

LAST FIRE

Large Atmospheric Storage Tank Fires

**Developing best practice guidance in storage tank
Fire Hazard Management**



An industry consortium of international oil companies reviewing the hazards and risks associated with storage tank fires



Steering Panel
Meeting
Budapest, November
2015



LASTFIRE

Large Atmospheric Storage Tank Fires



الرامكو السعودية
Saudi Aramco



Thank you!

NESTE OIL



PETRONAS



Firefighting Foam

Do we have a crisis?



Firefighting Foam

Scene setting for next presentations



Increasing environmental concerns
Increasing environmental controls





Environment
Agency

Fire-fighting foam in the River Wandle

You may see foam collecting on the surface of the river. This is following a fire at a tyre processing site on Purley Way on Thursday 22 September.

We are monitoring the river and working with the London Fire Brigade to reduce any potential environmental impacts.

If you notice fish or other wildlife in distress please contact our 24 hour incident hotline on 0800 80 70 60.

www.environment-agency.gov.uk/news

Certainly more awareness

PUBLISHED: September 12, 2009 2:30 pm

Airport fire foam pollution has reached the reservoir

Certainly a lot of concern!

Give Feedback

Enter your search criteria

Home

Health and Wellbeing

Your Health and the Environment

Monitoring and Sampling

PFOS In Drinking Water

PFOS In Drinking Water

Trace levels of a chemical known as PFOS in drinking water, as a result of historic use, are present in the water supplies. The concentrations present are below the levels where supplies remain safe to drink. The source of the chemical is being investigated.

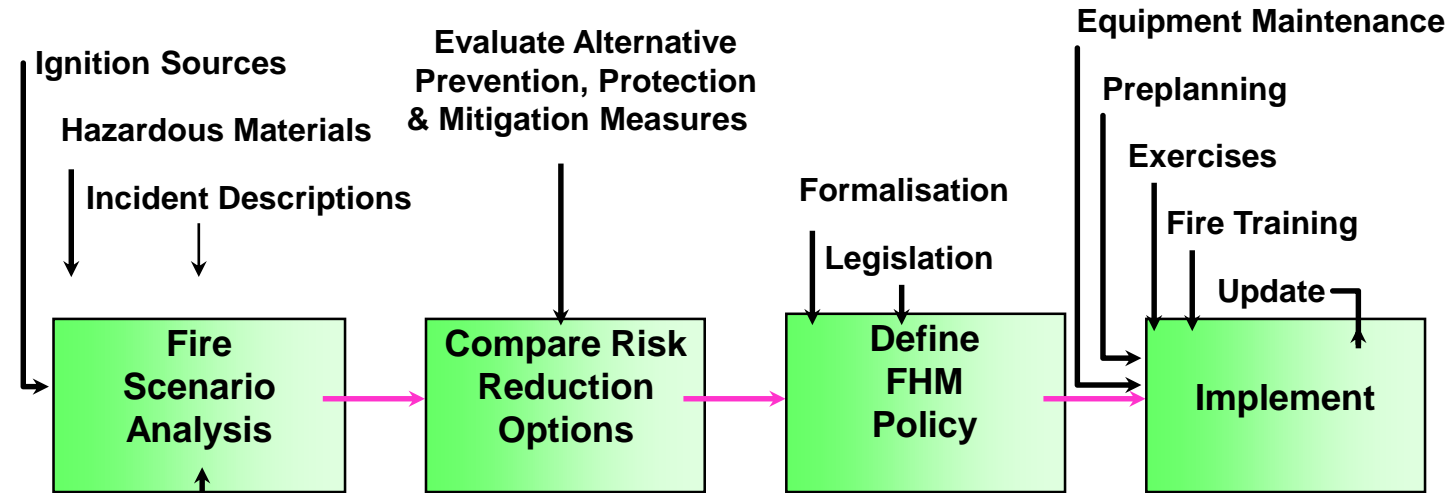
An independent expert review has been carried out to assess the health risk. This review was carried out by the Centre for Public Health England.

PUBLISHED: September 17, 2009 2:30 pm

Deadly fire foam in the reservoir: inquiry begins

The States watchdog has launched an investigation into the pollution of Guernsey's water by toxic airport firefighting foam.

