

**From:** "Gauntt, Randall O" <rogaunt@sandia.gov>  
**To:** "Jason Schaperow" <JHS1@nrc.gov>, "Gauntt, Randa...  
**Date:** Wed, Jul 12, 2000 11:14 AM  
**Subject:** RE: Plume Energy

Jason

I got you e-mail yesterday.

I am working on it presently and will be done, probably today sometime.

Boy, there's lots of energy in the air oxidation reaction !

My approach is an energy balance approach. Some energy (sensible heat) must reside in the fuel material and zircaloy oxide debris, and the principal parameters come down to

- 1) the temperature of the debris after the chemical reactions, (2000K to 3000K), and
- 2) amount of metal participating in the oxidation (fraction of assemblies involved).

What energy doesn't remain in the debris after the reaction must be transported to the plume through principally hot nitrogen. One would think that very hot gas might radiate away some energy, but that is well beyond "back of the envelope stuff".

Randy

-----Original Message-----

**From:** Jason Schaperow [mailto:JHS1@nrc.gov]  
**Sent:** July 11, 2000 1:12 PM  
**To:** rogaunt@sandia.gov  
**Cc:** AXB@nrc.gov; AXN@nrc.gov; CGT@nrc.gov  
**Subject:** Plume Energy

Please see the attached file (WordPerfect8 format). Also, I just FAXed you a copy of the attached file (FAX number (505)-844-8719), in case you do not have a program handy to read it. Thank you very much.

Sincerely,  
Jason

**CC:** TWFN\_DO.twf5\_po(AXB,AXN,CGT)

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