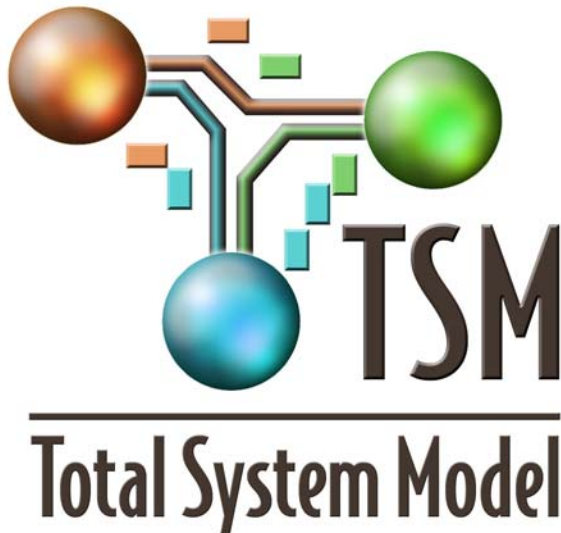




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Total System Model Version 6.0 Cost Estimating Routines Design and Bases



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**TOTAL SYSTEM MODEL VERSION 6.0 COST ESTIMATING ROUTINES
DESIGN AND BASES**

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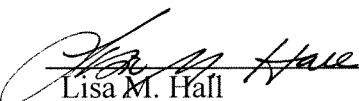
October 2007

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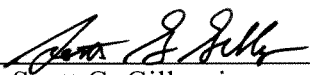
Stephen. L Turner 10-31-2007
Date

Checked by:



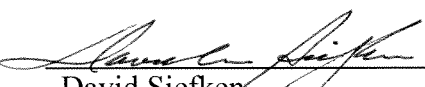
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ACRONYMS AND ABBREVIATIONS

BAH	Booze, Allen, Hamilton
BSC	Bechtel SAIC Company, LLC
CALVIN	CRWMS Analysis and Logistics Visually Interactive model
CaS	Create-a-Soft
CF	Contingency Factor
CPD	Cost per Day
CRG	Cost Report Generator
CRWMS	Civilian Radioactive Waste Management System
CSNF	Commercial Spent Nuclear Fuel
D	Distance
DOE	U.S. Department of Energy
DOE SNF	U. S. Department of Energy Spent Nuclear Fuel
DPC	Dual-Purpose Canister
ESC	Escalation
FMF	Fleet Management Facility
GROA	Geologic Repository Operations Area
GUI	Graphical User Interface
HH	Heavy Haul
HLW	High-Level Radioactive Waste
IS	Initial State
LWT	Legal Weight Truck
MCO	Multi-Canister Overpack
MGR	Monitored Geologic Repository
MSC	MGR Site-Specific Cask
OCRWM	Office of Civilian Radioactive Waste Management (DOE)
SNF	Spent Nuclear Fuel
SSC	Site-Specific Canister

TAD	Transportation, Aging and Disposal
TC	Transportation Contractor
TSC	Transportable Storage Cask
TSLCC	Total System Life Cycle Cost
TSM	Total System Model
TSMPP	Total System Model Preprocessor
V	Version
WAST	Waste Acceptance, Storage, and Transportation
WHF	Wet Handling Facility
WP	Waste Package

1. INTRODUCTION

This manual discusses the cost estimating routines used in Version (V) 6.0 of the Total System Model (TSM) as described in the TSM User Manual (BSC 2007a). The TSM estimates costs during the simulation of the Civilian Radioactive Waste Management System (CRWMS) mission. The TSM is not intended to provide a full Total System Life Cycle Cost (TSLCC) evaluation tool but focuses on the CRWMS Waste Acceptance, Storage, and Transportation (WAST) elements reported for the TSLCC in Reference BSC 2003a. This manual also summarizes the comparison of the results of the TSM to the results in the 2003 TSLCC, which are contained in the *TSM Cost Basis and Check*, (BSC 2006a). Reference BSC 2006a compares the TSM results to the cost results for the 2003 TSLCC because the 2003 TSLCC was contemporary at the onset of the TSM development and had a comprehensively documented and checked system analysis.

The *TSM Cost Basis and Check*, (BSC 2006a) was developed for TSM V4.0 but applies equally to TSM V5.0 and TSM V6.0 because there have been no major changes to the cost estimating parts of the TSM. Other changes that could impact cost results are discussed in the TSM User Manual (BSC 2007a) Section 1.5 and Section 1.5 of this report. There were no unanticipated impacts on the cost results as addressed in the TSM V6.0 validation report (BSC 2007b).

This manual assumes the reader has a basic knowledge of the TSM functionality and conventions in the TSM User Manual (BSC 2007a) and this manual must be read in conjunction with the User Manual.

TSM uses the SimCAD™ process simulation software developed by Create-a-Soft (CaS); more information on SimCAD™ conventions is in Reference CaS 2006.

This document was prepared in accordance with AP-ENG-006, *Total System Model (TSM) – Changes to Configuration Items and Base Case*.

1.1 PURPOSE OF THIS MANUAL

The TSM User Manual (BSC 2007a) generally describes the cost estimating routines that are used. This manual describes the routines in more detail and describes the extensions and function calls that are used to estimate costs and how these are integrated in to the TSM. Users interested in cost details can use this manual to understand how the costs are estimated allowing them to make changes for sensitivity studies or to accommodate updates in the cost information. This manual also provides the bases for the routines.

1.2 FUNCTIONAL OVERVIEW OF COST ROUTINES

The basic TSM design for estimating costs is that cost variables that begin with “cost” are set up as model variables that can be accessed by extensions and function calls. The variable values are incremented as simulation events with cost elements occur to estimate costs that are accumulated over the course of the run in the “cum” values of the variable. (“Cum” indicates the value is cumulative.) Appendix A shows the cost variables used in the TSM.

Cost estimating routines that use the cost variables are included in the TSM using various SimCAD™ elements and capabilities. These include:

SimCAD™ Extensions. Many cost estimating routines are in the overall model extensions (under Simulation Properties) and in the “TruckShipCost6” process in the upper left of the TSM (Graphical User Interface) GUI specifically set up to estimate costs. Some cost estimates are also included in extensions in individual processes.

Function Calls. Function calls use local variables at the TSM processes (“process context”) to send information to function call extensions for the cost estimate. For example, to estimate truck shipping costs, sites that use a truck Cask 6 send information on the shipment to process “TruckShipCost6” that contains the Function Call formulas to estimate the shipping cost. There is also a similar Function Call for rail cask shipments.

Resources. Resources are people or equipment needed to perform processes or move objects through the simulation. Resources are defined in the SimCAD™ Flow Properties dialog box and the number available during the simulation can be limited. However, for the TSM, the number of resources are all assumed very high (usually 100) so that there are always adequate resources. The TSM uses resources as the basis for cost estimates. Costs are estimated by assessing the number of resources in use at a time step and multiplying by the associated unit cost per time step. The TSM function to assess resources in use (GetNumberofResources) provides the number of resources available, not the number in use. So, the number in use is the total resources in the model minus the in-use value (i.e., the formula is usually 100 minus the number of resources given by GetNumberofResources).

1.3 USING TSM COST RESULTS

The cost results from TSM will rarely be used directly for published results in comprehensive programmatic cost assessments. This is because most of these published studies will apply updated unit cost estimates or other economic considerations such as escalation (ESC), contingency factors (CF), or discounting that are not included in TSM. The TSM is not intended to be a comprehensive cost estimating model and the cost results that are directly output should only be used for relative cost comparison between various scenarios. Accordingly, the unit cost values in the TSM must be regarded as assumptions that will be helpful in systems analysis but not as the current value endorsed by the Office of Civilian Radioactive Waste Management (OCRWM).

The TSM also does not cover many programmatic costs but focuses on WAST costs to reflect system impacts. The key programmatic costs that are in other cost analyses like the TSLCC but not in the TSM include:

- Engineering, procurement, and construction costs,
- Repository operating costs,
- Transportation contractor (TC) costs,
- Cask loading costs at reactor sites,
- Utility site training cost at the waste sites,

- Federal facility support equipment cost,
- Federal facility site training cost,
- Federal facility shipping of support equipment cost,
- Reactor site welding equipment cost (if needed),
- Reactor site support equipment cost per site,
- Maintenance costs (transportation casks, rolling stock),
- Cask refurbishing costs (see Section 2.3.2).

Although the TSM does not directly provide or use the costs listed above, there are TSM outputs that support estimates for these costs. For example, the TSM outputs for the “counts” of objects vs. time combined with appropriate unit costs can be used for post-run cost estimates (e.g., the count of cask refurbishments vs. time can be used to estimate cask refurbishment costs). The TSM also provides other valuable outputs for comprehensive cost assessments such as the time when the last item returns from aging that indicates the end of operations for the surface facilities used to prepare Waste Packages (WP).

Careful planning of a system study will ensure that the TSM output will include the parameters required for any post-run analyses. Understanding how TSM cost estimates are used in comprehensive programmatic cost assessments is enabled by reviewing examples of such analyses in the so-called “Phase 1 TAD Study” (BSC 2005a) and its cost calculation (BSC 2006b). In this case, the Phase 1 TAD Study carefully planned how the TSM outputs should be used and provided settings for the unit values in TSM. The unit values used in TSM V5.0 (BSC 2007g) are those that were set for the Phase 1 TAD Study, and the same values are used in TSM V6.0.

1.4 ASSUMPTIONS

The model and analyses methods described in this document are based on conceptual CRWMS plans and facility designs. Due to the preliminary nature of these plans and designs, it was necessary to make assumptions (both referenced and specifically cited) during the development of the TSM model elements that represent detailed CRWMS operations. It is expected that many of these assumptions will be revised as the CRWMS facility designs and concept of operations are further developed.

Other assumptions cited in this manual are:

- The TSM uses zero cost to the utility for Dual Purpose Canisters (DPC) purchased by the utility. Transportation, Aging, and Disposal (TAD) canisters can be purchased by OCRWM or by the utility as an option for the TSM set up. There are some variables to include DPC costs but these are not used. Post run cost analyses can adjust these costs as needed depending on the cost assessment needs.
- The unit costs in TSM V6.0 are assumed to be in 2004 constant dollars. The TSLCC 2003 WAST costs (BSC 2003a) are typically in 2002 constant dollars. Unit costs are adjusted in the validation calculation (BSC 2006a) to make comparisons between TSM

V5.0 used for that analysis and the 2003 TSLCC. For some cost estimates, the 2002 and 2004 unit costs are the same since the small percent change is much less than the over all uncertainty in the basis. Unit costs have not been updated in TSM V6.0 because the changes would be small, and it is also possible to escalate the costs if desired in post run cost analyses.

- The weight of all truck casks is the same for all cask types. Based on calculations in BSC 2006a, this causes <1% change in the absolute costs, and is negligible in relative cost estimates used in the TSM cost analyses.
- The TSM assumes that transportation of the rail casks is by Dedicated Rail for the loaded casks from the waste sites to the repository, and by General Freight for the empty casks to the waste sites.
- The TSM cask weights for rail shipment cost estimates are from the 2003 TSLCC and the Phase 1 TAD Study (BSC 2005a). In the TSM, the weight used does not change if the cask assignment to that site is changed. Based on manual checks in BSC 2006a, changing from the lightest (60 tons) to heaviest (125 tons) rail cask causes less than 8% difference in the shipping cost. The error should be less for the TAD canister scenarios that are the focus of TSM V6.0 because a large number of the sites use the same transportation cask.
- All shipments travel directly from the waste site to the head of the Nevada Rail with no stops for combining shipments or receiving wastes at other waste sites.
- For truck demurrage, a constant cost to cover 4-days of demurrage is included for all truck cask shipments for all sites. Demurrage costs are less than 3.5% of the total truck costs so minor variations of this assumption do not have a major impact on the overall cost assessment especially if relative cost between scenarios is used for system analyses.

1.5 CHANGES IN VERSION 6.0

Site Specific Canisters (SSC) and Monitored Geologic Repository (MGR) Site Specific Canisters (MSC) were removed in TSM V6.0 since they are no longer used-TAD canisters are now used. The costs for TAD canisters required by the Wet Handling Facility (WHF) are captured in new extensions added to the “TADB” and “TADP” processes (in the WP area of the GROA GUI) that create the objects representing the TAD canisters. As in other cost extensions, each extension increments a cumulative cost for TAD canisters (costcumTADcan) when the objects depart the TADB or TADP processes. TAD canisters loaded at the GROA are assumed to be 21/44 and are assigned costs of \$730,000 or \$560,000 based on the variables costTADLMB or costTADLMP.

Changes in the modeling of the Geologic Repository Operations Area (GROA) and refinements to the transportation elements in the TSM will change the overall simulation behavior and costs that are estimated by the TSM. Most of the cost impacts associated with these changes are manifested in the Cost Report Generator (CRG) post processing tool that bases costs on counts

of items completed in the GROA. The CRG is validated as described in Section 3.1. With respect to changes in transportation costs for routes and state line crossings, the TSM V6.0 transportation validation in Reference BSC 2007d indicates that the changes are very small.

There were also changes in V6.0 to add a “basket and shell” approach for U.S. Department of Energy Spent Nuclear Fuel (DOE SNF) and High-Level Radioactive Waste (HLW) transportation casks. Costs are now included for these items using extensions in the cask allocation department. (Previous versions of TSM captured DOE cask costs in the CRG).

The new GROA design does not use MSCs so the “MSCB” and “MSCP” processes and associated extension that incremented WP costs by \$350,000 were deleted.

The CRG values are typically cost results directly from the TSM and do not include unit costs. However, the CRG does have some unit costs which are set equal to those in the TSM, and includes some flexibility for post analysis adjustments by the cost analyst to fit a particular case. As described in the TSM User Manual (BSC 2007a) the CRG also has some EXCEL programming of items that are changed to fit particular cases. For example, the analyst must manually change the unit costs for the TAD overpack if a large vs. medium TAD overpack is used (a medium overpack is in TSM). The CRG and TSM are not linked and it is up to the analyst to ensure that the desired unit costs are used either by making a temporary change in TSM (and documenting it in the analysis) or by changing unit costs in the CRG. It is also up to the analyst to ensure analyses begin with the configured version of the CRG so there are no errors from residual manual changes.

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2. COST METHODS AND PARAMETERS

This section describes the general approach, data sources, bases, and descriptions for the cost estimating routines in the TSM.

2.1 INPUT DATA AND BASES

The WAST cost elements and the (properly escalated) costs are those used to support the 2003 TSLCC as documented in the *WAST Cost Input Calculation for 2003 TSLCC Update*, CAL-CRW-SE-000003, hereafter referred to as the “WAST cost basis” (BSC 2003a).

The main source for the TSM cost estimate algorithms is *CALVIN Version 3.1 Computer Code Database Information Update*, CAL-WAT-SE-00005 (BSC 2003b).

Cask parameters and unit costs are provided in a spread sheet that summarizes the 2003 TSLCC input as documented in the cost calculation that supported TSM V5.0 (BSC 2006a).

Where timing information or other transportation parameters are used these are documented in the TSM Transportation Description (BSC 2007c) and the associated validation (BSC 2007d).

2.2 GENERAL APPROACH

The commercial SimCAD™ software used for the TSM has various ways to estimate costs for the processes and objects that are modeled. As the real-time simulation advances, costs are estimated and tracked based on the modeling techniques as described in Section 1.2.

TSM uses many system variables to support the cost estimate and the cost-related variables begin with “cost” so they are easy to identify in the TSM. See Appendix A for a list of variables used for cost estimates.

The TSM has many places where the same type of cost is incurred by many different processes or connections. For example, rail-shipping costs may be incurred at many of the waste sites in the Transportation Module. For costs that occur in many parts of the model over the simulation time, a “cumulative” variable is assigned and incremented by each process or connection as the cost occurs in that process or connection. For example, the variable “costrailship” is estimated for each waste site process as a shipment is made and the cumulative variable “costrailshipcum” is incremented using the formula $\text{costrailshipcum} = \text{costrailshipcum} + \text{costrailship}$ in the process extension function.