FIRE AND EXPLOSION HAZARD MANAGEMENT



CONSEQUENCES

- Life Safety
- Environment
- Business Interruption
- Asset Value
- Other Issues

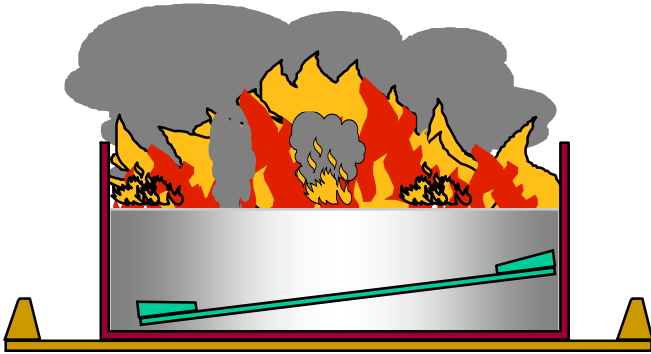


Always been a factor

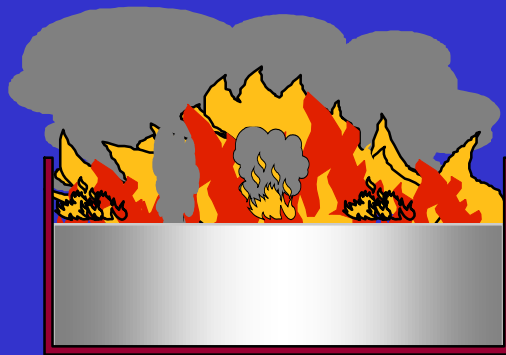
Is it a new concern?

Back to basics!

Tank Fire Response Options



**Do you
want to put
it out?**



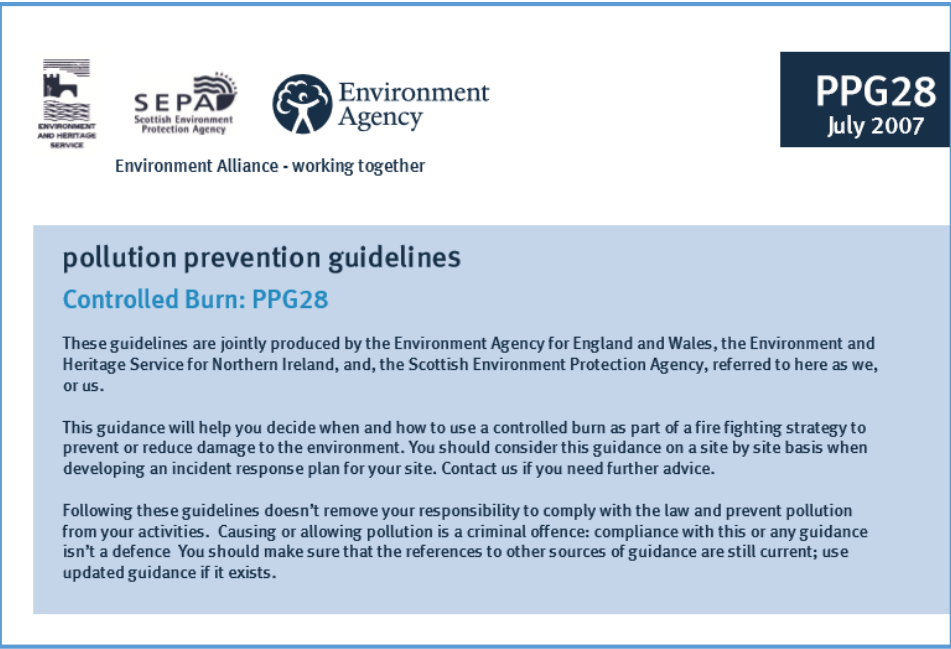
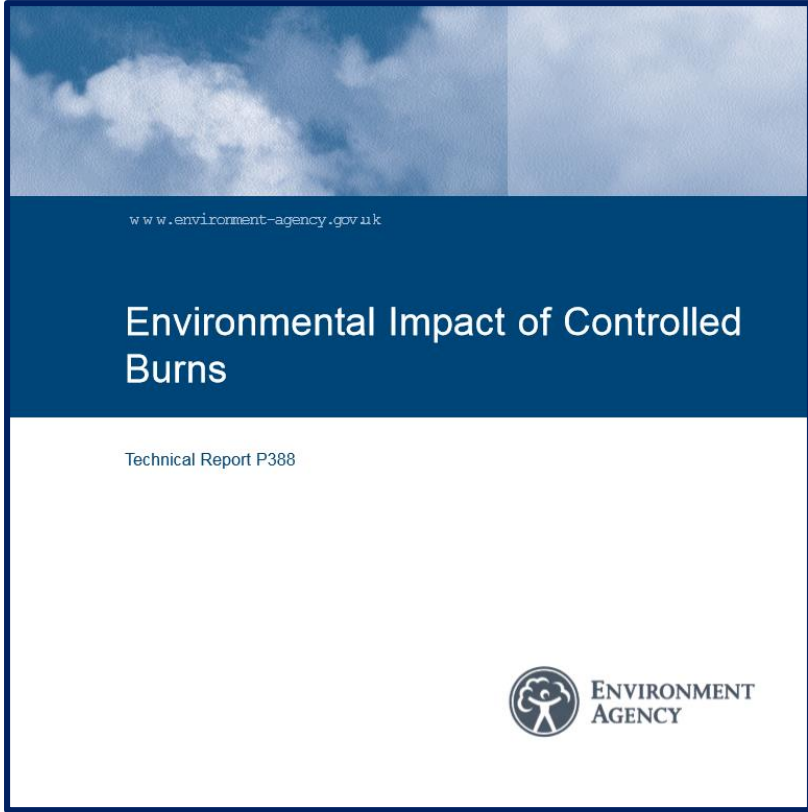
Pump-out and Controlled Burndown

