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An end user's perspective of the implementation of Queensland Foam Policy.

Foam Summit – Budapest - *October 2017*

Rod Rutledge
National Process Safety & Regulatory Advisor
Caltex Australia Petroleum Pty Ltd

Caltex Infrastructure Footprint in Australia

(Non-Retail) Fuel Infrastructure Network

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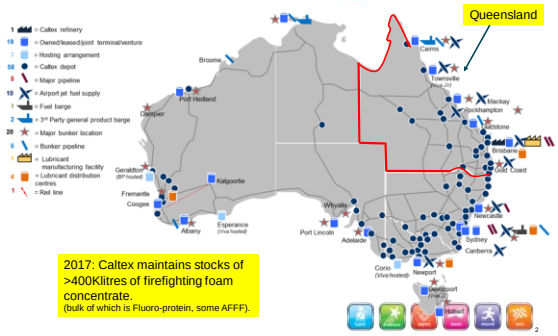

2017: Caltex maintains stocks of >400Klitres of firefighting foam concentrate.
(bulk of which is Fluoro-protein, some AFFF).

Qld Foam Policy- Timeline relevant to the Foam User

October 2013	May 2014	November 2014 – February 2015	May 2015 – June 2016	July 2016
Initial Draft Qld Policy Issued for Consultation	Various Industry Roundtables Debate Policy Justification & Raise Implementation Concerns	Revised Draft Policy Issued for Consultation	Industry focus shifts to 'Challenges' rather than 'Barriers'.	Industry Response to Issued Policy.
• Qld Gov't had developed draft policy over preceding 2 years. • Initial review provides feedback to Government on matters relevant to the industry including the balance of life safety vs environmental harm. • For many in the industry this was a discovery phase.	• Roundtables with representatives from foam producers, oil industry, environmental consultancies, industry groups. • Industry raises concerns on the basis of absence of performance data for fluorine free & C6 foams for tank fires. • Life Safety vs Environmental Performance • Conflicting science seems to abound.	• Industry Groups (AIP, FPA) now fully engaged. • Industry raises concern with the significant 'unknowns' and the potential for substantial cost impacts not commensurate with the future risk.	• Industry broadly accepts 'need for change'. • Industry monitors closely but does not participate in the Science led debate on environmental harm. • Suitability of replacement foams, cost of implementation and implementation timeframe are seen as key challenges.	• Escalating media coverage of legacy contamination at Defence sites. • Qld Gov't issues policy. • 3 year transition period • Option of transition to C6 purity with 100% containment or fluorine free. • Industry implements Interim Risk Management Plans to Contain/Collect/Store/Dispose. • 'Change-out Cost' and potential for 'Regret Spend' are key uncertainties.

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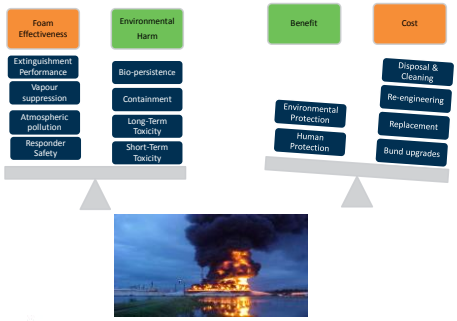
How did Operators and the fire protection industry initially respond to draft Qld Foam Policy?



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Numerous Stakeholders

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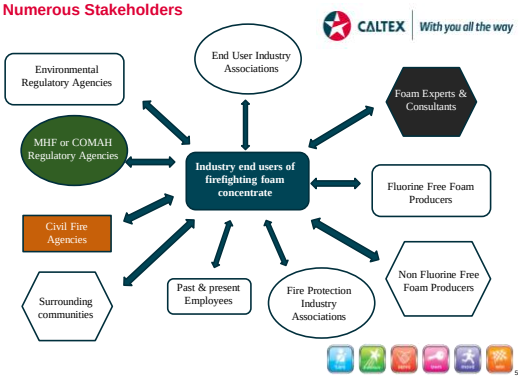