The TSM uses variables with user-defined values for many key unit costs or process variables that may need to be changed as the TSM evolves or different cases are run. The intent is to avoid “hardwired” values that may need to be changed. The sections below for each cost item list the variables that are used. These variables lists are excerpted from Appendix A. Variables can be revised in the Flow Properties “Custom Variables” tab as needed.

The variables are used in the extensions for the processor function calls to estimate the costs. The extension logic and function calls for the TSM are listed in Appendix B. The sections below explain how the extensions and function calls are implemented for each type of cost. The extensions shown in the text are excerpted from Appendix B.

Some estimating routines are generic and apply to many processes. For example, rail shipping cost extensions apply to all waste sites that use rail shipments and the extensions are all very similar except for the process specific variables. In these cases, the generic method is explained in the text with a single example excerpted from Appendix B.

2.3 TRANSPORTATION CASK COSTS

The costs estimated for the shipping casks are the costs for the initial procurement of the cask and the major refurbishment cost (also called “replacement cost”) when the cask is old (usually after 25 years).

2.3.1 Cask Purchase Cost

The cask purchase costs primarily depend on the number of casks required which in turn depends on many factors such as the maintenance required, turn-around times at the repository, shipping times, and other factors. The TSM and the CALVIN analyses to support the TSLCC have substantially different approaches for estimating these factors that determine the so-called “cask fleet.” CALVIN estimates the casks required each year by calculating an annual “total time in use” per cask (shipping and GROA processing) and dividing by that cask’s “utilization time,” or available days per year.

The TSM estimates cask requirements based on the demand for shipments in the simulation. If the scheduled time for a waste site shipment occurs (a “ship event”) the waste site “requests” a cask from the cask management part of the TSM. If there is a cask available, one is shipped, if not, a cask is “bought” immediately to meet the request. (It is recognized that the actual “buy” procure order will have to be in place a few years before the actual need to meet the ship event, however, TSM uses the term “buy” for the name of the process that provides a “new” cask.) There are also other options for the cask buying logic, see Section 4.1.2 of the TSM User Manual (BSC 2007a).

In TSM after the cask is “received” at the waste site, the waste is loaded in the cask and the cask is transported to the repository. For rail transport, several cask loads are usually batched into shipments of multiple casks (maximum of 3 for Commercial Spent Nuclear Fuel [CSNF], 5 for DOE SNF and HLW, and 6 for Naval SNF). After unloading, the cask is sent to the Fleet Management Facility (FMF) for inspection and maintenance (if needed) and then the cask is placed in a queue to be reused to meet another ship event. The cask use is continuously simulated step-by-step in the repetitive cycle so the TSM simulation carefully tracks the use of the casks. Accordingly, the TSM need not make an assumption for “cask utilization” like CALVIN. The results of the simulation will indicate how long the cask was waiting in the FMF queue for reuse, the time for loading, the time in transit, the time for turnaround at the repository

and the time for inspection maintenance at the FMF. See the Transportation Design Description (BSC 2007c) for more discussion.

The implementation for estimating the cask purchase costs is based on using a cumulative variable that is incremented as casks are created by the start processes for each cask type. When a new cask is created and leaves the start process (called “Buy Cask XX where XX is the numerical cask type) the connector from the start process increments the cumulative costs by the costs of the particular cask. The TSM uses a so-called “basket and shell” approach where the general term “cask” and “cask cost” refers to bare rail baskets, Transportable Storage Casks (TSC), DPCs, TAD canisters, and the associated overpacks (OV, also called a “shell”) for these items if used in the scenario. Some shells can accommodate a basket or DPC. See the Transportation Design Description (BSC 2007c) for more discussion on the “basket and shell” approach and the details for the casks used in the TSM simulation.

The variables that are used for cask costs are (values are typical examples; the values are set by the user to fit an analysis plan and costs in Table 1):

Variable Name	Context	Input Value	Where used	Description
costcaskbarebasket	\$ each	\$400,000	Model Extensions	Cost for a bare basket
costcaskDOE	\$ each	\$4,470,000	Model Extensions	Cost for a DOE cask
costcaskDOEbasket	\$ each	\$425,000	Model Extensions	Cost for a DOE basket
costcaskDOEov	\$ each	\$4,045,000	Model Extensions	Cost for a DOE overpack (shell)
costcaskmed	\$ each	\$2,800,000	Model Extensions	Cost for medium rail cask
costcaskov	\$ each	\$2,800,000	Model Extensions	Cost for cask overpack
costcasksmall	\$ each	\$2,000,000	Model Extensions	Cost for small cask
costcasktruck	\$ each	\$2,500,000	Model Extensions	Cost for truck cask
costcaskTSC	\$ each	\$3,300,000	Model Extensions	Cost for TSC cask
csotcumcaskDOE	\$	N/A	Model Extensions	Cumulative costs for DOE cask purchases
costcumcaskD	\$	N/A	Model Extensions	Cumulative costs for DPC cask purchases
costcumcaskR	\$	N/A	Model Extensions	Cumulative costs for rail cask purchases
costcumcaskreplR	\$	N/A	Model Extensions	Cumulative costs for rail cask refurb at 25 years
costcumcaskreplS	\$	N/A	Model Extensions	Cumulative costs for cask shell refurb at 25 years
costcumcaskreplT	\$	N/A	Model Extensions	Cumulative costs for truck cask refurb at 25 years
costcumcaskS	\$	N/A	Model Extensions	Cumulative costs for cask shell purchases
costcumcaskT	\$	N/A	Model Extensions	Cumulative costs for truck cask purchases
costcumcaskTAD	\$	N/A	Model Extensions	Cumulative costs for TAD canister purchases
costcumcaskTADOV	\$	N/A	Model Extensions	Cumulative costs for TAD overpack purchases
costTADLMB	\$ each	\$730,000	TAD buy processes in TAD department	Unit costs for large or medium BWR TAD canister
costTADLMOV	\$ each	\$4,000,000	TAD buy processes in TAD department	Unit costs for large or medium TAD overpack
costTADLMP	\$ each	\$560,000	TAD buy processes in TAD department	Unit costs for large or medium PWR TAD canister
costTADSB	\$ each	\$410,000	TAD buy processes in TAD department	Unit costs for small BWR TAD canister
costTADSOV	\$ each	\$2,400,000	TAD buy processes in TAD department	Unit costs for small TAD overpack
costTADSP	\$ each	\$340,000	TAD buy processes in TAD department	Unit costs for small PWR TAD canister

Table 1. Cask-Related Capital Costs

Component	Millions of 2004 Dollars		Cask Numbers	Variable Name
	PWR	BWR		
DPC/TAD Transportation Overpack	2.8	2.8	202, 208, 214, 217, 226, 229, 238, 244, 247, 253	costcaskov
TSC	3.3	3.3	66, 76, 106, 109, 232, 235, 290, 295, 298	costcaskTSC
Large TAD canister (32/68) ¹	1.12	0.81	251, 254	costTADLMB, costTADLMP
Large Bolted TAD canister (32/68) ^{1,2}	1.14	0.84	251, 254	costTADLMB, costTADLMP
Large TAD Transportation Overpack ¹	4.0	3.7	253	costTADLMOV
Large TAD Transportation Overpack – bolted lid ^{1,2}	4.4	4.1	253	costTADLMB, costTADLMP
Medium TAD canister (21/44) ¹	0.73	0.56	251, 254	costTADLMB, costTADLMP
Medium Bolted TAD canister (21/44) ^{1,2}	0.76	0.58	251, 254	costTADLMB, costTADLMP
Small TAD canister (12/24)	0.41	0.34	206, 209	costTADSB, costTADSP
Small Bolted TAD canister (12/24) ²	0.44	0.37	206, 209	costTADSB, costTADSP
Medium TAD Transportation Overpack (21/44) – welded lid TAD ¹	3.4	3.0	253	costTADLMOV
Medium TAD Transportation Overpack (21/44) – bolted lid TAD ^{1,2}	3.8	3.4	253	costTADLMOV
Small TAD Transportation Overpack (12/24) – welded lid TAD canister	2.4	2.6	208	costTADSOV
Small TAD Transportation Overpack (12/24) – bolted lid TAD canister ²	2.8	3.0	208	costTADSOV
Large Bare Rail Cask (32/68)	3.2	3.2	26, 27	costcaskbarebasket
South Texas Bare Rail Cask	3.2	N/A	60	costcaskbarebasket
Medium Bare Rail Cask (18/42)	2.8	2.8	28, 29	costcaskmed
Small Bare Rail Cask (8/20)	2.0	2.0	30, 31	costcasksmall
Truck Cask (4/9)	2.5	2.5	1, 6, 11, 12, 18	costcasktruck
DOE cask	4.47		44, 50, 52, 56	costcaskDOE
DOE basket	0.425		44_ins, 50_INS, 52_INS, 56_INS,	costcaskDOEbasket

Component	Millions of 2004 Dollars		Cask Numbers	Variable Name
	PWR	BWR		
DOE ov	4.045		2xx	costcaskDOEov

Note 1: These TAD canisters are selected as large or medium in the TSM run set up. The user must also remember to change the corresponding cost variables. Runs can use large TAD canisters or Medium TAD canisters and they cannot be mixed in a run.

Note 2: Bolted configurations are selected in the TSM run setup or in post-run analysis.

The cost for DOE casks have been added in TSM V6.0. Costs are incremented in a cumulative variable (costcumcaskDOE) by process extensions as casks are inserted in the simulation via the cask buy processes in the DOE and DOEOV departments.

The most recent estimate of DOE cask costs (for Cask 44) was made for the 2000 TSLCC, and is \$4,000,000 in 1997 dollars - this value is in the CALVIN V4.0 database, and can be traced to a calculation titled *High-Level Waste Transportation Cask Unit Cost for the 2000 Total System Life Cycle Cost Estimate* (BSC 2000). Escalating 1997 to 2004 dollars with a factor of 1.1178 (BAH 2005), gives \$4,470,000. This estimate was only for the HLW cask, but it was based on a design concept for an "all-in-one" cask for HLW, Multi-Canister Overpacks (MCO), and DOE SNF. So, it is probably appropriate to use for Cask 50, 51 and 56 also (given the lack of any better data). For a basket and shell arrangement, the unit cost of the basket was estimated (for HLW) to be \$380,000 (1997\$), or about \$425,000 in 2004\$. So, the basket is assumed to be \$425,000 and the shell is the net of this basket cost and an integral DOE cask or \$4,045,000 (\$4,470,000-\$425,000).

Costs for Navy casks are not borne by OCRWM so the cost extension is incremented by zero for the unit cost.

The costs are incremented on the connector from the “Cask Buy” processes such as the examples below for Cask 26 (a large rail cask), Cask 28 (a medium rail cask), Cask 31 (a small rail cask), Cask 217 (an overpack or shell), Cask 251 (a TAD overpack provided by DOE), and Cask 6 (a truck cask).

Line	Connector	Event Handler or Connection from	Line Type or connection to	Line Formula
64	c26B	BuyCask26	26Dist	
65		ObjectProcessingCompleted		
66			Comment	Increment cumulative cask cost
67			Expression	costcumcaskR = costcumcaskR+costcaskbarebasket
1600	c28B	BuyCask28	28Dist	
1601		ObjectProcessingCompleted		
1602			Comment	Increment cumulative cask cost
1603			Expression	costcumcaskR = costcumcaskR+costcaskmed
1611	c31B	BuyCask31	31Dist	
1612		ObjectProcessingCompleted		
1613			Expression	costcumcaskR = costcumcaskR+costcasksmall
1641	c217	BuyCask217	217Dist	
1642		ObjectProcessingCompleted		
1643			Comment	Increment cask cost
1644			Expression	costcumcaskS = costcumcaskS+costcaskov
1625	c251	TADLargeBBare	251load	
1626		ObjectProcessingCompleted		
1627			Expression	costcumcaskTAD = costcumcaskTAD+costTADLMB
1737	c6b	BuyCask6	Cask6Distribute	
1738		ObjectProcessingCompleted		
1739			Expression	costcumcaskT = costcumcaskT+costcasktruck

If a cask is not listed in Table 1 it is because the cask is assumed to have already been purchased by the utility and has no costs to OCRWM. For example, there are no unit costs for DPCs. In other cases there are unique casks that already exist that are suitable for transportation or “one time” transportation that have already been purchased by the utility and there is no costs for these. As explained in the TSM Transportation Design Description (BSC 2007c) TAD canisters are a special case where the cost for the TAD canister can either be by the utility or by OCRWM. The Initial State (IS) file from the Total System Model Preprocessor (TSMPP) starts TAD canister loads at process “TADbare” if OCRWM purchases the TAD canister (with the extensions in line 1625 above) or at process “TAD” if the utility purchases the TAD canister (no cost extension).

Notice that the nomenclature convention for connectors with extensions is to name the connector, usually with a leading “c”. Many cost extensions are in connectors as shown above.

An exception to naming convention is that the connectors in the transportation maps are not named to keep the GUI legible; these connectors are identified using the “from” and “to” convention shown above.

2.3.2 Major Cask Refurbishment

The TSM simulates that casks require maintenance in the FMF. The FMF simulation checks if maintenance is required when the cask arrives at the FMF and routes the cask to maintenance process as appropriate. Otherwise, the cask is returned to the queue to be reused in a shipment. A major refurbishment of the cask internals usually at age 25 years may be performed for various casks. When entering the maintenance process, the process checks the state of the lifetime and routes the cask to maintenance if the lifetime is greater than 25 years. If it is, the maintenance process routes the cask to a Replacement Process that increments the variable for cumulative costs for cask replacements to track these costs. Although the variables and extensions for this routine are in place, the algorithm to estimate casks replacement costs is still being developed. Therefore, cask refurbishment costs are not calculated in this version of the TSM.

2.4 TRANSPORTATION SHIPPING COSTS

In the 2003 TSLCC transportation cost information is provided for legal weight truck (LWT), heavy haul (HH), barge, and railroad shipping. The TSM also estimates costs for these items based on the routines in Reference BSC 2003b as discussed in separate sections below.

Both the TSLCC and the TSM use time as a parameter in estimating costs. The key difference in the methods used in the 2003 TSLCC and the TSM is that the TSM cost algorithms do not use a fixed estimate for usage time for resources that incur costs. The TSM is continuously tracking the time and use of resources and process actions during the simulation. For example, if a resource costs \$200/hour, the TSM cost algorithm does not have to calculate the hours the resource is used. The cost is incremented by \$1,600 for each 8-hour time step. Not using fixed estimates is important because if there are delays or holdups of a process, the resources are also properly “held” in use for the appropriate time. Because the TSM uses 8-hour time steps, the costs in the TSM are estimated by multiplying the resources used in that time step by the cost per 8-hours for many cost items.

Resource-based costs depend on the time in transit which in-turn depends on the speeds and distances for the connectors for the transit. Resource assignments are based on data and information in Reference BSC 2007c and the cost validation calculation for TSM V5.0 (BSC 2006a). The loading times or other time elements are also discussed in Reference BSC 2007c. Costs for resources are continuously incremented while the resource is committed and in use for an active shipment.

2.4.1 Legal Weight Truck Models

Reference BSC 2003b, Section 7.1, recommends the LWT cost as a step function for distances below 500 miles. Linear equations for the shipment costs, minus contingency and escalation factors, are listed below along with step function for minimum costs:

$$\text{LWT Costs (\$)} = (C_L + C_E + Q) \quad (1)$$

Where

Q	= Maximum (\$450 or (0.65*D))				
C _E	= Maximum (\$1,000 or (0.00518*W _E *D))				
C _L	= Maximum (\$1,000 or (A _L *W _L *D))				
A _L	=0.03816	for 0 to 100 miles	0.02603	for 101 to 250 miles	
	0.01877	for 251 to 500 miles	0.01266	for 501 to 750 miles	
	0.01155	for 751 to 1,000 miles	0.01104	for over 1, 000 miles	
W _L	= weight of a loaded transportation cask (hundred weight)				
W _E	= weight of an empty transportation cask (hundred weight)				
D	= 1-way distance (miles)				

Note: Typos in the A_L values in BSC 2003b, Section 7.1 have been corrected, in the values listed above, using formulas in BSC 2003c (e.g. 0.03816 vs. 3.816, etc.)

