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2003

Applying a Risk Based Approach

A Users View

Safety Instrumented Systems &
IEC 61511 - So What's New?

Overview of Site

World scale chemical manufacturing plant

Based on the Humber bank with three main operating areas

Until late 90's traditional plants with associated local control rooms and disparate DCS, ESD's

Flat management structure with mainly plant based engineers

Late 90's: project to centralise control rooms and provide Common DCS and ESD platforms

Overview of Site

Top Tier COMAH Site

Corporate Policy

Corporate Standards

Site Policy & Standards

Plant Standards

Overview of Corporate Policy and Standards

Process Safety Goal and HSE Commitment:-

No harm to people
No harm to environment
No accidents

Overview of Corporate Policy and Standards

Major Accident Risk Criteria

Determines Tolerable Risk Criteria / Graph

The intolerable limit line is set in relation to the value of an operation to society

Below the intolerable line is an area of Continuous Risk Reduction

Refers to Life Cycle

Overview of Corporate Policy and Standards

The area of CRR requires process of Continuous Improvement whilst:-

Recognising that resources are not infinite

Using Cost Benefit Analysis, demonstrate – ALARP

Overview of Corporate Policy and Standards

Suite of Technical Guidance for Practice standards generated

Related to 61511

- **Management of Safety Lifecycle**
- **Development of Process requirements**
- **Design & Engineering of Logic Solvers**
- **Implementation of Process requirements**
- **Operation & Maintenance**

Overview of Corporate Policy and Standards

Site Standing Orders and Guidelines refer to the Standard

Local Plant Procedures and Guidelines refer to site and corporate standards:-

- **Works Inspection Practice**
- **I/E Standing Orders**
- **Test Procedures**
- **Competency for Engineers / Technicians**
- **License system for technicians based on: experience, assessed training and practice**
- **IEE / BCS for engineers**

So – that’s all there is to it !!

Well, actually ……..

Corporate standards – nice fit and feel for new installations

What about legacy systems and retrofits – ALARP

Life Cycle Issues

Historical data retrieval

Original design criteria

Well, actually ……..

Review Lifecycle with emphasis on what is applicable and Practical for present day –

- **Expect to see more evidence of O&M and Competency than initial design**
- **GAP analysis to standards to derive continuous improvement strategy**
- **IL & Interval Calculators to provide consistent and efficient assessment**
- **IL jump calculator to demonstrate cost benefit analysis**

Well, actually ……..

Corporate standards – nice fit and feel to Company and HSE Policy

What about site and plant guidelines and standards

Lots of them

Well known and understood

Common sense and locally specific

Well, actually ……..

Review existing standards and map across to 61511

- **Often higher level document missing!**
  - **Management plan**
  - **Roles and responsibilities**
  - **Not the “Hows”**
- **Consider third party audit**

Well, actually ……..

Challenging Areas

Competency

Effort required not to be underestimated
Practice (Recency Criteria)
Use of simulators
Technician refresher training before testing
Third Party Engineers - Assessment

Well, actually ……..

