

PoolWorks™ Software: Time-to-boil Simulation/Future Pool Capacity Management Software

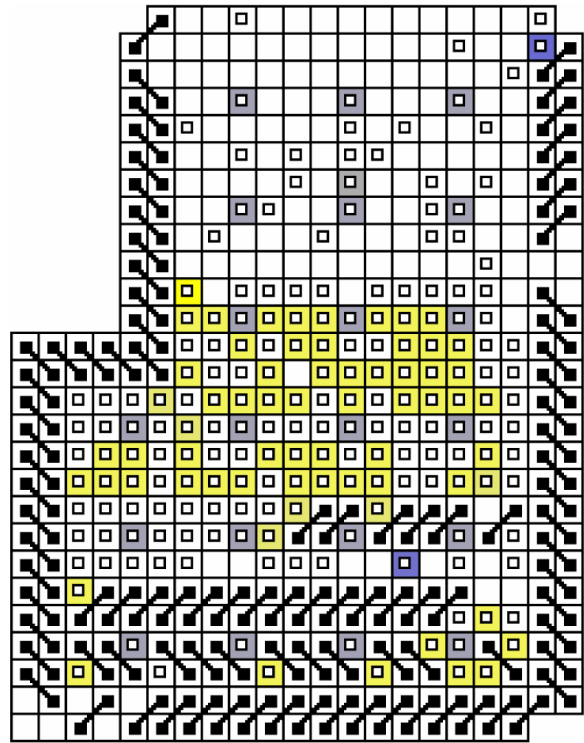
Background

Westinghouse has developed PoolWorks™ software, a computer-based product that helps utilities effectively run “time-to-boil” (TTB) calculations and provides a tool to generate pool capacity information years into the future.

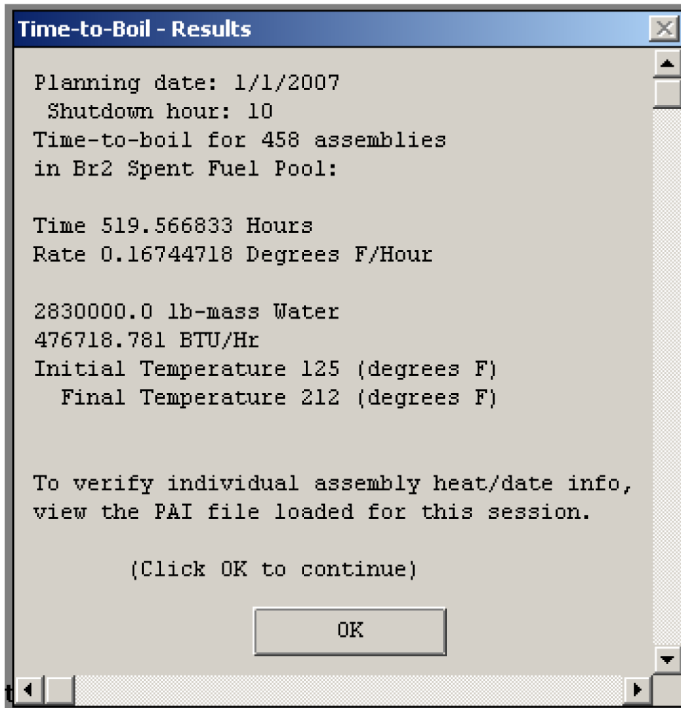
PoolWorks software is designed to take advantage of the same data models and user interfaces found in the ShuffleWorks® and CaskWorks® Westinghouse software products. PoolWorks and CaskWorks software products share the same ORIGEN-based decay heat module and templates. By using a link to the ShuffleWorks software, the two products provide all the tools needed to calculate TTB at discrete points in an offload, reload or in-core shuffle.

Description

PoolWorks software uses an ORIGEN-based decay heat module to generate data to calculate the TTB for the reactor core and the spent fuel pool. In general, PoolWorks software is used to produce heat value projections that are then used by a TTB calculation provided in the ShuffleWorks software product; i.e., PoolWorks-generated values are imported into the ShuffleWorks software and TTB calculations are executed in the ShuffleWorks software. The TTB module is designed this way to take advantage of the stepping features in ShuffleWorks software interactive planning. This provides a way for users to calculate TTB at discrete points in an offload, reload or in-core shuffle.



PoolWorks provides interactive graphics of the spent fuel pool



PoolWorks software TTB screen output

Simulation Features

The system provides simulation capability beyond the current core cycle by providing a way to enter (simulated) future refueling and dry storage campaigns. Historical and future plant operating cycles are provided in a simple format that includes: cycle-ID, operating days, effective power days, outage days, start date and reactor shut-down date. Associated with each future cycle is the data for new fuel in each cycle. Based upon anticipated plant operations, the system can produce a time series of discharged fuel by date, total number of bundles discharged and by number of bundles discharged and number of bundles in groupings, where the groupings are defined by enrichment level, kgU and burnup.

Deliverables

- PoolWorks software site license and documentation
- Custom PoolWorks software models for all customer units
- Installation help and training
- Phone support and warranty
- Optional scope custom fuel-specific ORIGEN- libraries

Benefits

- Helps utilities avoid reaching spent fuel pool capacity limits prematurely
- Performs easy-to-generate TTB calculations during fuel movement campaigns
- Provides electronic transfer of data between products for TTB calculations, thereby reducing manual data error potential
- Interfaces with Westinghouse products (ShuffleWorks, TracWorks®)

Report: temp

Pool Capacity Simulation for: 2

Date	Event	Pool Size	Usable Locs	Change	Empty Usable	Pool Assems
1/1/2007	START	2091	2047	0	754	1325
04/12/2007	REFUEL	2091	2047	246	508	1571
6/1/2007	CASKLOAD	2091	2047	244	752	1327
1/1/2008	CASKLOAD	2091	2047	122	874	1205
04/11/2009	REFUEL	2091	2047	246	628	1451
1/1/2010	CASKLOAD	2091	2047	244	872	1207
1/1/2011	CASKLOAD	2091	2047	122	994	1085
6/1/2012	CASKLOAD	2091	2047	244	1238	841
12/31/2012	REFUEL	2091	2047	246	992	1087
1/1/2014	CASKLOAD	2091	2047	122	1114	965
04/10/2015	REFUEL	2091	2047	246	868	1211

PoolWorks software pool simulation report

The ShuffleWorks menu option “Check Boil Time for ICA” calculates the TTB. When initiated, this calculation mode prompts for the number of hours since shutdown. It then provides an opportunity to change mass of water inventory from the default value stored in the TTB plant model database.

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