The TSM implementation uses a function call from each of the waste site processes to estimate the costs each time a shipment is dispatched from a waste site. The function call extensions increment a cumulative variable using the cost estimate from the function call with each step where a shipment is dispatched. The function call extensions are in the process “TruckshipCostCalc6” in the upper left corner of the TSM GUI.

TSM V5.0 and before used a separate algorithm for Cask 1 (weight full=53,666, weight empty 47,321) and for Cask 6 (weight full=54,242; weigh empty=47,582). The differences in the costs for a 1,000 mile trip vs. TSM V5.0 is less than \$77 out of \$9,103 or about 0.8% because of the different weights. Therefore a single algorithm is used for truck shipping cost in V5.0 without introducing significant error. The weights are consistent with the TSLCC 2003 inputs (BSC 2003b).

The TSM variables that are used for the nomenclature in Formula (1) and other related truck costs include:

Variable Name	Context	Units	Input Value	Where used	Description
costcumtruckship	Model	\$	N/A	Model Extensions	Cumulative truck shipping costs
costruckshipAL	Process	\$/mile-hundred wt.	N/A	TruckShipCostCalc6	Variable used in shipping cost estimate
costruckshipCL	Process	\$	N/A	TruckShipCostCalc6	Variable used in shipping cost estimate
costruckshipD	Process	miles	N/A	TruckShipCostCalc6	Distance from waste site to repository
costruckshipQ	Process	miles	N/A	TruckShipCostCalc6	Variable used in shipping cost estimate
costtruck2driver	Model	\$/mile	0.82	Model Extensions	Cost for 2nd truck driver

Variable Name	Context	Units	Input Value	Where used	Description
costtruck2drivercum	Model	\$	N/A	Model Extensions	Cumulative cost for 2nd driver
costtruckdem8hr	Model	\$/time step	160	Model Extensions	Unit cost for truck demurrage
costtruckseccum	Model	\$	N/A	Model Extensions	Cumulative cost for truck security
costtrucksecmile	Model	\$/mile	6.07	Model Extensions	Unit cost for truck security
costtruckshipCE	Process	miles-hundred weight	N/A	TruckShipCostCalc6	Variable used in shipping cost estimate

The function call that is used is in the Model Extensions that implements Formula (1) for Cask 6 is:

Line	Process Process and Event Handler	Line Formula
1681	TruckShipCostCalc6	
1682	ObjectActivated	
1683	Comment	Calc Truck shipping cost, called from truck sites
1684	Expression	caskwtfull = 54242
1685	Expression	caskwtempy = 47582
1686	Condition	IF (costtruckshipD*.65>450) is TRUE
1687	Expression	costruckshipQ = costruckshipD*.65
1688	Condition	END IF
1689	Condition	IF (costruckshipD*.65<=450) is TRUE
1690	Expression	costruckshipQ = 450
1691	Condition	END IF
1692	Condition	IF ((.00518*(caskwtempy/100)* costruckshipD)>1000) is TRUE
1693	Expression	costruckshipCE = .00518* costruckshipD*(caskwtempy/100)
1694	Condition	END IF
1695	Condition	IF ((.00518*(caskwtempy/100)*costruckshipD)<=1000) is TRUE
1696	Expression	costruckshipCE = 1000
1697	Condition	END IF
1698	Condition	IF (costruckshipD<100) is TRUE
1699	Expression	costruckshipAL = .03816
1700	Condition	END IF
1701	Condition	IF ((costruckshipD>=100) and (costruckshipD<250)) is TRUE
1702	Expression	costruckshipAL = .02603
1703	Condition	END IF
1704	Condition	IF ((costruckshipD>=250) and (costruckshipD<500)) is TRUE
1705	Expression	costruckshipAL = .01877
1706	Condition	END IF
1707	Condition	IF ((500<=costruckshipD) and (costruckshipD<750)) is TRUE
1708	Expression	costruckshipAL = .01266
1709	Condition	END IF
1710	Condition	IF ((750<=costruckshipD) and (costruckshipD<1000)) is TRUE
1711	Expression	costruckshipAL = .01155
1712	Condition	END IF
1713	Condition	IF (1000<costruckshipD) is TRUE
1714	Expression	costruckshipAL = .01104
1715	Condition	END IF
1716	Condition	IF ((costruckshipAL*(caskwtfull/100)* costruckshipD>1000)) is TRUE
1717	Expression	costruckshipCL = costruckshipAL*(caskwtfull/100)* costruckshipD
1718	Condition	END IF
1719	Condition	IF ((costruckshipAL*(costwtfull/100)*costruckshipD<=1000)) is TRUE
1720	Expression	costruckshipCL = 1000
1721	Condition	END IF
1722	Expression	costcumtruckship = costcumtruckship+ costruckshipQ+ costruckshipCE+ costruckshipCL

The calls to the function in the Model Extensions from the waste sites are implemented using extensions in each waste site. For example, the function call “Call Object Activated in ()” for Fort Calhoun is shown below.

Line	Process	Event Handler	Line Type	Line Formula
1040	FCT			
1041		Object:NextProcessDefined		
1042			Expression	costruckshipD = 1459
1043			Expression	costtruckseccum = costtruckseccum+ costtrucksecmile* costruckshipD
1044			Function Call	Call ObjectActivated() In TruckShipCostCalc6

Table 2 shows the distance data used in the extensions for the truck waste sites. These are based on the CALVIN database values used for the 2003 TSLCC site-to-repository distances and the empty cask weights. See the cost validation calculation for TSM V5.0 (BSC 2006a) for more details on the CALVIN database used and the estimate of shipping cost variability using different shipping weights.

Notice that only the sites shown in Table 2 (which include the current active truck sites) can be used as truck sites in the TSM. Truck shipment capability for other sites is not programmed in TSM V5.0. Programming for truck shipment capability is added when the site is first used in a scenario.

Table 2. Truck Site Parameters in TSM

Site Name	TSM Name	Distance, mi	Site Name	TSM Name	Distance, mi
BRUNSWICK	BRU	2,966	MONTICELLO	MON	1,866
CLINTON	CLI	1,929	MORRIS	MO	1,901
COOPER STN	CPR	1,568	NINE MILE PT	NMP	2,631
CRYSTAL RVR	CRY	2,905	OCONEE	OCO	2,615
COOK	DCC	1,986	OYSTER CRK	OC	2,749
DRESDEN	DRE	1,901	PALISADES	PAL	2,016
FORT CALHOUN	FC	1,459	PILGRIM	PIL	2,934
FORT ST. VRAIN	FSV	1,087	POINT BEACH	POI	2,076
GINNA	GIN	2,541	QUAD CITIES	QC	1,788
HANFORD	HAN	1,169	ROBINSON	ROB	2,776
INEEL-DOE	INL	746	ST LUCIE	SL	3,072
INDIAN PT 1&2	IP	2,723	SAN ONOFRE	SO	431
LACROSSE	LAC	1,873	SURRY	SUR	2,865
MCGUIRE	MCG	2,701	TURKEY PT	TP	3,230
MILLSTONE	MIL	2,813	VT YANKEE	VY	2,868

2.4.2 Barge Costs

BSC 2003b, Section 7.1 recommends a barge cost model that allows more than one cask per barge:

$$\text{Barge Cost} = \text{Transport Cost} + \text{Handling Cost} + \text{Idle Cost} \quad (2)$$

$$\text{Transport cost} = \{(\text{BCD} + 2^{\text{nd}} \text{ tug cost/day}) * \text{Transport time (days/shipment)} + \text{Port charges}\} * \text{No. of shipments} \quad (3)$$

$$\text{Handling cost} = \{ \text{Load-unload cost/day} * \text{Time to Load-unload (days/cask)} * \text{No. of casks} \} * \text{No. of shipments} \quad (4)$$

$$\text{Idle Cost} = \{ \text{Idle cost/day} * \text{Idle time (days)} \} * \text{No. of shipments} \quad (5)$$

where the number of shipments is defined as one-way travel (i.e., 2 for round trip)
 BCD = the barge/tug transport cost per day
 2nd tug cost/day = \$3,360 to \$4,800
 Port charges = about \$2,500 per docking
 Load-unload cost/day = \$5,000 for an empty cask, and \$13,000 for a loaded cask
 Idle cost per day = \$2,500

The TSM variables that are used for the nomenclature in Formula (2-5) include:

Variable Name	Context	Units	Input Value	Where used	Description
costbargeCPDall	Model	\$/day	N/A	Model Extensions	CostbargeCPDbarge+costbargeCPDtug
costbargeCPDbarge	Model	\$/day	16425	Model Extensions	Cost per day for barge use
costbargeCPDtug	Model	\$/day	4080	Model Extensions	Cost per day for tug use
costbargecum	Model	\$	N/A	Model Extensions	Cumulative costs for all barge costs
costbargedock	Model	\$/dock	2500	Model Extensions	Cost for each barge docking
costbarge-load	Model	\$/load	18000	Model Extensions	Cost for loading a barge, each
costbarge-loadcum	Model	\$	N/A	Model Extensions	Cumulative costs for barge loadings
costbarge-loadpercask	Model	\$/load	18000	Model Extensions	Same as costbarge-load
costbarge-loadsteps	Model	Time steps	3	Model Extensions	Time to load a barge
costbarge-portcum	Model	\$	N/A	Model Extensions	Cumulative cost for port use
costbarge-porteach	Model	\$/port	N/A	Model Extensions	Cost for port use, each
Costbarge-portnumcum	Model	number	N/A	Model Extensions	Cumulative number of port uses
costbarge-travelcum	Model	\$	N/A	Model Extensions	Cost for barge travel (exclude port uses)
costbarge-unloadsteps	Model	Time steps	3	Model Extensions	Time to unload a barge
costbarge-usecum	Model	Time steps	N/A	Model Extensions	Cumulative barge use

The function call that is used is in the Model Extensions that implements Formula (2-5) are:

Line	Line Type	Formula
16	Comment	Calculate Barge Costs
17	Comment	See the barge sites on the maps for costbargeloadcum loan/unload costs. See connectors at barge sites for portnum (no. of dockings).
18	Expression	mvBargerresource = GetAvailableNumberOfResources(ModelID, 'Bargerresource')
19	Comment	Barge use is in the R to B connector at barge sites. Barge use is in steps so divide CPDall by 3.
20	Expression	costbargetravelcum = (costbargeCPDall/3)* costbargeusecum
21	Expression	costbargeportcum = costbargeportnumcum* costbargeporteach
22	Expression	costbargecum = costbargetravelcum+ costbargeloadcum+ costbargeportcum

At the barge waste sites, the total time steps that barges have been used for all sites (costbargeusecum) are incremented in the site connection from the rail loading point at the waste site to the barge site. The number of port uses is also incremented. These incremented values are then used in the Model Extensions above to estimate the costs. For example, the incrementing routine for Cooper (2.6 time steps per round trip, BSC 2006c) is shown below.

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
914	Connection:	CPRR	CPRB	
915		ObjectActivated		
916			Comment	Barge use is the input total travel barge time per cask in steps (to and from B and R site)
917			Expression	costbargeusecum = costbargeusecum+2.6
918			Comment	Increment the number of port uses per cask = 2
919			Expression	costbargeportnumcum = costbargeportnumcum+2

There are also extensions for the barge loading and barge port costs in the barge site:

Line	Process	Event Handler	Line Type	Line Formula
903	CPRB			
904		ObjectProcessingCompleted		
905			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
906			Expression	caskwtempty = 229800
907			Expression	costrailshipD = 1349
908			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
909			Expression	costbargeloadcum = costbargeloadcum+(costrailshipcaskcars*(costbargeloadsteps/3)* costbargeloadpercask)
910			Function Call	Call ObjectActivated() In RailShipCostCalc

2.4.3 Heavy Haul

BSC 2003b, Section 7.1 for Heavy Haul recommends using the formula:

Total HH Cost per Cask (\$) =

$$\text{MAXIMUM} (\text{MinCost or } 2 * (\text{HHC} + \text{HHT} + \text{HHL}) (\frac{\text{HHM}}{24\text{HHS}} + \frac{\text{HHW}}{24})) \quad (6)$$

where

MinCost is an estimate of the minimum cost incurred when heavy-hauling a cask (not used in TSM).

HHC = heavy haul crane cost

HHT = heavy haul tractor cost

HHL = heavy haul labor cost

HHM = heavy haul 1-way travel distance per site (miles)

HHS = heavy haul travel speed (mph)

HHW = heavy haul loading/unloading time (hrs).

The TSM variables that are used for the nomenclature in Formula (6) include:

Variable Name	Context	Units	Input Value	Where used	Description
costHHCPDall	Model	\$/day	N/A	Model Extensions	costHHCPDcrane+costHHCPDlabor+costHHCPDtractor
costHHCPDcrane	Model	\$/day	\$4,181	Model Extensions	HH crane unit costs
costHHCPDlabor	Model	\$/day	\$4,181	Model Extensions	HH labor unit cost
costHHCPDtractor	Model	\$/day	\$2,091	Model Extensions	HH tractor unit cost
costHHcum	Model	\$	N/A	Model Extensions	Cumulative HH cost
costHHloadsteps	Model	time steps	3	Model Extensions	Time to load HH
costHHtravelmin	Model	time steps	1	Model Extensions	Minimum travel time from site to barge/rail depot
costHHunloadsteps	Model	time steps	3	Model Extensions	Time to unload HH
costHHusecum	Model	time steps	N/A	Model Extensions	Cumulative time HH in use

The function call that is used is in the Model Extensions that implements Formula (6) are:

Line	Line Type	Formula
24	Comment	Calculate HH Costs
25	Comment	See HH input connector for HH use in steps Divide CPD by 3 to get cost per step
26	Expression	costHHCPDall = costHHCPDcrane+ costHHCPDlabor+ costHHCPDtractor
27	Expression	costHHcum = (costHHCPDall/3)* costHHusecum

At the HH waste sites, the total time steps that HH have been used for all sites (HHusecum) is incremented in the site connection from the rail loading point at the site to the HH site. These incremented values are then used in the Model Extensions above to estimate the costs. For example, the incrementing routine for Calloway with a 0.21 step HH one-way travel time (BSC 2006c) from the reactor to the HH depot that interfaces with the railroad is:

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
115	Connection:	CALR	CALHH	
116		ObjectActivated		
117			Comment	HH use based on load+unload+travel time All HH use for cost estimate is in this extension
118			Expression	costHHusecum = costHHusecum+2*(0.21)+ costHHunloadsteps+ costHHloadsteps

2.4.4 Rail Shipping Costs

As discussed in BSC 2003b, Section 7.1, transportation costs by rail may be based on combinations of general rail or dedicated rail shipments. The TSM transportation cost is based on General Freight to take the empty cask to the waste site and dedicated rail for the loaded cask return. The CALVIN representation for these cost are (Ref. BSC 2003c, Section A.3.3.1.2):

$$\text{Total \$/shipment} = \text{One-way Trip Dedicated Train Charges} + n * P_1 * FC + P_2 * (2 * BC + EC) \quad (7)$$

where

$$\begin{aligned} FC (\$/\text{cask-car}) &= (0.0065 * W_{\text{cask}} * D + 0.3772 * D + 214) \\ BC (\$/\text{buffer car}) &= (0.548 * D + 175) \\ EC (\$/\text{escort car}) &= (0.612 * D + 176) \\ P_1 &= \text{estimated railroad profit margin for shipping hazardous waste (3.51)} \\ P_2 &= \text{estimated railroad profit margin for shipping buffer and escort cars alone (1.8)} \\ n &= \text{number of freight cars carrying transportation casks} \\ W_{\text{cask}} &= \text{weight of the transportation cask (tons)} \\ D &= \text{1-way distance (miles)} \end{aligned}$$

The One-way Trip Dedicated Train Charges are:

$$\text{To site \$/shipment} = (n * P_1 / 3.51) * [A * (W_{\text{train}} * D) + B * D + C] \quad (8)$$

Where:

$$\begin{aligned} A (\$/\text{ton-mile}) &= \exp(-1.009 * \ln(n) - 3.9287) \\ B (\$/\text{mile}) &= 19.6167 / n \\ C (\$) &= \exp(-0.586 * \ln(n) + 7.4935) \\ W_{\text{train}} &= n * (W_{\text{cask}} + 113) + 288 \end{aligned}$$

Table 3 shows the distance and weight parameters used in the extension for the rail waste sites. These are based on the CALVIN database values used for the 2003 TSLCC site-to-repository

distances and the empty cask weights. The cask weights were assigned to the sites in the original TSM development based on the type of cask assigned to that site for the TSLCC. The same cask weight is used to/from the waste sites and this means that the cost estimate is valid for either general rail to/dedicated return or dedicated rail to/general return.