Challenging Areas

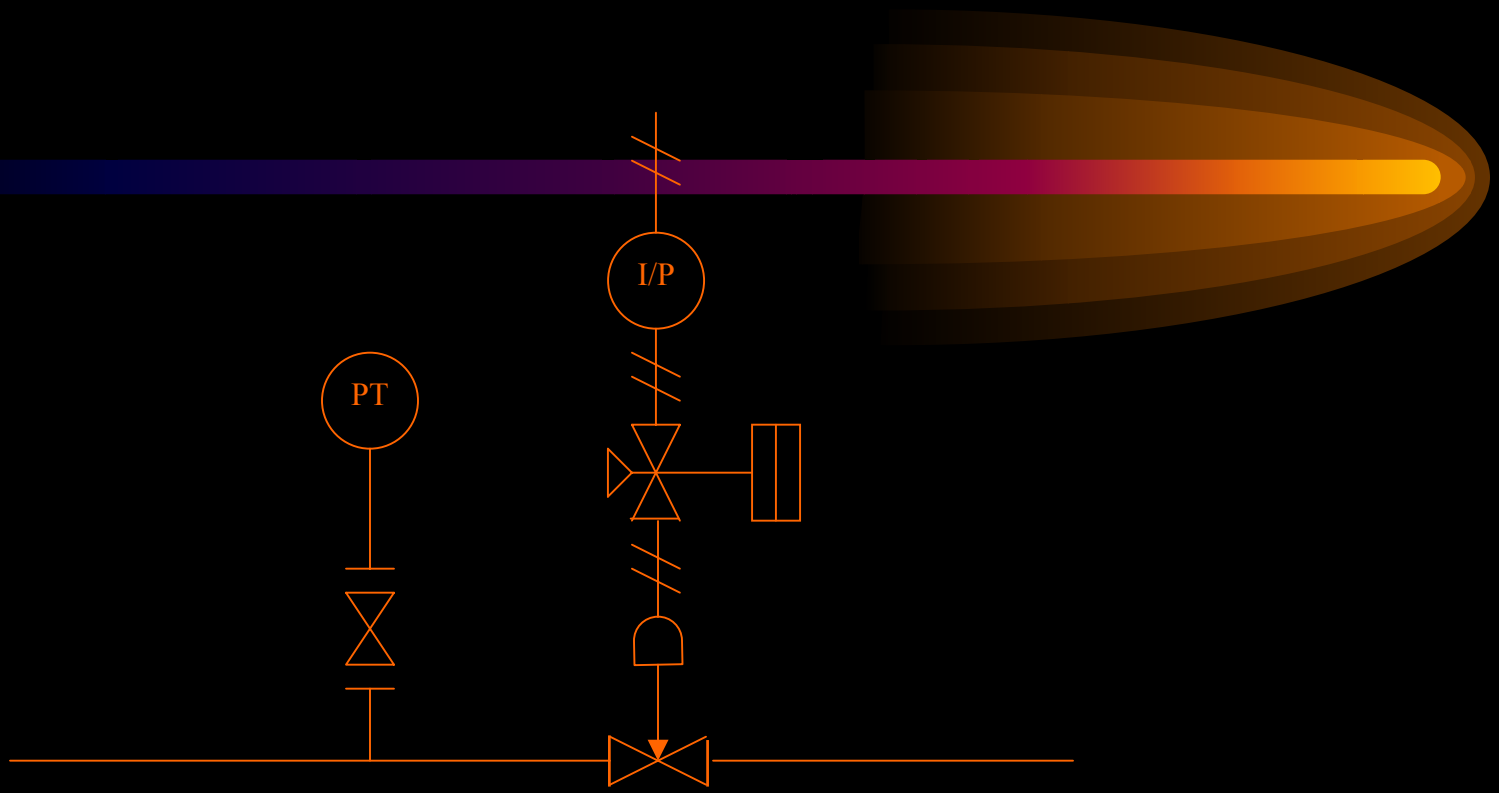
- **Man Machine Interface**
  - **Care and attention required so as not create demands on SIS via Operator**
  - **Design & Testing effort not to be underestimated**
- **Failure Data**
  - **Local collection relatively easy**
  - **Corporate collection and analysis more difficult**
- **Validation and economy to be gained from data analysis**

Well, actually ……..

Specific Help facilities

- **IL Jump Calculator**
- **TRAC (IL and Test Interval calculator)**
- **IEE / BCS Competency Guide**
- **Principles of proof testing for SIS in the Chemical Industry (ABB for HSE)**