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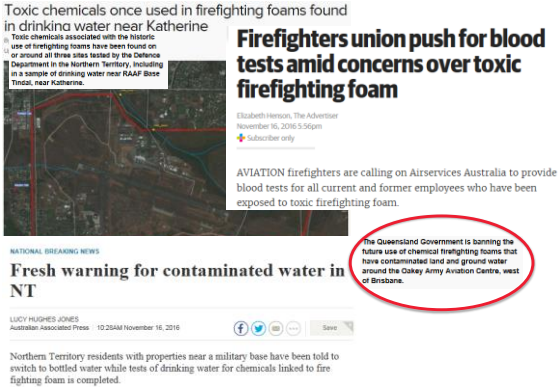
A background of escalating community health concern.



Toxic chemicals once used in firefighting foams found in drinking water near Katherine

Toxic chemicals associated with the historic use of firefighting foams have been found on or around all three sites tested by the Defence Department in the Northern Territory, including in a sample of drinking water near RAAF Base Tindal, near Katherine.

Firefighters union push for blood tests amid concerns over toxic firefighting foam

Elizabeth Henson, The Advertiser
November 16, 2016 5:56pm
Subscriber only

AVIATION firefighters are calling on Airservices Australia to provide blood tests for all current and former employees who have been exposed to toxic firefighting foam.

The Queensland Government is banning the future use of chemical firefighting foams that have contaminated land and ground water around the Oakey Army Aviation Centre, west of Brisbane.

NATIONAL BREAKING NEWS

Fresh warning for contaminated water in NT

LUCY HUGHES JONES
Australian Associated Press 10:28AM November 16, 2016

Northern Territory residents with properties near a military base have been told to switch to bottled water while tests of drinking water for chemicals linked to fire fighting foam is completed.

Social Expectation - Why Caltex saw that it needed to action this?

Caltex currently maintains over 400kL of firefighting foams containing PFAS across its network of refinery, terminals and depots (including >150kL+ in Qld)

Continued use of non-compliant foams
Caltex could face regulatory action arising from specific foam policy in Qld and general policy provisions in other states.

Concern around impact on the environment
PFAS chemicals do not degrade in the natural environment and accumulate in the food chain

Potential harm to human health
Still being investigated, but concern around people being exposed to contaminated water or food. "Precautionary Principle".

Brand & reputational damage

While expectations around legislation are being finalised, we need to minimise or eliminate the use of firefighting foams containing PFAS

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2016 Queensland Foam Policy – Requirements on Operators.

1. A disposal plan for non-compliant waste fluorinated foam concentrate containing >10mg/kg PFOS and >50mg/kg PFOA, PFOA precursors and their higher homologues must be drawn up as soon as is possible but nonetheless within 6 months (i.e. by 8th Jan 2017)
2. Non-compliant waste fluorinated foam concentrate must be disposed of to an approved facility.
3. Non-compliant foams must not be used in training, maintenance, testing or other activities that may result in their release to the environment on or off the user's site.
4. Foam containing short-chain fluorotelomers (C6 or shorter perfluorinated moieties) can be used if it is found to be the only viable option, and subject to a range of conditions including the requirement to fully contain any foams used.
5. Full compliance with the QLD Policy is required within 3 years or unless a separate transition plan is approved by the Regulator.

Hydrocarbon Refineries and Large Storage Facilities–Key Issues:
• Large refineries and fuel storage facilities are acknowledged as having a range of circumstances that could affect transition to best practice in a timely manner. **Provisions exist to consider customised extended timeframes, milestones and interim measures for upgrading facilities to meet best practice.**

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How did Caltex respond to issued Qld Foam Policy?

Caltex Foam Task Force ⟷ Monitor ⟷ PFAS Science

Interim Risk Management Plan
Immediate action to improve/validate management controls for existing non-compliant foam stocks.

Legacy contamination work stream

- Review & identification of historical use of firefighting foams at Caltex sites.
- Determine sampling/test protocols and assessment criteria.
- Sampling & testing for legacy contamination
- Working with potential remediation & disposal technology providers including pilot activities.
- Community engagement
- Reported in media that Defence >$100m thusfar and have treatment plants that have treated >900ML of contaminated groundwater.