See the cost validation calculation for TSM V5.0 (BSC 2006a) for more details on the CALVIN database used and the estimate of shipping cost variability using different shipping weights. Manual calculations in Reference BSC 2006a show that variations in the cask weight from 120,000 (smallest bare rail cask) to 250,000 lbs (largest rail cask) causes about an 8% increase in costs. So, the cask weight is not a major factor in the overall cost behavior.

The TSM variables that are used for the nomenclature in Formula (7-8) include:

Variable Name	Context	Units	Input Value	Where used	Description
caskwtempty	Process	Lb	Varies	RailShipCostCalc	Hard-wired at each waste site based on 2003 TSLCC cask used
costrailshipA	Process	\$/ton-mile	N/A	RailShipCostCalc	Variable used in shipping cost estimate
costrailshipB	Process	\$/mile	N/A	RailShipCostCalc	Variable used in shipping cost estimate
costrailshipBC	Process	\$	N/A	RailShipCostCalc	Variable used in shipping cost estimate
costrailshipC	Process	\$	N/A	RailShipCostCalc	Variable used in shipping cost estimate
costrailshipcaskcars	Process	None	N/A	RailShipCostCalc	Number of rail cars in a loaded shipment
costrailshipD	Process	miles	N/A	RailShipCostCalc	Distance from waste site to repository
costrailshipEC	Process	\$	N/A	RailShipCostCalc	Variable used in shipping cost estimate
costrailshipempty	Process	\$	N/A	RailShipCostCalc	Cost for shipping empty casks to sites
costrailshipFC	Process	\$/cask-car	N/A	RailShipCostCalc	Variable used in shipping cost estimate
costrailshiploaded	Process	\$	N/A	RailShipCostCalc	Cost for shipping loaded casks to repository
costrailshipP1	Model	none	3.51	Model Extensions	Coefficient used in rail cost formula
costrailshipP2	Model	none	1.8	Model Extensions	Coefficient used in rail cost formula

The function call that is used is in the Model Extensions that implements Formula (7-8) are:

Line	Process	Event Handler	Line Type	Line Formula
1117	RailShipCostCalc			
1118		ObjectActivated		
1119			Comment	Cost calculation for rail shipment costs, use call function from all rail processes
1120			Expression	costrailshipFC = 0.0065* (caskwtempty/2000)* costrailshipD+.3772* costrailshipD+214
1121			Expression	costrailshipBC = .548* costrailshipD+175
1122			Expression	costrailshipEC = .612* costrailshipD+176
1123			Expression	costrailshipempty = (costrailshipcaskcars* costrailshipP1*costrailshipFC)+ costrailshipP2*(2* costrailshipBC+ costrailshipEC)
1124			Expression	costrailshipA = EXP(-1.009*LN(costrailshipcaskcars)-3.9287)
1125			Expression	costrailshipB = 19.6167/costrailshipcaskcars
1126			Expression	costrailshipC = EXP(-0.568*LN(costrailshipcaskcars)+7.4935)
1127			Expression	costrailshiptrwt = costrailshipcaskcars* ((caskwtempty/2000)+113)+288
1128			Expression	costrailshiploaded = (costrailshipcaskcars* costrailshipP1/3.51)* (costrailshipA* costrailshiptrwt* costrailshipD)+ costrailshipB* costrailshipD+ costrailshipC)
1129			Expression	costcumrailship = costcumrailship+ costrailshipempty+costrailshiploaded

The calls to the function in the Model Extensions from the waste sites are implemented using extensions in each waste site. For example, the function call for Monticello is:

Line	Process	Event Handler	Line Type	Line Formula
984	MONR			
985		Object:NextProcessDefined		
986			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
987			Expression	caskwtempy = 229800
988			Expression	costrailshipD = 1795
989			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
990			Function Call	Call ObjectActivated() In RailShipCostCalc

Table 3. Rail Site Parameters in TSM

Site Name	TSM Name	Distance, mi	Weight, lb
ARK NUCLEAR	ANO	1862	229,800
BROWNS FERRY	BF	2127	229,800
BRAIDWOOD	BRA	1858	229,800
BIG ROCK	BRP	2275	296,500
BRUNSWICK	BRU	2826	229,800
BEAVER VALLEY	BV	2265	229,800
BYRON	BYR	1744	229,800
CALLAWAY	CAL	1637	229,800
CATAWBA	CAT	2624	229,800
CALVERT CLF	CC	2591	210,500
CLINTON	CLI	1863	229,800
COLUMBIA	CGS	1101	229,800
COMANCHE PK	CP	1688	229,800
COOPER STN	CPR	1349	229,800
CRYSTAL RVR	CRY	2846	229,800
DAVIS-BESSE	DB	2063	210,500
DIABLO CANYON	DC	508	229,800
COOK	DCC	1886	229,800
DRESDEN	DRE	1810	229,800
LASALLE	LS	1794	229,800
MCGUIRE	MCG	2684	272,900
MILLSTONE	MIL	2827	210,500
MONTICELLO	MON	1795	229,800
MORRIS	MO	1808	229,800
MAINE YANKEE	MY	3006	272,900
NORTH ANNA	NA	2701	210,500
NINE MILE PT	NMP	2507	229,800
OYSTER CRK	OC	2784	210,500
OCONEE	OCO	2574	186,262
PALISADES	PAL	1990	191,200
PEACHBOTTOM	PEA	2643	180,700
PERRY	PER	2253	229,800
PRAIRIE ISL	PI	1707	229,800
PILGRIM	PIL	2818	229,800
POINT BEACH	POI	1868	210,500
PALO VERDE	PV	714	272,900
QUAD CITIES	QC	1758	229,800
RVR BEND	RB	2146	229,800

Site Name	TSM Name	Distance, mi	Weight, lb
DUANE ARNOLD	DUA	1598	210,500
FARLEY	FAR	2750	229,800
FORT CALHOUN	FC	1329	229,800
ENRICO FERMI	FER	2160	229,800
FITZPATRICK	FIT	2508	229,800
GRAND GULF	GG	2182	229,800
GINNA	GIN	2449	229,800
HADDAM NECK	HAD	2785	272,900
HANFORD-DOE	HAND	1094	265,512
HANFORD-HLW	HANH	1094	265,512
HARRIS	HAR	2765	229,800
HATCH	HAT	2693	229,800
HOPE CREEK	HC	2717	229,800
HUMBOLDT BAY	HUM	1050	229,800
INEEL-DOE	INLD	550	265,512
INEEL-NAVAL	INLD	550	265,512
INEEL-HLW	INLH	550	265,512
INEEL	INLP	550	229,800
INDIAN PT 1&3	IP	2793	229,800
KEWAUNEE	KEW	1868	229,800
LACROSSE	LAC	1917	229,800
LIMERICK	LIM	2696	229,800

Site Name	TSM Name	Distance, mi	Weight, lb
ROBINSON	ROB2	2668	229,800
RANCHO SECO	RS	720	191,200
SALEM	SAL	2717	205,562
SEABROOK	SEA	2911	229,800
SEQUOYAH	SEQ	2343	229,800
ST LUCIE	SL	3097	229,800
SAN ONOFRE	SO	466	210,500
SAV RIVER-DOE	SRSD	2582	265,512
SAV RIVER-HLW	SRSB	2582	265,512
SOUTH TEXAS	STP	2065	221,440
SUMMER	SUM	2584	229,800
SURRY	SUR	2825	210,500
SUSQUEHANNA	SUS	2629	210,500
THREE MILE ISL	TMI	2630	205,562
TURKEY PT	TP	3123	229,800
TROJAN	TRO	1317	229,800
VOGTLE	VOG	2728	229,800
VT YANKEE	VY	2785	229,800
WATERFORD	WAT	2315	229,800
WATTS BAR	WB	2308	229,800
WOLF CREEK	WC	1561	229,800
WVDP	WVB	2396	179,540
YANKEE-ROWE	YR	2735	272,900
ZION	ZIO	1830	229,800

2.5 OTHER TRANSPORTATION COST PARAMETERS

This section discusses other transportation costs estimated in the TSLCC.

2.5.1 Demurrage

Per Reference BSC 2003b, demurrage (or detention) charges for the truck drivers and the equipment are assessed while wastes are being loaded into the transport cask and made ready for shipment at the origin. The following demurrage costs are recommended based on the waiting time:

- Demurrage-cost per hour for first day = \$20
- Demurrage-cost for first day= \$420
- Demurrage-cost per hour after first day = \$25
- Demurrage-min time before cost charged = 3 hours.

TSM simplifies this algorithm and makes a rough assumption that demurrage will occur in 8-hour increments and will cost \$20*8 or \$160 per 8 hours in 2002\$. Demurrage is <3.5% of the truck transportation costs so this approximation is deemed adequate for system modeling.

Previous versions of TSM used a resource defined for demurrage and then while casks were being loaded at the truck site, one demurrage resource was required to be in use. At each time step, the TSM assesses the demurrage resources in use and multiplies them by the unit cost for demurrage for 8 hours. TSM V5.0 assumes that the demurrage is 4 days (12 8-hour time steps) and the cost is escalated to 2004\$ by an assumed 2.5% from the 2002 unit costs of \$160 per 8 hours. The cost for demurrage is thus (12*\$160*1.025) or \$1968 for each truck shipment. The cumulative variable “costtruckdemcum” is incremented at the truck sites using the extensions below (for PAL):

Line	Process	Event Handler	Line Type	Line Formula
392	PALT			
393		ObjectActivated		
394		Object:NextProcessDefined		
395			Expression	costruckshipD = 2016
396			Expression	costtruckseccum = costtruckseccum+ costtrucksecmile* costruckshipD
397			Function Call	Call ObjectActivated() In TruckShipCostCalc6
398			Expression	costtruckdemcum = costtruckdemcum+1968

Note that the truck demurrage resource “mvtruckdemresource” is retained in TSM for possible future use.

2.5.2 Truck Shipment Security Costs

Reference BSC 2003b assumes that escorts will accompany truck shipments for the entire round trip, and will keep it under 24 hour surveillance. Reference BSC 2003c provides a flat rate for security for trucks as \$6.077 per mile.

The TSM variables that are used to estimate truck security costs are:

Variable Name	Context	Units	Input Value	Where used	Description
costruckseccum	Model		N/A	Model Extensions	Cumulative cost for truck security
costrucksecmile	Model	\$/mile	\$6.07	Model Extensions	Unit cost for truck security
costruckshipD	Process	miles	N/A	TruckShipCostCalc 6	Distance from waste site to repository

The total security costs are incremented at each waste site based on the distance. For example, the extension for Fort Calhoun is:

Line	Process	Event Handler	Line Type	Line Formula
1040	FCT			
1041		Object:NextProcessDefined		
1042			Expression	costruckshipD = 1459
1043			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD

2.5.3 Rail Shipment Security Costs

Reference BSC 2003b assumes that escorts will accompany rail shipments for the entire round trip, and will keep it under 24 hour surveillance. For rail security, the cost of each of the escorts is separated into two parts: a cost per day (escort labor cost) plus a cost per mile (costrailsecmile) charged by the rail carrier.

For TSM, the cost routine is based on assigning resources for security crews whenever a loaded cask is in control of CRWMS. The crews are tracked for each 8-hour time step.

To implement this routine, cumulative variables for costs are set up and the cumulative variables are incremented each time step based the shipments throughout the model at the waste sites.

The TSM variables that are used for this estimate are:

Variable Name	Context	Units	Input Value	Where used	Description
costcumrailship	Model	\$	N/A	Model Extensions	Cumulative rail shipping costs
costrailseccrew8hr	Model	\$/time step	\$675	Model Extensions	Rail security crew unit cost
costrailseccrewcum	Model	\$	N/A	Model Extensions	Cumulative rail security crew cost
costrailseccum	Model	\$	N/A	Model Extensions	Cumulative rail security cost
costrailsecmile	Model	\$/mile	\$1.512	Model Extensions	Commercial rail charge based on mileage
costrailsecmilecum	Model	\$	N/A	Model Extensions	Cumulative rail security cost based on miles
mvRailresource	Model	Integer	100	Model Extensions	Number of Railresources available

The Model Extension that implements the estimate is:

Line	Line Type	Formula
8	Comment	Rail security cost include crew cost and per mile cost Per mile cost done at each site based on distance
9	Expression	$\text{costrailseccrewcum} = \text{costrailseccrewcum} + \text{costrailseccrew8hr} * (100 - \text{mvRailresource})$
10	Expression	$\text{costrailseccum} = \text{costrailseccum} + \text{costrailseccrewcum}$

Incrementing the variables at the waste sites is implemented using extensions in each waste site. For example, the extension for Trojan is:

Line	Process	Event Handler	Line Type	Line Formula
1013	TROR			
1014		Object:NextProcessDefined		
1015			Expression	$\text{costrailshipcaskcars} = \text{GetNumberOfPartsOfType}(\text{ModelID}, \text{ObjectReferenceID}, \text{'Caskonrail'})$
1018			Expression	$\text{costrailseccum} = \text{costrailseccum} + \text{costrailseccum} * \text{costrailshipD}$

2.5.4 Satellite Transmission

Reference BSC 2003c lists that satellite costs are \$6.54E-02 per transmission. Also, Reference BSC 2003c recommends that the costs be based on one transmission every 15 minutes. For the TSM routine, it is assumed these transmissions are needed every 15 minutes that a security crew (truck or rail) is in active deployment. Therefore, the resources for truck and rail security crews can be used to estimate the costs. Since the security crews are tracked in 8-hour time steps, the cost per time step is \$2.09.

The TSM variables that are used for this estimate are:

Variable Name	Context	Units	Input Value	Where used	Description
costsatelite8hr	Model	\$/time step	2.09	Model Extensions	Satellite communication unit cost
costsatelitecum	Model	\$	N/A	Model Extensions	Cumulative satellite communication cost
mvRailresource	Model	Integer	100	Model Extensions	Number of Railresources available up to 100
mvTruckresource	Model	Integer	100	Model Extensions	Number of Truckresources available up to 100

The Model Extension that implements the estimate is:

Line	Line Type	Formula
29	Comment	Satellite cost based on \$0.0654/15min when on the road
30	Expression	$\text{costsatelitecum} = \text{costsatelitecum} + \text{costsatelite8hr} * ((100 - \text{mvRailresource}) + (100 - \text{mvTruckresource}))$

2.5.5 Rail Rolling Stock Costs

The TSM estimates the cost for the rail rolling stock that includes two buffer cars and a personnel car for each rail shipment. BSC 2003b recommends costs of \$0.05M for a buffer car and \$0.276M for a personnel car. The TSM uses values of \$50,000 and \$250,000. This will cause a small difference if the results of V5.0 and the TSLCC are compared.

