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Chief of Rules
U.S. NRC
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RULES AND DIRECTIVES BRANCH USNRC
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Regarding NUREG/CR-6886
FR Citation: 70FR 72681
Published December 6, 2005

I am writing to provide input for the above item.

I feel that applying the circumstances know about the Baltimore Tunnel Fire to evaluate the fire safety situation that would apply in a fire situation affecting a transport cask containing nuclear waste, do not, for the reasons below, allow such an application to be considered valid:

1) Regarding Temperature to which casks would be exposed:
The maximum temperature circumstances, for which Type B tasks are tested involve exposure to no more than 800 degrees C, for no more than 30 minutes. However, as is shown below, in the circled sections of the references provided, the temperature of fuel oil, a potential burning agent in a rail or truck fire accident, would result in temperatures of up to a range of 1650 C to 2000 C (see circled sections in references below).

2) Regarding duration of exposure of casks:
Especially in a tunnel accident situation, involving either trucks or trains, access to an accident site and/or a remote location of such an accident site, could easily result in such a fire burning furiously, for a period of time much longer than the 30 minute tolerance length of type B containers.

Conclusion: The possibility of fuel oil fire temperatures of 1650 C - 2000 C, for periods of time far in excess of the 30 minute test characteristics of type B casks, make it impossible to consider that the circumstances know about the Baltimore Tunnel fire would be the worst circumstances that would be likely to apply in a fire situation affecting nuclear waste casks, during their transport.

Sincerely,

William Rothman, M.D.

2004 Denver Annual Meeting (November 7–10, 2004)

Paper No. 90-4

Presentation Time: 8:00 AM-12:00 PM

PARAMETERS OF COAL AND OIL FIRES

SOKOL, Ella and VOLKOVA, Nina, Institute of Mineralogy and Petrography SB RAS, Koptyug pr., 3, Novosibirsk, 630090, Russia, sokol@uiggm.nsc.ru

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Although the oldest bitumen fire known occurred 16 Ma in the Sinai Peninsula, prehistoric coal fires

SISP Review Complete
Template = ADM-013

E-RIDS = ADM-03
Add = A. Hansen (AGH)

Although the oldest bitumen **fire** known occurred 16 Ma in the Sinai Peninsula, prehistoric coal fires occurred predominantly during the Pliocene-Pleistocene interglacial periods (2.5-1.8 Ma), in the mean and high latitudes of Asia and North America. These fires occurred in areas characterized by rugged relief and steeply dipping coal-bearing strata. Combustion in the presence of fuel and oxygen occurred within 500 m of the surface. Prior to the Quaternary, numerous fossil-fuel horizons were isolated from atmospheric oxygen. Subsequently, tectonic activation and uplift resulted in caustobiolith oxidation and combustion. Pyrogenic landscapes, up to 1000 km^2 in area, are a distinctive feature of many coal and **oil** basins. Two examples are the Hatrurim and Kuznetsk basins in Israel and Russia, respectively. The evolution of such landscapes is dependent upon repeated cycles of combustion – gas outburst – rock crushing – cooling –shrinkage fracturing – oxygen intake – ignition – combustion. As caustobiolith-bearing strata burn, flame fronts develop along steeply dipping beds and the **fire** descends quickly to depth. On rare occasions, coke forms and is itself later ignited. Underground coal fires are estimated to spread at the rate of 5-17 meters per year. During **oil** fires, however, gas ignition in narrow "chimneys" is responsible for flames that may spread as fast as tens of meters per second. The basic mechanism of heat and mass transfer during pyrogenesis is gas convection. Country rock has been heated by coal fires to **temperatures** as high as 1300°C, whereas bitumen and **oil fire temperatures** may reach 1600°C and 2000°C respectively. Such fires usually burn at less than 25 bar lithostatic pressure. During combustion, pyrolysis and sublimation from the gas occurs. Pyrometamorphism is responsible for mineral dehydration, amorphization, carbonate decomposition reactions, and it may result in the partial or complete melting of country rock.

2004 Denver Annual Meeting (November 7–10, 2004)
General Information for this Meeting

Ask A Scientist©

Engineering Archive

University of Chicago NEWTON BBS

Fuel Oil/Fuel Gas Burn Temperatures

Index Key: ENG049
Author: jeff.d gilbertson
Subject: Fuel oil/Fuel gas burn temperatures.

We have two different types of burners on our boilers. Natural gas and fuel oil. Our information indicates that the natural gas flame burns at about 3000 degrees. We have no information about the fuel oil temperature. The natural gas has a btu content of 1027 btu/cf. The fuel oil has a btu content of 18,100 btu/lb. Could you tell me at what temperature the oil fire would burn? In case it is necessary, we use Babcock & Wilcox return flow oil burner and ring type gas burners. Their capacities are 5,660 lbs/hr oil and 1,600 cfm gas.

Response #: 1 of 1
Author: david r munoz

This is a complicated question and can probably best be answered by measurement. You can calculate the adiabatic flame temperature for any fuel air oxidation reaction (fancy terminology for combustion). Adiabatic means without heat transfer (losses). Therefore, if you had a perfectly insulated chamber and you had a combustion process occurring and you measured the flame temperature, you would be measuring the adiabatic flame temperature. However, in real burner applications, there is always heat transfer and this is the complicating factor. Either you estimate the heat transfer loss and include it on the balance of energy equation that is used to find the flame temperature or you measure the flame temperature. Looking in one of my references, I see that I cannot readily find a value for the adiabatic flame temperature of fuel oil. However, I would say that your 3000 degrees F is probably a good estimate (+ or - 100 F).

= 1650 C