Tank at full height



Burn out!





Smoke?
Incident duration?
Asset loss?
Public image?

Environmental effects Always a balance!

Both have an
environmental
consequence



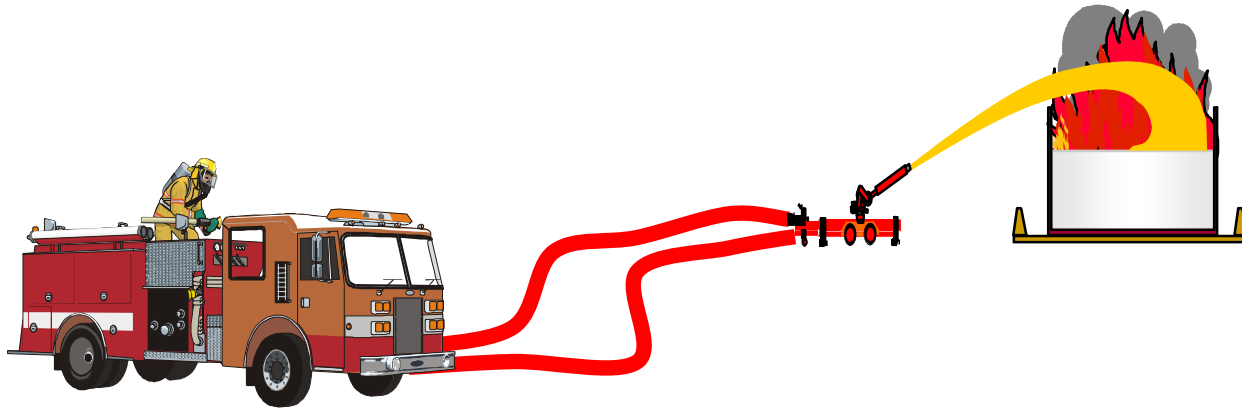
Let it burn



And other
consequences of
course!



Firewater run off



Normally you want to extinguish!!

How do you minimise environmental damage?

Contain everything on site

Often not possible

Minimise usage

Most efficient extinguishing

Minimise effects

Least damaging

**Ideally the same
foam**

**But not the case
yet!**

Getting closer!