The TSM cost routine is similar to the routine for transportation casks discussed in Section 2.3.1. As rail rolling stock is “bought” by the start processes for the TSM rolling stock, a cumulative cost variable is incremented by the cost of the rail cars and buffer cars. The “costrailcarcostcum” initial value is -\$700,000 because the TSM logic as set up initially “buys” two sets of 1 crew car and 2 buffer cars (\$700,000) that are never used when the TSM is initialized. So costrailcarcostcum is revised to \$0 when the TSM starts.

The TSM variables that are used for this estimate are:

Variable Name	Context	Units	Input Value	Where used	Description
costrailbufcar	Model	\$	\$50,000	Model Extensions	Cost to purchase a rail buffer car
costrailcarscum	Model	\$	-\$700,000	Model Extensions	Cumulative costs for rail cars
costrailcrewcar	Model	\$	\$250,000	Model Extensions	Cost to purchase a rail crew car

The Model Extension that implements the estimate is:

Line	Process or Connection	Event Handler or Connection from	Line Type or connection to	Line Formula
1130	Connection:	BuyLoco	DistLoco	
1131		ObjectProcessingCompleted		
1132			Comment	Cost for 2 buffer cars and 1 crew car
1133			Expression	costrailcarscum = costrailcarscum+(2*costrailbufcar)+ costrailcrewcar)

2.5.6 State Line Crossing Costs

Reference BSC 2003b recommends the following formula for the state transit fees:

$$\text{Fees/shipment} = (\# \text{ casks/shipment}) * (\text{cost/cask}) * (\# \text{ state borders crossed/shipment})$$

Reference BSC 2003b also recommends \$1,000 per shipment (or cask) for truck shipments and \$900 per cask for rail shipments.

The TSM variables that are used for this estimate are:

Variable Name	Context	Units	Input Value	Where used	Description
costcumSLR	Model	\$	N/A	Model Extensions	Cumulative state fees for rail casks crossing state lines
costcumSLT	Model	\$	N/A	Model Extensions	Cumulative state fees for truck casks crossing state lines
costSLrateR	Model	\$/cask	900	Model Extensions	Fee for state line crossing by rail
costSLrateT	Model	\$/cask	1000	Model Extensions	Fee for state line crossing by truck

The number of state line crossings is manually input to extensions in each connector that crosses a state line in the TSM. The state line costs are incremented at each connection. For truck shipments an example of the extensions for a connector that crosses one (1) state line is:

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1037	Connection:	CPRT	Omaha 1	
1038		ObjectActivated		
1039			Expression	costcumSLT = costcumSLT+1* costSLrateT

For rail routes, the number of casks in the shipment must be assessed using the SimCAD™ query to assess the contents of a joined object like the “caskonrail” and used in the estimate. This example is for a connection from the South Texas Project to Barstow:

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1546	Connection:	STPR	Barstow	
1547		ObjectActivated		
1548			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')

This example is for an intermediate connection that crosses 3 state lines:

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
890	Connection:	Blair6 6	Uvada1 6 6	
891		ObjectActivated		
892			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')

The number of state lines crossed for each connector is documented in the transportation validation (BSC 2007d).

2.6 WASTE PACKAGE AND TAD CANISTER COSTS

The TSM includes costs for the WPs and TAD canisters used by the WHF. The cost routine is similar to the routine for transportation casks discussed in Section 2.3.1. As a WP or TAD canister is required at the GROA processing lines, the WP and or TAD canister is “bought” by start processes in the GROA Blending Department (see Ref. BSC 2007c). Each time a WP or or TAD canister is bought, a cumulative cost variable is incremented by the cost of the WP.or TAD canister.

The TSM variables that are used for the WP cost estimates are all model context variables and include the costs for the various types of casks and cumulative variables as shown below. The significant digits below do not imply accuracy; they are retained to easily find the same values in the reference cost sources. The values are from the Phase 1 TAD Study (BSC 2006b).

Variable Name	Units	Input Value	Where used	Description
costWPBWR24	\$/WP	\$435,200	WP Preparation	Cost of a BWR Crit WP
costWPBWR44	\$/WP	\$497,800	WP Preparation	Cost of a BWR WP
costWPCSNFcum	\$	N/A	Model Extensions	Cumulative cost for WP
costWPDOECo	\$/WP	\$400,800	WP Preparation	Cost of a CoDisposal WP
costWPDOECoL	\$/WP	\$489,600	WP Preparation	Cost of a CoDisposalLong WP
costWPDOECum	\$	N/A	Model Extensions	Cumulative cost for WP
costWPDOEMCO	\$/WP	\$393,600	WP Preparation	Cost of a MCO WP
costWPNavY	\$/WP	\$459,800	WP Preparation	Cost of a Navy WP
costWPNavYL	\$/WP	\$487,600	WP Preparation	Cost of a NavyLong WP
costWPPWR12L	\$/WP	\$458,700	WP Preparation	Cost of a STP WP
costWPPWR21	\$/WP	\$598,800	WP Preparation	Cost of a PWR WP
costWPPWR21c	\$/WP	\$514,200	WP Preparation	Cost of a PWR Crit WP
costWPTAD	\$/WP	\$555,158	WP Preparation	Cost of a TAD WP

The costs are incremented in the WP start processes as shown in the example below for a TAD WP.

Line	Process or Connection	Event Handler	Line Type	Line Formula
53	WPTAD			
54		Object:NextProcessDefined		
55			Expression	costWPCSNFcum = costWPCSNFcum+costWPTAD

The TSM variables that are used for the TAD canister cost estimates are all model context variables and include the costs for the various types of casks and cumulative variables as shown below:

Variable Name	Units	Input Value	Where used	Description
costcumTADcan	\$/can	N/A	Model Extensions	Cumulative costs for TAD can for WHF
costTADLMB	\$/cask	\$810,000	TAD buy processes, TADB	Unit costs for large or medium BWR TAD canister
costTADLMOV	\$/cask	\$4,000,000	TAD buy processes, TADP	Unit costs for large or medium TAD overpack
costTADLMP	\$/cask	\$1,120,000	TAD buy processes	Unit costs for large or medium PWR TAD canister

The costs are incremented in the TAD canister processes as shown below:

Process	Event Handler	Line Type	Line Formula
TADB	Next Process Defined	Expression	costcumTADcan=costcumTADcan+costTADLMB
TADP	Next Process Defined	Expression	costcumTADcan=costcumTADcan+costTADLMP

Notice the unit costs for the TAD canisters filled in WHF are the same as the canisters purchased at the waste sites.

The TSM is not set up to calculate the costs for overpacks for any TAD canisters that are sent to aging. Aging overpacks are reused and the net number needed for aging is not tracked by TSM. Costs for TAD canister aging overpacks are performed in the CRG where the net number of overpacks needed is calculated using the “to” and “from” aging values and a unit cost selected by the analyst.

As mentioned in Section 1.3, the counts of objects completed can be used in post-run analyses to develop estimates using unit costs other than those set by the variables above. For example, the values in the cost analysis for the Phase 1 TAD Study (BSC 2005a) used different unit cost values in the post run analysis using both manual calculations and the CRG set up for the analysis. There were two options in handling the unit cost values by either resetting the unit costs in the TSM variables or by setting the desired values in post run analyses. The Phase 1 study set the values in post run as it was anticipated the costs could be changed with no need for a rerun. In this situation the values in the TSM variables still indicated the overall cost behavior during the run, but were not used for the published cost results.

2.7 TOTAL COST ROLLUPS

TSM estimates total costs to allow easier analysis of the simulation results. The variables used are:

Variable Name	Context	Units	Input Value	Where used	Description
costwastcaskcum	Model	\$	N/A	Model Extensions	Cumulative costs for all transportation casks
costwastother	Model	\$	N/A	Model Extensions	Cumulative costs for all other WAST costs excluding transportation casks

The Model Extensions used are:

Line	Line Type	Formula
33	Expression	costwastcaskcum = costcumcaskD+ costcumcaskR+ costcumcaskT
34	Expression	costwastothercum = costbargecum+ costcumrailship+ costcumtruckship+ costHHcum+ costtrailseccum+ costsatelitecum+ costSLrateR+ costSLrateT+ costtruckdemcum+ costtruckseccum+ costtruck2drivercum

3. COST ESTIMATE CHECKS

During system studies and TSM development, the cost TSM calculations have been checked by manual functional checks during development, manual and automated checks of system analysis results, and comparisons to previous cost analyses such as the TSLCC.

3.1 MANUAL CHECKS

As TSM was constructed, short test runs were done by the developers to check the validity of the results. These are usually undocumented short tests, typical for standard practice in code development. Corrections are made as needed to correct errors. For example, the developer can use a hand-calculation of the shipping, cask costs, and other costs for three cask loads from a site and run those cask loads to check the results.

As development progresses, more processes and systems are added and undocumented checks are made for individual changes and overall system effects. For example, the cask costs from a test run with many casks can be used to check the costs for each cask as well as the integrated costs for all the casks. System checks for things like resources used by multiple shipments simultaneously are checked using the output for the number of resources in use and using that with the unit cost of the resource to ensure costs are properly accumulated.

Other integrated manual checks using EXCEL spreadsheets are performed and these are documented in the cost validation calculation for TSM V5.0 (BSC 2006a), the CRG validation (BSC 2007f), and the overall TSM V6.0 validation (BSC 2007b). For example, the TSM can be run for a full case and the IS file for this case can be analyzed to estimate the number and origin of each cask load and these can be combined with the proper unit costs to check that the total cost agrees with the result of the TSM.

3.2 SYSTEM ANALYSIS CHECKS

Detailed, integrated systems studies such as the Phase 1 TAD Study (BSC 2005a) provided an opportunity to check the cost calculations at the detailed functional level and also at a general systems level. The cost estimate results and checks are discussed in the backup cost calculation to support the Phase 1 TAD Study (BSC 2006b). The Phase 1 TAD Study analysis was documented with considerable rigor and the logistics results and cost results were carefully analyzed for consistency and to identify and correct any errors or problems in the TSM cost estimating routines. The TSM V6.0 uses the same cost algorithms that were used for TSM V5.0 for the Phase 1 TAD Study, so the Phase 1 TAD Study results and checks remain valid.

As discussed in the backup cost calculation to support the Phase 1 TAD Study (BSC 2006b) the cost analyses and checks included both manual checks and checks using the CRG. These methods for estimating costs and checking them provide additional assurance the logistics that provide the counts of objects used as the basis for cost estimating routines in the TSM are adequate.

The Phase 1 TAD Study also provided the opportunity to check cost impacts on a system level. For example, if the number of WPs increased from one case to another, the analyst can predict

the associated cost increase by hand and compare it to the TSM result. In these situations the TSM cost results become another way to judge if the system analysis “makes sense” and that the impacts from changes are predictable.

The Phase 1 TAD Study is also a good example of how costs are used in the system assessment. Relative cost results were used to understand cost impacts of various scenarios. In these cases, the absolute values of the costs and the underlying unit cost values are not particularly relevant. As mentioned, the TSM is not a cost estimating tool but is suitable for relative cost comparisons. The Phase 1 TAD Study demonstrates that the TSM meets its intended function to show system impacts as key parameters are changed.

3.3 COMPARISON TO EXISTING ANALYSES

When TSM V3.0 was issued in 2004, one independent check of costs was to compare the results to the 2003 TSLCC update. For consistency, this same case was run using TSM Version 4.0 and the results compared to the 2003 TSLCC cost assessment. This comparison is—in the cost validation calculation for TSM V5.0 (BSC 2006a). The comparison is limited to WAST costs since the TSM does not provide many of the costs in the TSLCC 2003. The comparison includes the following WAST cost elements:

RAIL	TRUCK
Rail Shipping Cost	Truck Shipping Cost
Rail Security Costs	Truck Security Costs
Satellite Tracking	Truck Satellite tracking
Rail Operations	Truck operations
State Line Crossing	Truck state line crossing
Barge costs	Truck Demurrage
Heavy haul cost	Truck 2 nd driver
Cask costs	Truck Cask costs
Rail cars	

There are some TSLCC costs that are excluded from the comparison such as the cask fleet costs (the type and number of casks in the fleets compared for the check) because the cask allocation algorithms are so different.

Based on the fundamental differences in the two cost approaches, an exact match of the cost results is not expected. For example, as discussed in Reference BSC 2006c, the transit times in the TSM and the TSLCC basis do not match exactly. Also, even though the algorithms for the two models as are the same, the means of inputting data to the algorithm are quite different when executed by the model programming. Therefore, it is not expected that the costs between the two models would match. Some TSM cost estimates are also less refined (for example, the cask replacement costs) and causes cost differences. So some differences in the cost results are expected from the differences in the models.

Differences in the TSM results and the TSLCC 2003 results are explained to justify the differences and conclude that the two estimates agree. These successful comparisons of TSM

V5.0 to previous versions mean that comparisons of TSM V6.0 to V5.0 as done in the TSM V6.0 validation (BSC 2006b) are justified and proper.

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4.2 CODES, STANDARDS, REGULATIONS, AND PROCEDURES

AP-ENG-006 REV 1 ICN 0. *Total System Model (TSM) – Changes to Configuration Items and Base Case*. Washington, DC: BSC. ACC: Submit to RPC.

APPENDIX A
COST VARIABLE LISTING

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A. COST VARIABLE LISTING

The custom variables used in the TSM are listed in the “Flow Properties”, “Custom Variables” tab in the TSM main view. All of the TSM variables are also listed in the “Analysis” menu on the main TSM toolbar, menu item “Model Information” sub menu “Extensions/Events”. Table A-1 lists the custom variables for the cost routines. All of the cost variables are double precision.

The information in the columns of the table includes:

Variable name: TSM variable name.

Units: Measurement units.

Input Value: Value of value set in the variable list or a description of where the variable is set (such as the Initial State file). The bases for these values are in the main text.

Where used: The Department and Process where the variable is used or defined.

Description: The general function or purpose of the variable in the TSM. More details such as equations that use the cost variables are covered in the main text.

The variables are discussed more in the main text.