Preparation for a well informed transition of operational foam stocks

- **Contain/Collect/Store/Dispose of non-compliant concentrates & solutions.**
- Determine compliance of existing Caltex foam inventory
- Strategy for performance pre-requisites to be met prior to modifying foam to either C6 Purity or Fluorine Free.
- Investigate cost-efficient disposal options
- Determine scope of potential foam change-out activities and/or containment upgrades.

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Step 1. Interim risk management plan for existing foam stocks.

Project personnel

Procurement of firefighting foam for new systems
Should include review & recommendations by the Caltex Foam Task Force (C6 Purity vs Fluorine Free) dependent upon risk considerations.
Commissioning of new foam extinguishment equipment
To include a detailed plan for containment, collection and disposal of generated foam solutions. Novel solutions (eg containerised foam pourer commissioning).

Maintenance personnel

Maintenance
- Eliminate / minimise testing with PFAS foams.
- Seek alternate means (eg RCMII). Where testing unavoidable include a detailed plan for containment, collection and disposal.
- Extensions to test intervals should be documented in the form of a Change approval.
- End of life concentrate stored appropriately pending disposal

Operations personnel

Training
All training using foams containing PFAS halted. Selective use of training foams.
Caltex's incident response priorities are unchanged.
Operations personnel instructed to continue to respond as per existing pre-incident plans. Work with emergency services to contain and minimise contamination of waterways and soil should an incident occur.
Mindset Change - Respect and treat firefighting foam as a hazardous chemical
Consult the SDS prior to use, comply with PPE requirements, and if unsure seek assistance from Foam Taskforce.

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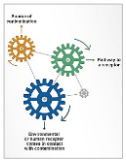
Step 2a) : Profiling legacy contamination.

"Where investigation of a site suspected of being contaminated finds significant concentrations of fluorinated organic compounds in soils such that there is the potential to cause pollution or environmental harm a detailed site investigation should be carried out in accordance with the guidance in the *National Environment Protection (Assessment of Site Contamination) Measure* to determine the nature and extent of the contamination".

Source:
- Cause of contamination (i.e. contaminants from historical use of firefighting foams)

Pathway:
- Soil
- Groundwater
- Surface water
- Sediment

Receptors:
- People
- Environment



Exposure:
- e.g. will people come into contact with contaminants and how (i.e. drinking water, recreational, etc.)

Risk:
- Are the contaminant concentrations higher than established guidelines

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Step 2b) : Analysis and Reporting.

Establish sampling methods & screening criteria.

Analyse results & assess risk.

Develop Legacy PFAS Management Plan for specific sites

Engagement strategy for surrounding communities

Investigation / piloting of soil & groundwater remediation & disposal technologies.

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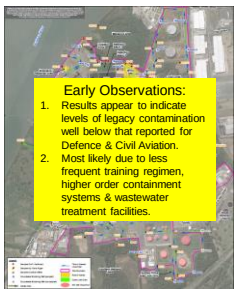
Step 2b) : Analysis and Reporting.



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Step 3: Preparation for a well informed Change-out of Operational Foam Stocks to comply with Policy (C6 Purity vs F3).

1. **Management of current foam concentrate stocks (PFAS Stewardship Program);**
   - Validate interim risk management plan is effectively implemented in the field
   - Routine communication bulletins issued to update & maintain sense of vulnerability.
   - Improvements in containment undertaken (eg portable bunding, UV protection, undercover storage)
2. **Scoping of change-out activities;**
   - Inspections to confirm inventories, label foam containers, sample & determine compliance.
   - Inspections to scope potential future change-out activities (clean-out vs swap-out).
   - Inspections to assess full containment capability.
3. **Assessment of alternate foam products;**
   - Caltex joined LastFire in 2016 to formalise access to objective foam test data.
   - We have also established the capability to perform our own testing.
   - We determined 3 criteria to be met for change-out;
     i. Batch certification for compliance to C6 Purity or Fluorine Free
     ii. Performance certification relevant to intended use (eg LastFire)
     iii. Fire chief satisfied with operability in Caltex equipment
4. **Obtaining access to an approved disposal technology for non-compliant foam concentrates & clean-out solutions.**
   - Thermal destruction & treatment options being made available
   - High cost- >$2000 per tonne ($2-3 per litre).
   - Additional costs of waste transportation and packaging disposal

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Industry end users – current challenges..