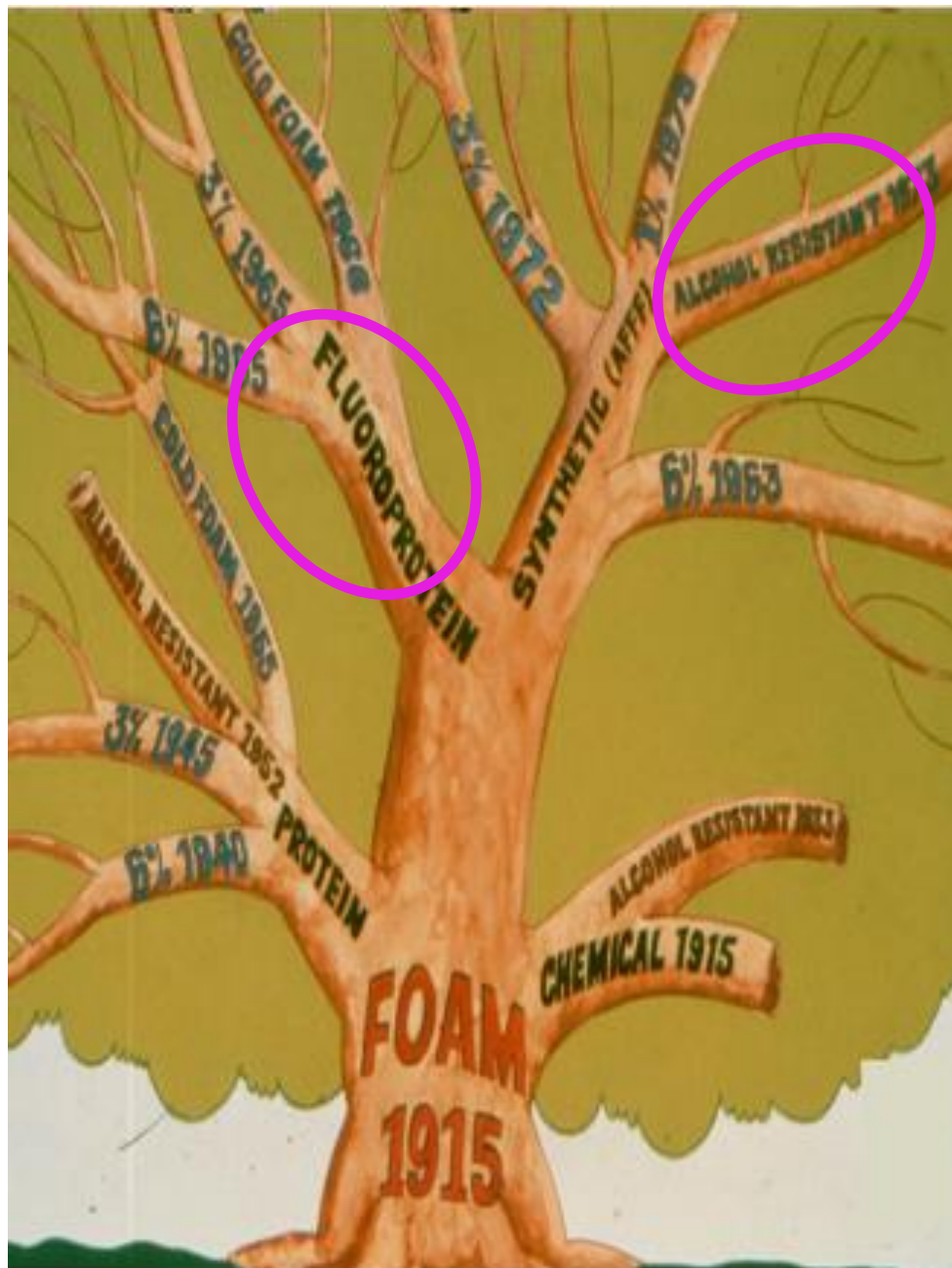
**And not the end of
the story!**

The foam with zero environmental effect does not exist



Some “poetic licence”

There will always be other contaminants too!