Table A-1. TSM Cost Variables

Variable Name	Context	Type	Units	Input Value	Where used	Description
costbargeCPDall	Model	Double	\$/day	N/A	Model Extensions	CostbargeCPDbarge+costbargeCPDtug
costbargeCPDbarge	Model	Double	\$/day	\$16,425	Model Extensions	Cost per day for barge use
costbargeCPDtug	Model	Double	\$/day	\$4,080	Model Extensions	Cost per day for tug use
costbargecum	Model	Double	\$	N/A	Model Extensions	Cumulative costs for all barge costs
costbargedock	Model	Double	\$/dock	\$2,500	Model Extensions	Cost for each barge docking
costbargeoad	Model	Double	\$/load	\$18,000	Model Extensions	Cost for loading a barge, each
costbargeoadcum	Model	Double	\$	N/A	Model Extensions	Cumulative costs for barge loadings
costbargeoadpercask	Model	Double	\$/load	18000	Model Extensions	Same as costbargeoad
costbargeoadsteps	Model	Double	Time steps	3	Model Extensions	Time to load a barge
costbargeportcum	Model	Double	\$	N/A	Model Extensions	Cumulative cost for port use
costbargeporteach	Model	Double	\$/port	N/A	Model Extensions	Cost for port use, each
costbargeportnumcum	Model	Double	number	N/A	Model Extensions	Cumulative number of port uses
costbargetravelcum	Model	Double	\$	N/A	Model Extensions	Cost for barge travel (exclude port uses)
costbargeunloadsteps	Model	Double	Time steps	3	Model Extensions	Time to unload a barge
costbargeusecum	Model	Double	Time steps	N/A	Model Extensions	Cumulative barge use
costcaskbarebasket	Model	Double	\$ each	\$400,000	Model Extensions	Cost for a bare basket
costcaskDOE	Model	Double	\$ each	\$4,470,000	Model Extensions	Cost for a DOE cask
costcaskDOEbasket	Model	Double	\$ each	\$425,000	Model Extensions	Cost for a DOE basket
costcaskDOEov	Model	Double	\$ each	\$4,045,000	Model Extensions	Cost for a DOE overpack (shell)
costcaskmed	Model	Double	\$\$ each	\$2,800,000	Model Extensions	Cost for medium rail cask
costcaskov	Model	Double	\$ each	\$2,800,000	Model Extensions	Cost for cask overpack
costcasksmall	Model	Double	\$ each	\$2,000,000	Model Extensions	Cost for small cask
costcasktruck	Model	Double	\$ each	\$2,500,000	Model Extensions	Cost for truck cask
costcaskTSC	Model	Double	\$ each	\$3,300,000	Model Extensions	Cost for TSC cask
costcumcaskD	Model	Double	\$	N/A	Model Extensions	Cumulative costs for DPC cask purchases
costcumcaskDOE	Model	Double	\$ each	\$4,470,000	Model Extensions	Cost for a DOE cask
costcumcaskR	Model	Double	\$	N/A	Model Extensions	Cumulative costs for rail cask purchases
costcumcaskreplR	Model	Double	\$	N/A	Model Extensions	Cumulative costs for rail cask refurb at 25 years (not active)
costcumcaskreplS	Model	Double	\$	N/A	Model Extensions	Cumulative costs for cask shells refurb at 25 years (not active)
costcumcaskreplT	Model	Double	\$	N/A	Model Extensions	Cumulative costs for truck cask refurb at 25 years (not active)
costcumcaskS	Model	Double	\$	N/A	Model Extensions	Cumulative costs for cask shell purchases
costcumcaskT	Model	Double	\$	N/A	Model Extensions	Cumulative costs for truck cask purchases
costcumcaskTAD	Model	Double	\$	N/A	Model Extensions	Cumulative costs for TAD purchases
costcumcaskTADOV	Model	Double	\$	N/A	Model Extensions	Cumulative costs for TAD overpack purchases
costcumrailship	Model	Double	\$	N/A	Model Extensions	Cumulative rail shipping costs
costcumSLR	Model	Double	\$	N/A	Model Extensions	Cumulative state fees for rail casks crossing state lines
costcumSLT	Model	Double	\$	N/A	Model Extensions	Cumulative state fees for truck casks crossing state lines
costcumTADcan	Model	Double	\$	N/A	TADP, TADB	Cumulative costs for TAD can for WHF
costcumtruckship	Model	Double	\$	N/A	Model Extensions	Cumulative truck shipping costs

Variable Name	Context	Type	Units	Input Value	Where used	Description
costHHCPDall	Model	Double	\$/day	N/A	Model Extensions	costHHCPDcrane+costHHCPDlabor+costHHCPDtractor
costHHCPDcrane	Model	Double	\$/day	\$4,181	Model Extensions	HH crane unit costs
costHHCPDlabor	Model	Double	\$/day	\$4,181	Model Extensions	HH labor unit cost
costHHCPDtractor	Model	Double	\$/day	\$2091	Model Extensions	HH tractor unit cost
costHHcum	Model	Double	\$	N/A	Model Extensions	Cumulative HH cost
costHHloadsteps	Model	Double	time steps	3	Model Extensions	Time to load HH
costHHtravelmin	Model	Double	time steps	1	Model Extensions	Minimum travel time from site to barge/rail depot
costHHunloadsteps	Model	Double	time steps	3	Model Extensions	Time to unload HH
costHHusecum	Model	Double	time steps	N/A	Model Extensions	Cumulative time HH in use
costrailbufcar	Model	Double	\$	\$50000	Model Extensions	Cost to purchase a rail buffer car
costrailcarscum	Model	Double	\$	-\$700,00	Model Extensions	Cumulative costs for rail cars (needs revision)
costrailcrewcar	Model	Double	\$	\$250,000	Model Extensions	Cost to purchase a rail crew car
costrailseccrew8hr	Model	Double	\$/time step	\$675	Model Extensions	Rail security crew unit cost
costrailseccrewcum	Model	Double	\$	N/A	Model Extensions	Cumulative rail security crew cost
costrailseccum	Model	Double	\$	N/A	Model Extensions	Cumulative rail security cost
costrailsecmile	Model	Double	\$/mile	1.512	Model Extensions	Rail security cost per mile
costrailsecmilecum	Model	Double	\$	N/A	Model Extensions	Cumulative rail security cost based on miles
costrailshipA	Process	Double	\$/ton-mile	N/A	RailShipCostCalc	Variable used in shipping cost estimate
costrailshipB	Process	Double	\$/mile	N/A	RailShipCostCalc	Variable used in shipping cost estimate
costrailshipBC	Process	Double	\$	N/A	RailShipCostCalc	Variable used in shipping cost estimate
costrailshipC	Process	Double	\$	N/A	RailShipCostCalc	Variable used in shipping cost estimate
costrailshipcaskcars	Process	Double	None	N/A	RailShipCostCalc	Number of rail cars in a loaded shipment
costrailshipD	Process	Double	miles	N/A	RailShipCostCalc	Distance from waste site to repository
costrailshipEC	Process	Double	\$	N/A	RailShipCostCalc	Variable used in shipping cost estimate
costrailshipempty	Process	Double	\$	N/A	RailShipCostCalc	Cost for shipping empty casks to sites
costrailshipFC	Process	Double	\$/cask-car	N/A	RailShipCostCalc	Variable used in shipping cost estimate
costrailshiploaded	Process	Double	\$	N/A	RailShipCostCalc	Cost for shipping loaded casks to repository
costrailshipP1	Model	Double	none	3.51	Model Extensions	Coefficient used in rail cost formula
costrailshipP2	Model	Double	none	1.8	Model Extensions	Coefficient used in rail cost formula
costrailshiptrwt	Process	Double	ton	N/A	RailShipCostCalc	Total train load weight
costreplaceCask1	Process	Double	\$	\$400,000	Maintenance, Cask replace process	Cost for major overhaul of casks after 25 years
costreplaceCask6	Process	Double	\$	\$570,000	Maintenance, Cask replace process	Cost for major overhaul of casks after 25 years
costreplaceRcask	Process	Double	\$	\$510,000	Maintenance, Cask replace process	Cost for major overhaul of casks after 25 years
costruckshipAL	Process	Double	\$/mile-hundred wt.	N/A	TruckShipCostCalc6	Variable used in shipping cost estimate
costruckshipCL	Process	Double	\$	N/A	TruckShipCostCalc6	Variable used in shipping cost estimate
costruckshipD	Process	Double	miles	N/A	TruckShipCostCalc6	Distance from waste site to repository
costruckshipQ	Process	Double	miles	N/A	TruckShipCostCalc6	Variable used in shipping cost estimate
costsatellite8hr	Model	Double	\$/time step	2.09	Model Extensions	Satellite communication unit cost
costsatellitecum	Model	Double	\$	N/A	Model Extensions	Cumulative satellite communication cost
costSLrateR	Model	Double	\$/cask	900	Model Extensions	Fee for state line crossing by rail

Variable Name	Context	Type	Units	Input Value	Where used	Description
costSLrateT	Model	Double	\$/cask	\$1,000	Model Extensions	Fee for state line crossing by truck
costTADLMB	Model	Double	\$/cask	\$810,000	TAD buy processes, TADB	Unit costs for large or medium BWR TAD canister
costTADLMOV	Model	Double	\$/cask	\$4,000,000	TAD buy processes, TADP	Unit costs for large or medium TAD overpack
costTADLMP	Model	Double	\$/cask	\$1,120,000	TAD buy processes	Unit costs for large or medium PWR TAD canister
costTADSB	Model	Double	\$/cask	\$340,000	TAD buy processes	Unit costs for small BWR TAD canister
costTADSOV	Model	Double	\$/cask	\$2,400,000	TAD buy processes	Unit costs for small TAD overpack
costTADSP	Model	Double	\$/cask	\$410,000	TAD buy processes	Unit costs for small PWR TAD canister
costtestn	Model	Double	none	N/A	Model Extensions	For check and test only
costtruck2driver	Model	Double	\$/mile	0.82	Model Extensions	Cost for 2nd truck driver
costtruck2drivercum	Model	Double	\$	N/A	Model Extensions	Cumulative cost for 2nd driver
costtruckdem8hr	Model	Double	\$/time step	160	Model Extensions	Unit cost for truck demurrage
costtruckdemcum	Model	Double	\$	N/A	Model Extensions	Cumulative cost for truck demurrage
costtrucksecum	Model	Double		N/A	Model Extensions	Cumulative cost for truck security
costtrucksecmile	Model	Double	\$/mile	6.07	Model Extensions	Unit cost for truck security
costtruckshipCE	Process	Double	miles-hundred weight	N/A	TruckShipCostCalc 1 and 7	Variable used in shipping cost estimate
costwastcaskcum	Model	Double	\$	N/A	Model Extensions	Cumulative WAST cost for casks
costwastothercum	Model	Double	\$	N/A	Model Extensions	Cumulative WAST cost excluding casks
costWPBWR24	Model	Double	\$/WP	435200	WP Preparation	Cost of a BWR Crit WP
costWPBWR44	Model	Double	\$/WP	497800	WP Preparation	Cost of a BWR WP
costWPCSNFcum	Model	Double	\$	N/A	Model Extensions	Cumulative cost for WP
costWPDOECo	Model	Double	\$/WP	400800	WP Preparation	Cost of a CoDisposal WP
costWPDOECoL	Model	Double	\$/WP	489600	WP Preparation	Cost of a CoDisposalLong WP
costWPDOEcum	Model	Double	\$	N/A	Model Extensions	Cumulative cost for WP
costWPDOEMCO	Model	Double	\$/WP	393600	WP Preparation	Cost of a MCO WP
costWPNavyl	Model	Double	\$/WP	459800	WP Preparation	Cost of a Navy WP
costWPNavylL	Model	Double	\$/WP	487600	WP Preparation	Cost of a NavyLong WP
costWPPWR12L	Model	Double	\$/WP	458700	WP Preparation	Cost of a STP WP
costWPPWR21	Model	Double	\$/WP	598800	WP Preparation	Cost of a PWR WP
costWPPWR21c	Model	Double	\$/WP	514200	WP Preparation	Cost of a PWR Crit WP
costWPTAD	Model	Double	\$/WP	555158	WP Preparation	Cost of a TAD WP

APPENDIX B
TSM COST ESTIMATE EXTENSIONS

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B. TSM COST ESTIMATE EXTENSIONS

This appendix shows the extension and function calls used in the TSM. Table B-1 shows the extensions used in the TSM toolbar “Properties” menu, “Flow Properties” Dialog Box, “Extensions/Events” tab, for the “Simulation Step Started” event handler (calculates at each time step). These extensions are referred to as “Model Extensions”.

Table B-2 shows the extensions that are in the individual processes and connections in the TSM GUI. As discussed in Section 2 many of these extensions are generic and are similar for the waste site processes. These extensions are referred to as “Process Extensions”.

A list of all extension in SimCAD™ is under the TSM main view tool bar “Analysis” menu, menu item “Model Information” sub menu “Extensions/Events”. The Extension/Events List lists the extensions in no particular order. The line numbers in the tables in this appendix are provided for easy reference in this manual.

In both tables, the extension lines are in the order they appear in the Extensions/Events listing but extension lines for other functions not related to costs have been removed.

In Table B-2 only extensions for active truck sites are included. As discussed in Section 2.4.1, the programming for truck sites is not completed until the site is used in a scenario.

Table B-1. TSM Model Extensions

Line	Line Type	Formula
1		SimulationStepStarted
2	Expression	mvRailresource = GetAvailableNumberOfResources(ModelID, 'Railresource')
3	Expression	mvTruckresource = GetAvailableNumberOfResources(ModelID, 'Truckresource')
4	Expression	mvBargerresource = GetAvailableNumberOfResources(ModelID, 'Bargerresource')
5	Expression	mvHHresource = GetAvailableNumberOfResources(ModelID, 'HHresource')
6	Expression	mvtruckdemresource = GetAvailableNumberOfResources(ModelID, 'Truckdemurrage')
7	Comment	
8	Comment	Rail security costs include crew cost and per mile cost. Per Mile cost done at each site based on distance.
9	Expression	costrailseccrewcum = costrailseccrewcum+ costrailseccrew8hr*(100- mvRailresource)
10	Expression	costrailseccum = costrailsecmilecum+ costrailseccrewcum
11	Comment	
12	Comment	Truck security cost based on distance only at each site
13	Comment	Truck Demurrage based on calc at each Tsite
14	Comment	Truck demurrage in sites 10/27/04.
15	Comment	
16	Comment	Calculate Barge Costs
17	Comment	See the barge sites on the maps for costbargeloadcum loan/unload costs. See connectors at barge sites for portnum (no. of dockings).
18	Expression	mvBargerresource = GetAvailableNumberOfResources(ModelID, 'Bargerresource')
19	Comment	Barge use is in the R to B connector at barge sites. Barge use is in steps so divide CPDall by 3.
20	Expression	costbargetravelcum = (costbargeCPDall/3)* costbargeusecum
21	Expression	costbargeportcum = costbargeportnumcum* costbargeporteach
22	Expression	costbargecum = costbargetravelcum+ costbargeloadcum+ costbargeportcum
23	Comment	
24	Comment	Calculate HH Costs
25	Comment	See HH input connector for Hh use in steps. Divide CPD by 3 to get per step
26	Expression	costHHCPDall = costHHCPDcrane+ costHHCPDlabor+ costHHCPDtractor
27	Expression	costHHcum = (costHHCPDall/3)* costHHusecum
28	Comment	
29	Comment	Satellite cost based on \$0.0654/15min when on the road.
30	Expression	costsatelitecum = costsatelitecum+ costsatelite8hr*((100- mvRailresource)+ (100- mvTruckresource))
31	Comment	
32	Comment	Sum WASTcost cum, separate cask and other
33	Expression	costwastcaskcum = costcumcaskD+ costcumcaskR+ costcumcaskT
34	Expression	costwastothercum = costbargecum+ costcumrailship+ costcumtruckship+ costHHcum+ costrailseccum+ costsatelitecum+ costSLrateR+ costSLrateT+ costtruckdemcum+ costtruckseccum+ costtruck2drivercum
35	Comment	
36	Comment	Calculate the Max number of resources in use for recording
37	Condition	IF (mvHHresource< mvHHmin) is TRUE
38	Expression	mvHHmin = mvHHresource
39	Condition	END IF
40	Condition	IF (mvBargerresource< mvBargemin) is TRUE
41	Expression	mvBargemin = mvBargerresource
42	Condition	END IF
43	Condition	IF (mvRailresource< mvRailmin) is TRUE
44	Expression	mvRailmin = mvRailresource

Line	Line Type	Formula
45	Condition	END IF
46	Condition	IF (mvTruckresource< mvTruckmin) is TRUE
47	Expression	mvTruckmin = mvTruckresource
48	Condition	END IF
49	Comment	Set the timestep interval to record to database, 270=3 months. Reset the max values for the resources for next recording interval.
50	Condition	IF (GetSystemTime(ModelID) MOD 270=0) is TRUE
52	Expression	mvHHmin = 500
53	Expression	mvBargemin = 500
54	Expression	mvRailmin = 500
55	Expression	mvTruckmin = 500
56	Condition	END IF

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Table B-2. TSM Process Extensions for Cost Estimates

This table shows the process extensions related to costs. It does not include process extensions for other model actions such as triggers. The list is also limited to process extensions that are actively used in the TSM V5.0. For example, extensions for truck waste sites that are not used are not included. Note that the second column indicates if the extension is for a connection. If so, the next columns indicate the connection from/to processes. For Version 6.0, new lines are indicated by the lettered items at the top of the list. There are also modifications for the DOE cask costs in lines 1-15, and deletion of lines 16-21 to remove the MSCB and MSCP cost extensions