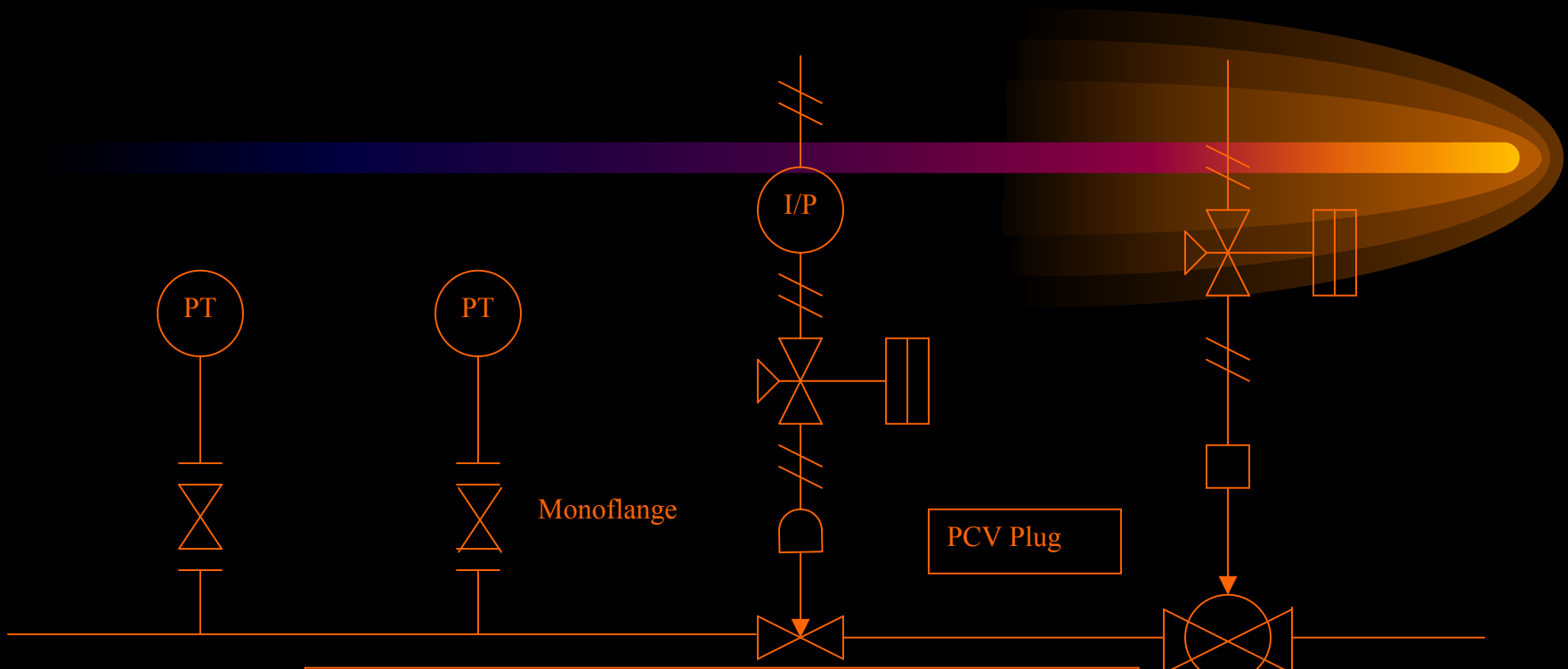
SIL 1 EXISTING BASE CASE



SIL 1 EXISTING BASE CASE

2” STAINLESS CLASS 600

SIL 2 (1002 VOTING)



SIL 2 (1002 VOTING)
2” Stainless Class 600

Options
14” + 6” sizes
2Carbon (2”, 4” 6”)
3) Hastelloy (2”, 4”, 6”)

SIL Jump Costs

SIL Jump Costing
SIL 1 to SIL 2 Situation
1002 Instrument Installation
2” Stainless Valve

	Qty	Unit	Total Cost - £ Indirect	Direct
Instruments	1	sum		£10,300
Mechanical	1	sum		£ 8,900
Scaffold Access				
30 mtrs @ £50/mtr	1	sum		£ 1,500
Crane Hire	1	sum		£ 0
Direct Cost				£20,700
Maintenance / Lifecycle costs	1	sum	£12,000	
Engineering/Design/Mgmt	1	sum	£ 9,300	
Indirect Cost			£21,300	
Total Cost	2” Stainless			£42,000

