

ITER Will Consume Most of the Expected Tritium Supply

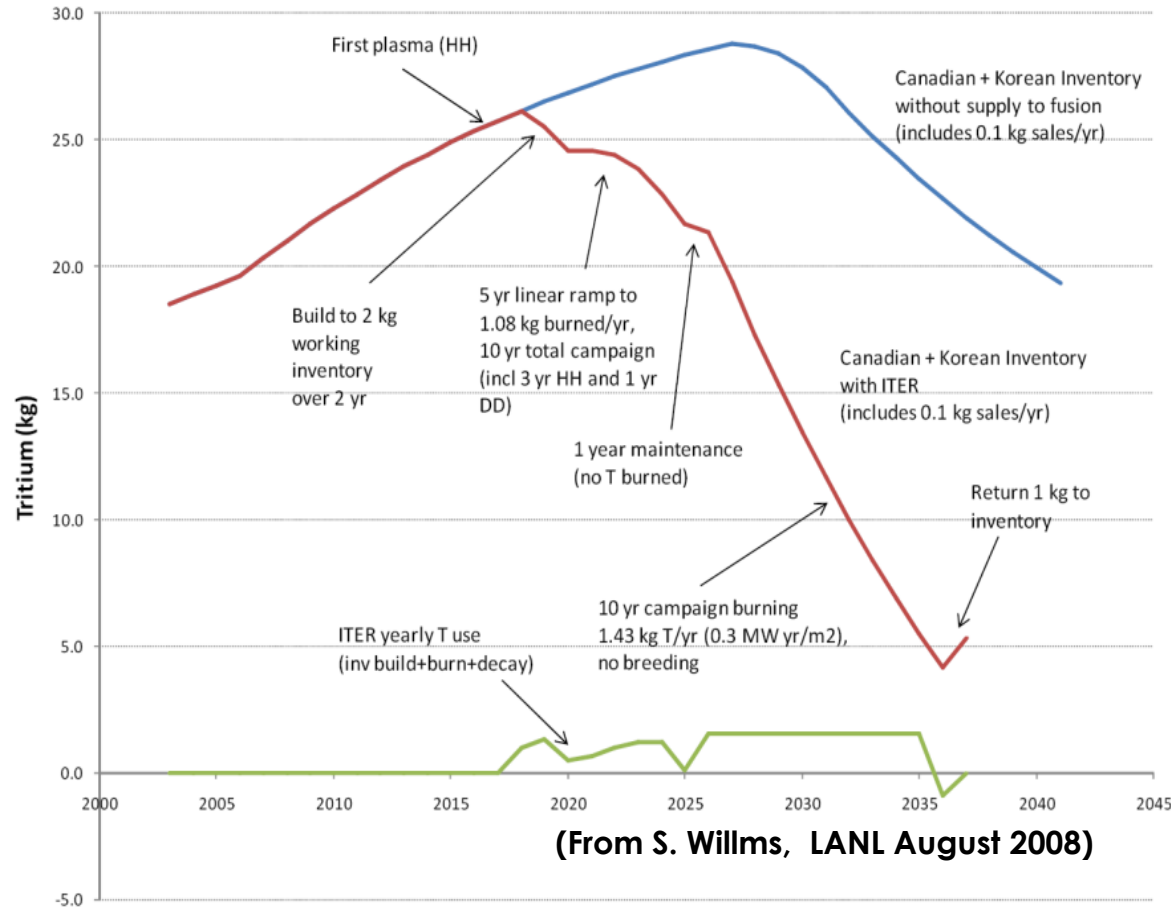
Consumption:
55.6 kg per 1000 MW fusion/yr

Production from fission:
2-3 kg/yr @\$84-130M/kg
CANDU reactor: 27 kg from over
40 years @ \$30M/kg (current)

Tritium decays @ 5.4% per yr.

**A successful ITER will exhaust most
of the world supply of tritium**

**CTF/FDF has to breed all of its own
tritium consumption and with the
goal of providing start up tritium for
DEMO**



CTF/FDF must have Tritium Breeding Ratio > 1

Development of a new Demo chamber wall concept



W-surface will melt under ELMs and Disruption
T retention as a function of temperature, damage from
He-ion damage, core contamination

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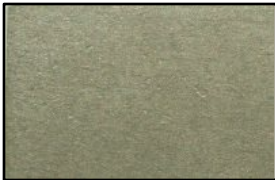


Prof. Noda (J. of Nu. Mat. 266-269, 1999) proposed the coating
with B to mitigate T retention and He-ion damage, yet coating can
only be is a few 100 nm thick

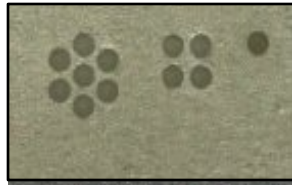
Development of a new Demo chamber wall concept (BW wall, apply where needed) at very early phase



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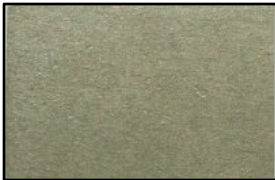
We proposed to remove 50% of the W and fill with B to take ELMs and a few disruptions
 $W-T_{\text{melt}} @ 3400 \text{ C}$, $B-T_{\text{subl}} @ 2550 \text{ C}$

Test holes 1 mm in Dia on 2 mm thick W-plate

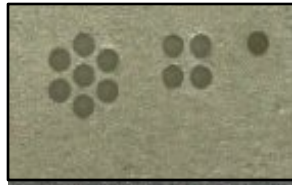
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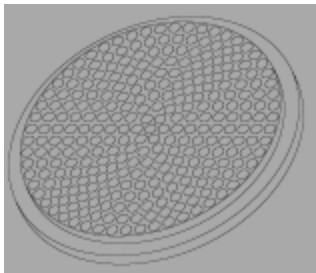


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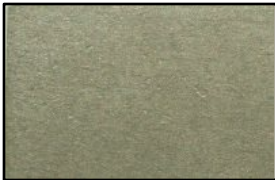


A W-disc that fits the DIII-D DiMES material exposure system is being fabricated, will be filled with B and proposed to ROF (2008) to be exposed at the lower divertor of DIII-D

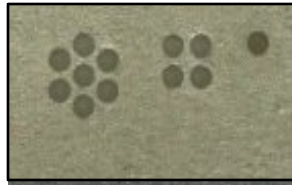
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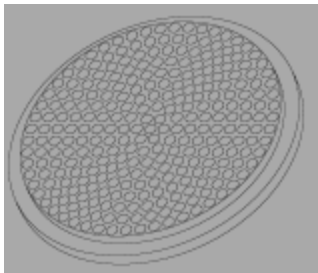


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Real time boronization for SS Demo (Does it need to be perfectly coated?)