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
A	TADB	Next Process Defined	Expression	costcumTADcan=costcumTADcan+costTADLMB
B				
C	TADP	Next Process Defined	Expression	costcumTADcan=costcumTADcan+costTADLMP
D				
E	c2XX	BuyCask2XX	2XXDist	
F		ObjectProcessingCompleted		
G			Expression	costcumcaskDOE = costcumcaskDOE+costcaskDOEov
H	c44_INS	BuyCask44_INS	Cask44_INSDistribute	
I		ObjectProcessingCompleted		
J			Expression	costcumcaskDOE = costcumcaskDOE+costcaskDOEbasket
K	c50_INS	BuyCask50_INS	Cask50_INSDistribute	
L		ObjectProcessingCompleted		
M			Expression	costcumcaskDOE = costcumcaskDOE+costcaskDOEbasket
N	c51_INS	BuyCask51_INS	Cask51_INSDistribute	
O		ObjectProcessingCompleted		
P			Expression	costcumcaskDOE = costcumcaskDOE+costcaskDOEbasket
Q	c52_INS	BuyCask52_INS	Cask52_INSDistribute	
R		ObjectProcessingCompleted		
S			Expression	costcumcaskDOE = costcumcaskDOE+0
T	c56_INS	BuyCask56_INS	Cask56_INSDistribute	
U		ObjectProcessingCompleted		
V			Expression	costcumcaskDOE = costcumcaskDOE+costcaskDOEbasket
1	c44b	BuyCask44	Cask44Distribute	
2		ObjectProcessingCompleted		
3			Expression	costcumcaskDOE = costcumcaskDOE+costcaskDOE
4	c50b	BuyCask50	Cask50Distribute	
5		ObjectProcessingCompleted		
6			Expression	costcumcaskDOE = costcumcaskDOE+costcaskDOE

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
7	c51b	BuyCask51	Cask51Distribute	
8		ObjectProcessingCompleted		
9			Expression	costcumcaskDOE = costcumcaskDOE+costcaskDOE
10	c52b	BuyCask52	Cask52Distribute	
11		ObjectProcessingCompleted		
12			Expression	costcumcaskDOE = costcumcaskDOE+0
13	c56b	BuyCask56	Cask56Distribute	
14		ObjectProcessingCompleted		
15			Expression	costcumcaskDOE = costcumcaskDOE+costcaskDOE
22	WPBWR24			
23		Object:NextProcessDefined		
24			Expression	costWPCSNFcum = costWPCSNFcum+costWPBWR24
25		trWPRelBWR24mon		
26	WPBWR44			
27		Object:NextProcessDefined		
28			Expression	costWPCSNFcum = costWPCSNFcum+costWPBWR44
29	WPCodisp			
30		Object:NextProcessDefined		
31			Expression	costWPDOEcum = costWPDOEcum+costWPDOEC0
32	WPCodispL			
33		Object:NextProcessDefined		
34			Expression	costWPDOEcum = costWPDOEcum+costWPDOEC0L
35	WPMCO			
36		Object:NextProcessDefined		
37			Expression	costWPDOEcum = costWPDOEcum+costWPDOEMCO
38	WPNavy			
39		Object:NextProcessDefined		
40			Expression	costWPDOEcum = costWPDOEcum+costWPNavy
41	WPNavyL			
42		Object:NextProcessDefined		
43			Expression	costWPDOEcum = costWPDOEcum+costWPNavyL
44	WPPWR12L			
45		Object:NextProcessDefined		
46			Expression	costWPCSNFcum = costWPCSNFcum+costWPPWR12L
47	WPPWR21			
48		Object:NextProcessDefined		
49			Expression	costWPCSNFcum = costWPCSNFcum+costWPPWR21
50	WPPWR21Rod			
51		Object:NextProcessDefined		
52			Expression	costWPCSNFcum = costWPCSNFcum+costWPPWR21c
53	WPTAD			

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
54		Object:NextProcessDefined		
55			Expression	costWPCSNFcum = costWPCSNFcum+costWPTAD
56	c202	BuyCask202	202Dist	
57		ObjectProcessingCompleted		
58			Comment	Increment cask cost
59			Expression	costcumcaskS = costcumcaskS+ costcaskov
60	c244	BuyCask244	244Dist	
61		ObjectProcessingCompleted		
62			Comment	Increment cask cost
63			Expression	costcumcaskS = costcumcaskS+ costcaskov
64	c26B	BuyCask26	26Dist	
65		ObjectProcessingCompleted		
66			Comment	Increment cumulative cask cost
67			Expression	costcumcaskR = costcumcaskR+costcaskbarebasket
68	c27B	BuyCask27	27Dist	
69		ObjectProcessingCompleted		
70			Comment	Increment cumulative cask cost
71			Expression	costcumcaskR = costcumcaskR+ costcaskbarebasket
72		Object:NextProcessDefined		
73			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
74			Expression	caskwtempty = 229800
75			Expression	costrailshipD = 1857
76			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
77			Function Call	Call ObjectActivated() In RailShipCostCalc
78	Connection:	BRAR	Blair2 7 8	
79		ObjectActivated		
80			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
81	BRPHH			
82		ObjectProcessingCompleted		
83			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
84			Expression	caskwtempty = 296500
85			Expression	costrailshipD = 2275
86			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
87			Function Call	Call ObjectActivated() In RailShipCostCalc
88	Connection:	BRPHH	Blair2 7 8	

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
89		ObjectActivated		
90			Expression	costcumSLR = costcumSLR+5* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
91	Connection:	BRPR	BRPHH	
92		ObjectActivated		
93			Comment	HH use based on load+unload+travel time All HH use for cost estimate is in this extension
94			Expression	costHHusecum = costHHusecum+2*(0.22)+ costHHunloadsteps+ costHHloadsteps
95	BYRR			
96		Object:NextProcessDefined		
97			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
98			Expression	caskwtempty = 229800
99			Expression	costrailshipD = 1743
100			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
101			Function Call	Call ObjectActivated() In RailShipCostCalc
102	Connection:	BYRR	Blair2 7 8	
103		ObjectActivated		
104			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
105	CALHH			
106		ObjectProcessingCompleted		
107			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
108			Expression	caskwtempty = 229800
109			Expression	costrailshipD = 1636
110			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
111			Function Call	Call ObjectActivated() In RailShipCostCalc
112	Connection:	CALHH	KansasCity2 7 8	
113		ObjectActivated		
114			Expression	costcumSLR = costcumSLR+1* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
115	Connection:	CALR	CALHH	
116		ObjectActivated		

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
117			Comment	HH use based on load+unload+travel time All HH use for cost estimate is in this extension
118			Expression	costHHusecum = costHHusecum+2*(0.21)+ costHHunloadsteps+ costHHloadsteps
119	CLIR			
120		Object:NextProcessDefined		
121			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
122			Expression	caskwtempty = 229800
123			Expression	costrailshipD = 1863
124			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
125			Function Call	Call ObjectActivated() In RailShipCostCalc
126	Connection:	CLIR	Blair2 7 8	
127		ObjectActivated		
128			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
129	Connection:	Cairo8	KansasCity2 7 8	
130		ObjectActivated		
131			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
132	Connection:	Columbiana	KansasCity2 7 8	
133		ObjectActivated		
134			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
135	DBR			
136		Object:NextProcessDefined		
137			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
138			Expression	caskwtempty = 210500
139			Expression	costrailshipD = 2063
140			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
141			Function Call	Call ObjectActivated() In RailShipCostCalc
142	Connection:	DBR	Blair2 7 8	
143		ObjectActivated		

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
144			Expression	costcumSLR = costcumSLR+5* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
145	DCCR			
146		Object:NextProcessDefined		
147			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
148			Expression	caskwtempty = 229800
149			Expression	costrailshipD = 1886
150			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
151			Function Call	Call ObjectActivated() In RailShipCostCalc
152	Connection:	DCCR	Blair2 7 8	
153		ObjectActivated		
154			Expression	costcumSLR = costcumSLR+5* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
155	DRER			
156		Object:NextProcessDefined		
157			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
158			Expression	caskwtempty = 229800
159			Expression	costrailshipD = 1810
160			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
161			Function Call	Call ObjectActivated() In RailShipCostCalc
162	Connection:	DRER	Blair2 7 8	
163		ObjectActivated		
164			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
165	DUAR			
166		Object:NextProcessDefined		
167			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
168			Expression	caskwtempty = 210500
169			Expression	costrailshipD = 1598
170			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
171			Function Call	Call ObjectActivated() In RailShipCostCalc
172	Connection:	DUAR	Blair2 7 8	

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
173		ObjectActivated		
174			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
175	Connection:	EastPalestine2 7 8	Blair2 7 8	
176		ObjectActivated		
177			Expression	costcumSLR = costcumSLR+5* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
178	FERR			
179		Object:NextProcessDefined		
180			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
181			Expression	caskwtempy = 229800
182			Expression	costrailshipD = 2159
183			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
184			Function Call	Call ObjectActivated() In RailShipCostCalc
185	Connection:	FERR	Blair2 7 8	
186		ObjectActivated		
187			Expression	costcumSLR = costcumSLR+5* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
188	KEWHH			
189		ObjectProcessingCompleted		
190			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
191			Expression	caskwtempy = 229800
192			Expression	costrailshipD = 1868
193			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
194			Function Call	Call ObjectActivated() In RailShipCostCalc
195	Connection:	KEWHH	Blair2 7 8	
196		ObjectActivated		
197			Expression	costcumSLR = costcumSLR+4* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
198	Connection:	KEWR	KEWHH	
199		ObjectActivated		
200			Comment	HH use based on load+unload+travel time All HH use for cost estimate is in this extension

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
201			Expression	costHHusecum = costHHusecum+2*(0.11)+ costHHunloadsteps+ costHHloadsteps
202	LACR			
203		Object:NextProcessDefined		
204			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
205			Expression	caskwtempty = 229800
206			Expression	costrailshipD = 1916
207			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
208			Function Call	Call ObjectActivated() In RailShipCostCalc
209	Connection:	LACR	Plattsmouth	
210		ObjectActivated		
211			Expression	costcumSLR = costcumSLR+4* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
212	LSR			
213		ObjectActivated		
214		Object:NextProcessDefined		
215			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
216			Expression	caskwtempty = 229800
217			Expression	costrailshipD = 1793
218			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
219			Function Call	Call ObjectActivated() In RailShipCostCalc
220	Connection:	LSR	Plattsmouth	
221		ObjectActivated		
222			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
223	Connection:	Lawrenceburg2 7 8	KansasCity2 7 8	
224		ObjectActivated		
225			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
226	Connection:	Lawrenceville	KansasCity2 7 8	
227		ObjectActivated		
228			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
229	MOR			
230			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
231			Expression	caskwtempy = 229800
232			Expression	costrailshipD = 1808
233			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
234			Function Call	Call ObjectActivated() In RailShipCostCalc
235	Connection:	MOR	Blair2 7 8	
236		ObjectActivated		
237			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
238	PALHH			
239		ObjectProcessingCompleted		
240			Expression	caskwtempy = 191200
241			Expression	costrailshipD = 1989
242			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
243			Function Call	Call ObjectActivated() In RailShipCostCalc
244	Connection:	PALHH	Blair2 7 8	
245		ObjectActivated		
246			Expression	costcumSLR = costcumSLR+5* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
247	Connection:	PALR	PALHH	
248		ObjectActivated		
249			Comment	HH use based on load+unload+travel time All HH use for cost estimate is in this extension
250			Expression	costHHusecum = costHHusecum+2*(0.46)+ costHHunloadsteps+ costHHloadsteps
251	PERR			
252		Object:NextProcessDefined		
253			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
254			Expression	costrailshipD = 2252
255			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
256			Function Call	Call ObjectActivated() In RailShipCostCalc
257	Connection:	PERR	KansasCity2 7 8	
258		ObjectActivated		

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
259			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
260	PIR			
261		Object:NextProcessDefined		
262			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
263			Expression	caskwtempty = 229800
264			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
265			Function Call	Call ObjectActivated() In RailShipCostCalc
266	Connection:	PIR	StPaul2 7 8	
267		ObjectActivated		
268			Expression	costcumSLR = costcumSLR+1* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
269	POIHH			
270		ObjectProcessingCompleted		
271			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
272			Expression	caskwtempty = 210500
273			Expression	costrailshipD = 1868
274			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
275			Function Call	Call ObjectActivated() In RailShipCostCalc
276	Connection:	POIHH	Blair2 7 8	
277		ObjectActivated		
278			Expression	costcumSLR = costcumSLR+4* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
279	Connection:	POIR	POIHH	
280		ObjectActivated		
281			Comment	HH use based on load+unload+travel time All HH use for cost estimate is in this extension
282			Expression	costHHusecum = costHHusecum+2*(0.40)+ costHHunloadsteps+ costHHloadsteps
283	Connection:	Painesville 8	Blair2 7 8	
284		ObjectActivated		
285			Expression	costcumSLR = costcumSLR+4* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
286	Connection:	Portsmouth2 7 8	KansasCity2 7 8	
287		ObjectActivated		
288			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
289	QCR			
290		Object:NextProcessDefined		
291			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
292			Expression	caskwtempy = 229800
293			Expression	costrailshipD = 1757
294			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
295			Function Call	Call ObjectActivated() In RailShipCostCalc
296	Connection:	QCR	Plattsmouth	
297		ObjectActivated		
298			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
299	Connection:	Youngstown 7	Blair2 7 8	
300		ObjectActivated		
301			Expression	costcumSLR = costcumSLR+4* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
302	ZIOR			
303		Object:NextProcessDefined		
304			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
305			Expression	caskwtempy = 229800
306			Expression	costrailshipD = 1830
307			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
308			Function Call	Call ObjectActivated() In RailShipCostCalc
309	Connection:	ZIOR	Blair2 7 8	
310		ObjectActivated		
311			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
312	BRAT			
313		Object:NextProcessDefined		
314			Expression	costruckshipD = 1903

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
315			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
316			Function Call	Call ObjectActivated() In TruckShipCostCalc6
317	Connection:	BRAT	Omaha2 3 3	
318		ObjectActivated		
319			Expression	costcumSLT = costcumSLT+3* costSLrateT
320	Connection:	BRPT	Omaha2 3 3	
321		ObjectActivated		
322			Expression	costcumSLT = costcumSLT+5* costSLrateT
323	Connection:	BYRT	Omaha2 3 3	
324		ObjectActivated		
325			Expression	costcumSLT = costcumSLT+3* costSLrateT
326	Connection:	Bloomington2 3	Omaha2 3 3	
327		ObjectActivated		
328			Expression	costcumSLT = costcumSLT+3* costSLrateT
329	Connection:	CALT	St. Joseph2 3 3	
330		ObjectActivated		
331			Expression	costcumSLT = costcumSLT+1* costSLrateT
332	CLIT			
333		Object:NextProcessDefined		
334			Expression	costruckshipD = 1929
335			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
336			Function Call	Call ObjectActivated() In TruckShipCostCalc6
337	Connection:	CLIT	Omaha2 3 3	
338		ObjectActivated		
339			Expression	costcumSLT = costcumSLT+3* costSLrateT
340	Connection:	Cincinnati2 3	St. Joseph2 3 3	
341		ObjectActivated		
342			Expression	costcumSLT = costcumSLT+4* costSLrateT
343	Connection:	DBT	Omaha2 3 3	
344		ObjectActivated		
345			Expression	costcumSLT = costcumSLT+5* costSLrateT
346	DCCT			
347		Object:NextProcessDefined		
348			Expression	costruckshipD = 1986
349			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
350			Function Call	Call ObjectActivated() In TruckShipCostCalc6
351	Connection:	DCCT	Omaha2 3 3	
352		ObjectActivated		