1. **Determining suitable replacement foam;**
   - Relevancy of performance criteria to fire scenarios in our industry (UL, EN, LastFire)
   - Limited access to experiential data for 'real' scale incidents using C6 or F3 foams.
2. **Re-engineering costs for higher viscosity foam concentrates;**
   - 'Pseudo plastic' F3 foam products and whether conventional proportioning methods will work
   - High cost of re-engineering some systems where static proportioning is untenable for F3.
3. **Optimising the costs of cleaning & disposal;**
   - Cleaning rigour required to remove active agents from fixed storage assets and appliances
   - Availability & high cost of approved disposal technologies for foam solutions
4. **Additional cost burden to meet full containment for a C6 Purity option;**
   - What is a reasonable standard of engineering for retrofit of full containment?
5. **Potential for a significant 'Regret' spend;**
   - Potential for emergence of suitable performing / fluorine free foam products following substantial investment in implementing a C6 purity option (foam change out, containment upgrades)
   - Potential for emergence of new knowledge of C6 foam bio-persistence >> untenable or at most a medium term option only.
   - Need to be assured that even F3 foams have no bio-persistent 'other' compounds

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Current Position…..Hold

1. "HOLD" on decision to transition to Fluorine Free vs C6 Purity foam.
2. Two key questions we continue to ask;
   i. How close are we to a F3 foam suitable for tank fire extinguishment?
   ii. How confident are we that C6 foam will remain a viable non bio-persistent option?
3. Current 'Last Fire' research program will inform question i.
4. Continuing to monitor the science will inform question ii.
5. Continue to develop our Risk & Cost models to provide visibility to decision making data.
6. Regular communication with Government of status of progress on resolution of each of the 'challenges'.

"The Policy recognises that such facilities will need time to design, budget for and implement the necessary changes while maintaining normal operations. The environmental legislation provides a number of mechanisms for agreed customised plans and programs based on negotiated reasonable time-frames, milestones and interim protective measures to minimise the risks."

In the interim,

1. Validation that Interim Risk Management measures are effective.
2. All new foams being purchased for fixed systems on tankage are C6 Purity.
3. Move to transition to F3 foam for 'above water' / non-deep seated fires.
4. Storage of waste foam solutions & concentrates pending disposal technology for high temperature incineration.
5. Exercising pre-incident plans to test adequacy of resources to contain/collect foam solutions in event of an incident.

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Other comments for Government, Foam Producers & Industry….

1. Successful alignment between industry/gov't on Policy Intent is an enabler.
2. Detailed Explanatory Notes were of immense assistance to educating the industry
3. Some form of Regulatory Impact Statement which identifies & acknowledges anticipated costs of compliance for industry is important.
4. With current uncertainty issues (F3 performance, C6 science) there is a place for an Interim Risk Management milestone in regulatory implementation timetable.
5. Operator due diligence will require foam producers to provide COA of compliance (eg TOPA), performance test certification (eg LastFire) and assurance of non bio-persistent nature of their formulations.
6. A change of this magnitude needs to be anchored to credible test methodologies & performance standards, proven reproducibility & independent verification of results.
7. Regulatory assistance in provision of access to cost effective foam disposal routes is a key enabler for resilient foam policy implementation.
8. There remain significant uncertainties that create potential for Regret Spend.

"The Policy recognises that such facilities will need time to design, budget for and implement the necessary changes while maintaining normal operations. The environmental legislation provides a number of mechanisms for agreed customised plans and programs based on negotiated reasonable time-frames, milestones and interim protective measures to minimise the risks."

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Questions?

Rod Rutledge
National Process Safety & Regulatory Advisor
Caltex Australia Petroleum Pty Ltd
rrutled@caltex.com.au

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