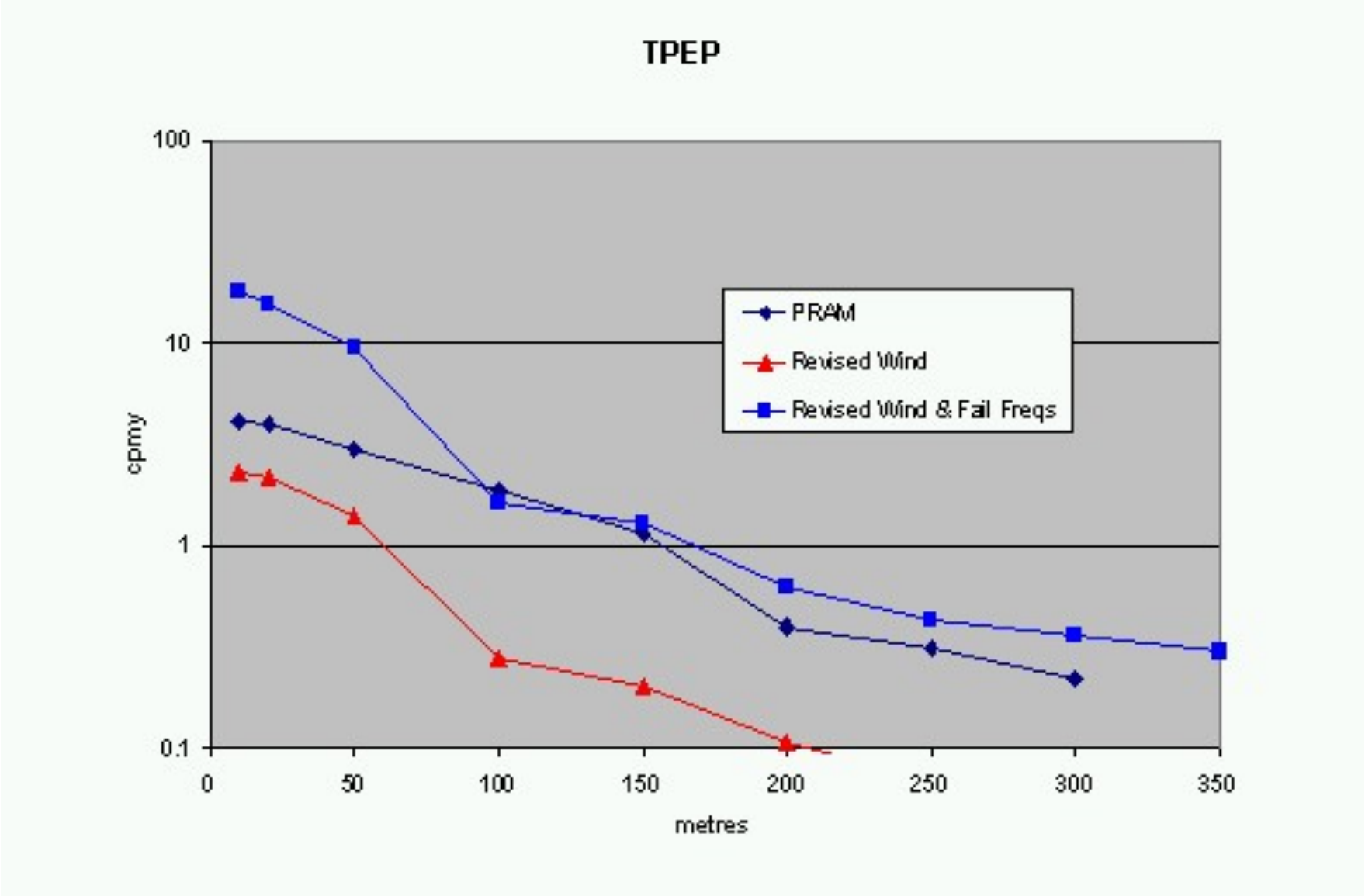
4 Ethylene Pipelines – Revision of LUPZs.

1 Review statistical analysis of Jane Haswell's report on UKOPA Pipeline Fault Database – Application to all pipelines

2 Extend work covered on TPEP using replicated HSE consequence models to cover generalised ethylene pipelines in the UK – re-calculate LUPZs

3 Produce report on revised LUPZs,

4 Consider PUBLISHING revised LUPZs through WGP?


TPEP
100
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metres
PRAM
Revised Wind
Revised Wind & Fail Freqs

5 Spiked Crude Pipelines – Revision of LUPZs

1 Collect data, QRAs and background information on LUPZ re-assessment work carried out so far (BP)

2 Re-assess LUP zones based on up-to-date risk assessment methodology, UKOPA pipeline failure data and replicate MISHAP-type models

3 Produce report on revised LUPZs

– consider publication

6 Gasoline Pipelines – Risk Assessment Approach for LUPZs.

1 **Gather together and consider previous risk assessments carried out by A.D. Little, W.S. Atkins, TNO and any others**

Done

2 **Assess the reports to assess the sensitivities of the QRAs to key assumptions, and therefore whether using a simple flat-earth model is a grossly pessimistic approach for setting Land Use Planning zones in the UK, and to provide a logical series of arguments leading to a clear conclusion**

4 **Discuss conclusion with HSE to define LUPZ philosophy for gasoline pipelines (25 November)**

Bellingham,
Washington State
USA
10 June 1999
Olympic Pipeline Co

Figure 11. Inside view of ruptured pipe section.

Figure 1. Postaccident aerial view of portion of Whatcom Creek showing fire damage.