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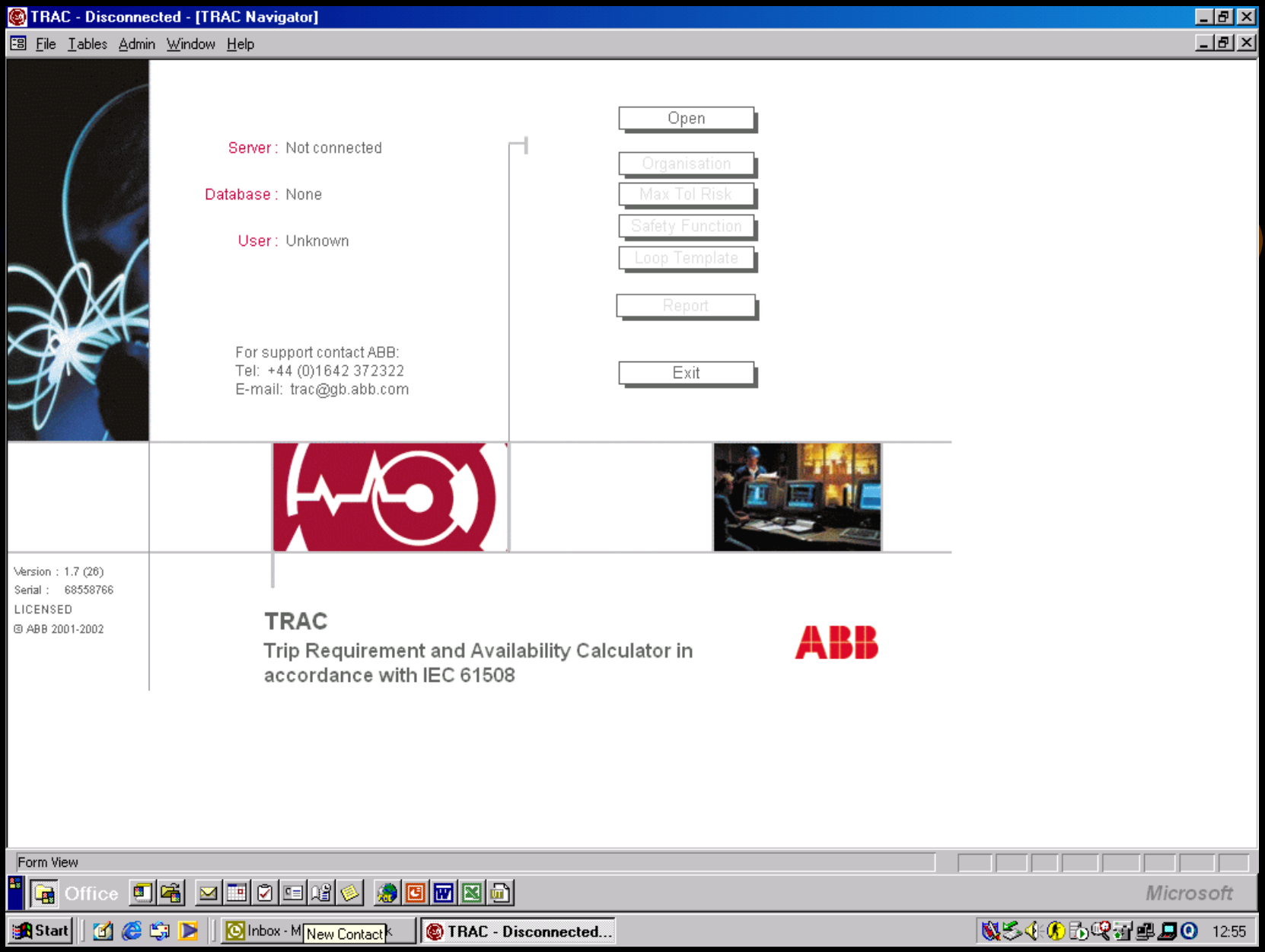

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CONCLUSION

Risk based approach tailors equipment to the need of the application

Providing significant safety and economic benefits

Demands more:

- Management
- Competency
- Planning
- Technical Judgement

For all lifecycle phases

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THANK YOU