**Current situation?
A history of development
Well proven foams**

**An old picture
~ 1980!**

**Fluorosurfactants 1960s
AR AFFF 1970s
Well established technology**



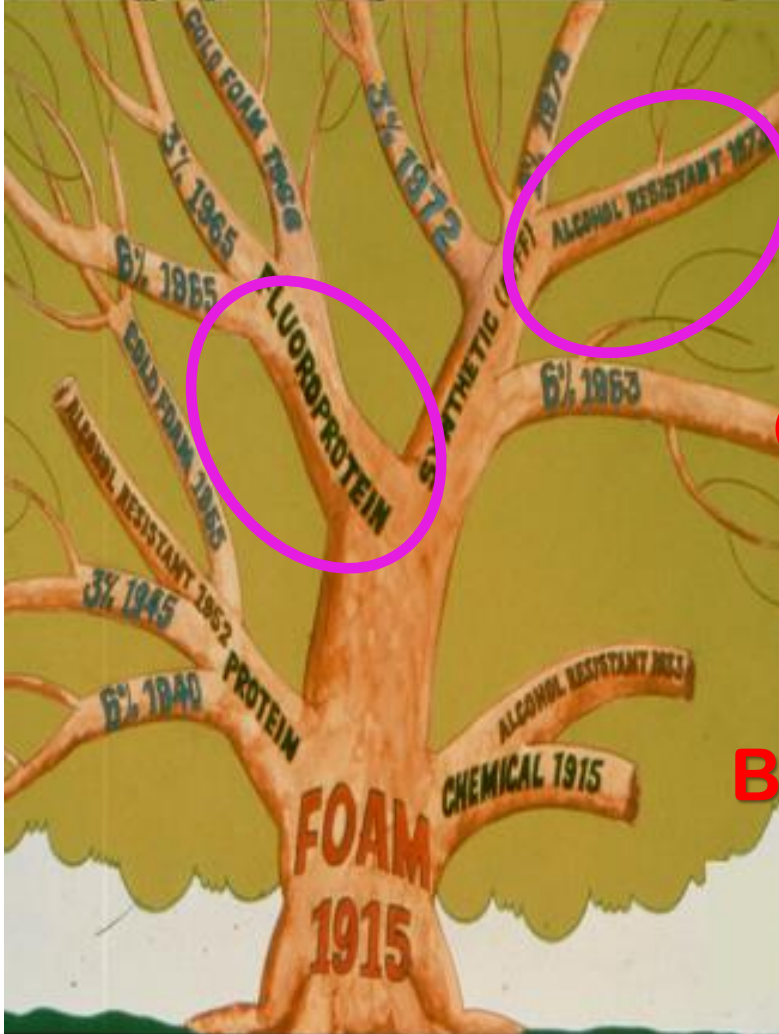
It works!



Sarnia

Orion





Expertise
Optimised Formulations
Physical Properties
Proven Performance
Experience
Built up over a long period

What do we need to know if we have to change?

FF or C6 or anything else!

**We need to get the same information and
experience**

Back to basics again!

**What is the most important requirement for foam?
Will it extinguish the fire?**

The ideal fire test!



**Tends to be
expensive!**



**Have to be realistic and bring the
test down to a workable size!**

BUT!!!!

**Must be relevant to scenario
Must differentiate
Must include safety factors**

Choosing a Fire Test

- **Fire Test Basic Requirements**
 - **Relevant Fire Type / Conditions**
 - **Critical Application Rate**
 - **Relevant Application Technique**



An example Foam Fire Test For Storage Tank Fires



Large freeboard

2.44m Diameter
Fire Test Pan

Test Sequence

Preburn

Extinguishment

Vapour Seal

Burnback

30 - END

0

3

10

12

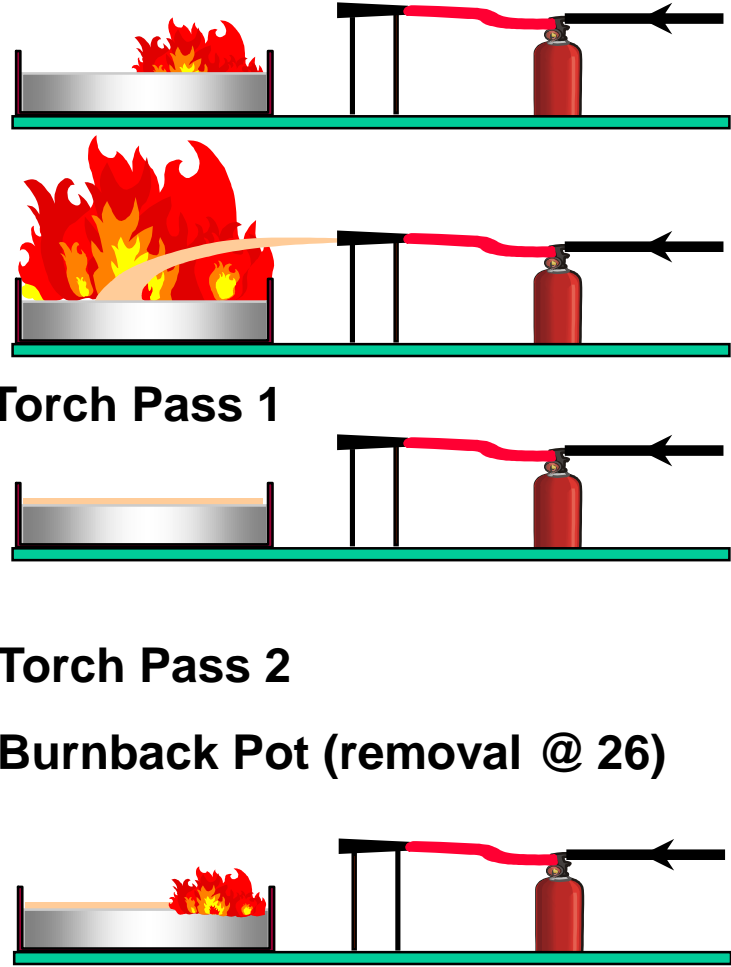
23

25

- Torch Pass 1

- Torch Pass 2

- Burnback Pot (removal @ 26)





We are seeing differences in performance!!

Still appropriate if application techniques, devices and rates remain the same



Not the end of the story!

Other issues

Physical Properties

Proportioning rates

Stability

Materials compatibility

Full environmental effect details

Disposal

**All of this applies to some extent
whatever the foam change – FF
or C6 or other!**

**Does it provide
similar foam quality
with site
equipment?
Expansion and
Drainage Time?**



**We have been through the
problems before**



**Will the
foam
proportion
correctly?**



High Viscous Foam - connected IBC's
8x accelerated movie

We have been through the problems before



Will the foam concentrate be stable?

Will it degrade?

Accelerated ageing?

We have been through the problems before



Storage material, pipework, valve seats, etc

**We have been through the
problems before**



**Health and
Environmental
Effects Data
CERTIFIED**

**It takes time
It is expensive**

**We have been through the
problems before**



Long term availability?

Future additional restrictions?

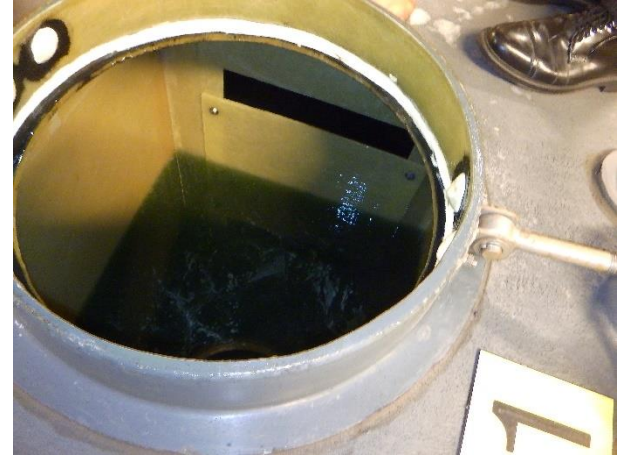
We have been through the problems before

If you have to change

Procedures

Criticality of cleaning

Disposal of old foam?



**We probably have to change
Even with Fluorosurfactant foams
with lower C chain**

**An opportunity
Cradle to Grave Approach
Not just actual use**

Training

Testing

Containment

Disposal



**Developing an
Assurance
Protocol**

Firefighting Foam

Do we have a crisis?

No crisis but a crossroads

And an opportunity and challenge!!

Get it right for the long term

So look on the bright side!



Firefighting Foam

is a crisis?

**No crisis?
And
So look**

**Thank
you!**