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
353			Expression	costcumSLT = costcumSLT+5* costSLrateT
354	DRET			
355		Object:NextProcessDefined		
356			Expression	costruckshipD = 1901
357			Expression	costtruckseccum = costtruckseccum+ costtrucksecmile* costruckshipD
358			Function Call	Call ObjectActivated() In TruckShipCostCalc6
359	Connection:	DRET	Omaha2 3 3	
360		ObjectActivated		
361			Expression	costcumSLT = costcumSLT+3* costSLrateT
362	Connection:	DUAT	Omaha2 3 3	
363		ObjectActivated		
364			Expression	costcumSLT = costcumSLT+2* costSLrateT
365	Connection:	FERT	Omaha2 3 3	
366		ObjectActivated		
367			Expression	costcumSLT = costcumSLT+5* costSLrateT
368	Connection:	KEWT	Omaha2 3 3	
369		ObjectActivated		
370			Expression	costcumSLT = costcumSLT+4* costSLrateT
371	LACT			
372		Object:NextProcessDefined		
373			Expression	costruckshipD = 1873
374			Expression	costtruckseccum = costtruckseccum+ costtrucksecmile* costruckshipD
375			Function Call	Call ObjectActivated() In TruckShipCostCalc6
376	Connection:	LACT	Omaha2 3 3	
377		ObjectActivated		
378			Expression	costcumSLT = costcumSLT+3* costSLrateT
379	Connection:	LST	Omaha2 3 3	
380			Expression	costcumSLT = costcumSLT+3* costSLrateT
381	MOT			
382		Object:NextProcessDefined		
383			Expression	costruckshipD = 1901
384			Expression	costtruckseccum = costtruckseccum+ costtrucksecmile* costruckshipD
385			Function Call	Call ObjectActivated() In TruckShipCostCalc6
386	Connection:	MOT	Omaha2 3 3	
387		ObjectActivated		
388			Expression	costcumSLT = costcumSLT+3* costSLrateT
389	Connection:	Metropolis2 3	St. Joseph2 3 3	
390		ObjectActivated		

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
391			Expression	costcumSLT = costcumSLT+1* costSLrateT
392	PALT			
393		ObjectActivated		
394		Object:NextProcessDefined		
395			Expression	costruckshipD = 2016
396			Expression	costtruckseccum = costtruckseccum+ costrucksecmile* costruckshipD
397			Function Call	Call ObjectActivated() In TruckShipCostCalc6
398			Expression	costtruckdemcum = costtruckdemcum+1968
399	Connection:	PALT	Omaha2 3 3	
400		ObjectActivated		
401			Expression	costcumSLT = costcumSLT+5* costSLrateT
402	Connection:	PERT	Painesville2 3	
403		ObjectActivated		
404			Expression	costcumSLT = costcumSLT+1* costSLrateT
405	Connection:	PIT	Bloomington2 3	
406		ObjectActivated		
407			Expression	costcumSLT = costcumSLT+1* costSLrateT
408	POIT			
409		ObjectActivated		
410		Object:NextProcessDefined		
411			Expression	costruckshipD = 2076
412			Expression	costtruckseccum = costtruckseccum+ costrucksecmile* costruckshipD
413			Function Call	Call ObjectActivated() In TruckShipCostCalc6
414	Connection:	POIT	Omaha2 3 3	
415		ObjectActivated		
416			Expression	costcumSLT = costcumSLT+4* costSLrateT
417	Connection:	Painesville2 3	Omaha2 3 3	
418		ObjectActivated		
419			Expression	costcumSLT = costcumSLT+4* costSLrateT
420	QCT			
421		Object:NextProcessDefined		
422			Expression	costruckshipD = 1788
423			Expression	costtruckseccum = costtruckseccum+ costrucksecmile* costruckshipD
424			Function Call	Call ObjectActivated() In TruckShipCostCalc6
425	Connection:	QCT	Omaha2 3 3	
426		ObjectActivated		
427			Expression	costcumSLT = costcumSLT+3* costSLrateT
428	Connection:	Youngstown2 3	Omaha2 3 3	

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
429		ObjectActivated		
430			Expression	costcumSLT = costcumSLT+4* costSLrateT
431	Connection:	ZIOT	Omaha2 3 3	
432		ObjectActivated		
433			Expression	costcumSLT = costcumSLT+3* costSLrateT
434	RCaskRepl			
435		ObjectActivated		
436			Comment	reset the 25 year counter and increment cost
437			Expression	Heat01 = GetSystemTime(ModelID)
438			Expression	costcumcaskreplR = costcumcaskreplR+costreplaceRcask
439	c214	BuyCask214	214Dist	
440		ObjectProcessingCompleted		
441			Comment	Increment cask cost
442			Expression	costcumcaskS = costcumcaskS+ costcaskov
443	c238	BuyCask238	238Dist	
444			Comment	Increment cask cost
445			Expression	costcumcaskS = costcumcaskS+ costcaskov
446	c64B	BuyCask64	64Dist	
447		ObjectProcessingCompleted		
448			Comment	Increment cumulative cask cost
449			Expression	costcumcaskR = costcumcaskR+ costcaskbarebasket
450	c65B	BuyCask65	65Dist	
451		ObjectProcessingCompleted		
452			Comment	Increment cumulative cask cost
453			Expression	costcumcaskR = costcumcaskR+ costcaskbarebasket
454	c77B	BuyCask77	77Dist	
455		ObjectProcessingCompleted		
456			Comment	Increment cumulative cask cost
457			Expression	costcumcaskR = costcumcaskR+ costcaskbarebasket
458	BVHH			
459		ObjectProcessingCompleted		
460			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
461			Expression	caskwtempy = 229800
462			Expression	costrailshipD = 2265
463			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
464			Function Call	Call ObjectActivated() In RailShipCostCalc
465	Connection:	BVHH	Youngstown-NA	
466		ObjectActivated		

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
467			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
468	Connection:	BVR	BVHH	
469		ObjectActivated		
470			Comment	HH use based on load+unload+travel time All HH use for cost estimate is in this extension
471			Expression	costHHusecum = costHHusecum+2*(0.19)+ costHHunloadsteps+ costHHloadsteps
472	CCB			
473		ObjectActivated		
474		ObjectProcessingCompleted		
475			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
476			Expression	caskwtempty = 210500
477			Expression	costrailshipD = 2591
478			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
479			Expression	costbargeloadcum = costbargeloadcum+ costrailshipcaskcars*(costbargeloadsteps/3)* costbargeloadpercask)
480			Function Call	Call ObjectActivated() In RailShipCostCalc
481	Connection:	CCB	Youngstown-NA	
482		ObjectActivated		
483			Expression	costcumSLR = costcumSLR+4* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
484	Connection:	CCR	CCB	
485		ObjectActivated		
486			Comment	Barge use is the input total travel barge time per cask in steps (to and from B and R sites)
487			Expression	costbargeusecum = costbargeusecum+2.2
488			Comment	Increment the number of port uses per cask = 2
489			Expression	costbargeportnumcum = costbargeportnumcum+2
490	FITR			
491		ObjectActivated		
492		Object:NextProcessDefined		
493			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
494			Expression	caskwtempty = 229800
495			Expression	costrailshipD = 2507

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
496			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
497			Function Call	Call ObjectActivated() In RailShipCostCalc
498	Connection:	FITR	Painesville 10	
499		ObjectActivated		
500			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
501	GINHH			
502		ObjectProcessingCompleted		
503			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
504			Expression	caskwtempy = 229800
505			Expression	costrailshipD = 2449
506			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
507			Function Call	Call ObjectActivated() In RailShipCostCalc
508	Connection:	GINHH	Painesville 10	
509		ObjectActivated		
510			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
511	Connection:	GINR	GINHH	
512		ObjectActivated		
513			Comment	HH use based on load + unload + travel time All HH use for cost estimate is in this extension
514			Expression	costHHusecum = costHHusecum+2*(0.39)+ costHHunloadsteps+ costHHloadsteps
515	HADB			
516		ObjectProcessingCompleted		
517			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
518			Expression	caskwtempy = 272900
519			Expression	costrailshipD = 2785
520			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
521			Expression	costbargeloadcum = costbargeloadcum+(costrailshipcaskcars*(costbargeloadsteps/3)* costbargeloadpercask)
522			Function Call	Call ObjectActivated() In RailShipCostCalc
523	Connection:	HADB	Schenectady	
524		ObjectActivated		

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
525			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
526	Connection:	HADR	HADB	
527		ObjectActivated		
528			Comment	Barge use is the input total travel barge time per cask insteps (to and from B and R sites)
529			Expression	costbargeusecum = costbargeusecum+2.2
530			Comment	Increment the number of port uses per cask = 2
531			Expression	costbargeportnumcum = costbargeportnumcum+2
532	HCB			
533		ObjectActivated		
534		ObjectProcessingCompleted		
535			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
536			Expression	caskwtempty = 229800
537			Expression	costrailshipD = 2717
538			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
539			Expression	costbargeloadcum = costbargeloadcum+(costrailshipcaskcars*(costbargeloadsteps/3) * costbargeloadpercask)
540			Function Call	Call ObjectActivated() In RailShipCostCalc
541	Connection:	HCB	ColumbianaNE	
542		ObjectActivated		
543			Expression	costcumSLR = costcumSLR+4* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
544	Connection:	HCR	HCB	
545		ObjectActivated		
546			Comment	Barge use is the input total travel barge time per cask in steps (to and from B and R sites)
547			Expression	costbargeusecum = costbargeusecum+0.7
548			Comment	Increment the number of port uses per cask = 2
549			Expression	costbargeportnumcum = costbargeportnumcum+2
550	IPHH			
551		ObjectProcessingCompleted		
552			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
553			Expression	caskwtempty = 229800
554			Expression	costrailshipD = 2792

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
555			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
556			Function Call	Call ObjectActivated() In RailShipCostCalc
557	Connection:	IPHH	ColumbianaNE	
558		ObjectActivated		
559			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
560	Connection:	IPR	IPHH	
561		ObjectActivated		
562			Comment	HH use based on load+unload+travel time All HH use for cost estimate is in this extension
563			Expression	costHHusecum = costHHusecum+2*(0.16)+ costHHunloadsteps+ costHHloadsteps
564	Connection:	JCT New Portage	EastPalestine1 9 10	
565		ObjectActivated		
566			Expression	costcumSLR = costcumSLR+1* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
567	LIMR			
568		Object:NextProcessDefined		
569			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
570			Expression	caskwtempty = 229800
571			Expression	costrailshipD = 2696
572			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
573			Function Call	Call ObjectActivated() In RailShipCostCalc
574	Connection:	LIMR	ColumbianaNE	
575		ObjectActivated		
576			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
577	MILR			
578		Object:NextProcessDefined		
579			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
580			Expression	caskwtempty = 210500
581			Expression	costrailshipD = 2826
582			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
583			Function Call	Call ObjectActivated() In RailShipCostCalc
584	Connection:	MILR	Schenectady	
585		ObjectActivated		
586			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
587	MYR			
588		Object:NextProcessDefined		
589			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
590			Expression	caskwtempy = 272900
591			Expression	costrailshipD = 3006
592			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
593			Function Call	Call ObjectActivated() In RailShipCostCalc
594	Connection:	MYR	Schenectady	
595		ObjectActivated		
596			Expression	costcumSLR = costcumSLR+4* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
597	NAR			
598		Object:NextProcessDefined		
599			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
600			Expression	caskwtempy = 210500
601			Expression	costrailshipD = 2701
602			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
603			Function Call	Call ObjectActivated() In RailShipCostCalc
604	Connection:	NAR	Youngstown-NA	
605		ObjectActivated		
606			Expression	costcumSLR = costcumSLR+4* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
607	NMPR			
608		Object:NextProcessDefined		
609			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
610			Expression	caskwtempy = 229800
611			Expression	costrailshipD = 2506

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
612			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
613			Function Call	Call ObjectActivated() In RailShipCostCalc
614	Connection:	NMPR	Painesville 10	
615		ObjectActivated		
616			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
617	OCB			
618		ObjectProcessingCompleted		
619			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
620			Expression	caskwtempty = 210500
621			Expression	costrailshipD = 2784
622			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
623			Expression	costbargeloadcum = costbargeloadcum+(costrailshipcaskcars*(costbargeloadsteps/3)* costbargeloadpercask)
624			Function Call	Call ObjectActivated() In RailShipCostCalc
625	Connection:	OCB	ColumbianaNE	
626		ObjectActivated		
627			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
628	Connection:	OCR	OCB	
629		ObjectActivated		
630			Comment	Barge use is the input total travel barge time per cask in steps (to and from B and R sites)
631			Expression	costbargeusecum = costbargeusecum+2.9
632			Comment	Increment the number of port uses per cask = 2
633			Expression	costbargeportnumcum = costbargeportnumcum+2
634	PEAHH			
635		ObjectProcessingCompleted		
636			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
637			Expression	caskwtempty = 180700
638			Expression	costrailshipD = 2643
639			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
640			Function Call	Call ObjectActivated() In RailShipCostCalc
641	Connection:	PEAHH	ColumbianaNE	

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
642		ObjectActivated		
643			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
644	Connection:	PEAR	PEAHH	
645		ObjectActivated		
646			Comment	HH use based on load + unload + travel time All HH use for cost estimate is in this extension
647			Expression	costHHusecum = costHHusecum+2*(0.65)+ costHHunloadsteps+ costHHloadsteps
648	PILB			
649		ObjectProcessingCompleted		
650			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
651			Expression	caskwtempty = 229800
652			Expression	costrailshipD = 2818
653			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
654			Expression	costbargeloadcum = costbargeloadcum+(costrailshipcaskcars *(costbargeloadsteps/3)* costbargeloadpercask)
655			Function Call	Call ObjectActivated() In RailShipCostCalc
656	Connection:	PILB	Schenectady	
657		ObjectActivated		
658			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
659	Connection:	PILR	PILB	
660		ObjectActivated		
661			Comment	Barge use is the input total travel barge time per cask in steps (to and from B and R sites)
662			Expression	costbargeusecum = costbargeusecum+1.6
663			Comment	Increment the number of port uses per cask = 2
664			Expression	costbargeportnumcum = costbargeportnumcum+2
665	SALB			
666		ObjectProcessingCompleted		
667			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
668			Expression	caskwtempty = 205562
669			Expression	costrailshipD = 2717
670			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
671			Expression	costbargeloadcum = costbargeloadcum+(costrailshipcaskcars*(costbargeloadsteps/3)* costbargeloadpercask)
672			Function Call	Call ObjectActivated() In RailShipCostCalc
673	Connection:	SALB	ColumbianaNE	
674		ObjectActivated		
675			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
676	Connection:	SALR	SALB	
677		ObjectActivated		
678			Comment	Barge use is the input total travel barge time per cask in steps (to and from B an R sites)
679			Expression	costbargeusecum = costbargeusecum+0.8
680			Comment	Increment the number of port uses per cask = 2
681			Expression	costbargeportnumcum = costbargeportnumcum+2
682	SEAR			
683		Object:NextProcessDefined		
684			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
685			Expression	caskwtempy = 229800
686			Expression	costrailshipD = 2450
687			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
688			Function Call	Call ObjectActivated() In RailShipCostCalc
689	Connection:	SEAR	Schenectady	
690		ObjectActivated		
691			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
692	SURB			
693		ObjectProcessingCompleted		
694			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
695			Expression	caskwtempy = 210500
696			Expression	costrailshipD = 2825
697			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
698			Expression	costbargeloadcum = costbargeloadcum+(costrailshipcaskcars*(costbargeloadsteps/3)* costbargeloadpercask)
699			Function Call	Call ObjectActivated() In RailShipCostCalc
700	Connection:	SURB	Portsmouth9 10	

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
701		ObjectActivated		
702			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
703	Connection:	SURR	SURB	
704		ObjectActivated		
705			Comment	Barge use is the input total travel barge time per cask in steps (to and from B and R sites)
706			Expression	costbargeusecum = costbargeusecum+1.6
707			Comment	Increment the number of port uses per cask = 2
708			Expression	costbargeportnumcum = costbargeportnumcum+2
709	SUSR			
710		Object:NextProcessDefined		
711			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
712			Expression	caskwtempty = 210500
713			Expression	costrailshipD = 2628
714			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
715			Function Call	Call ObjectActivated() In RailShipCostCalc
716	Connection:	SUSR	JCT New Portage	
717		ObjectActivated		
718			Expression	costcumSLR = costcumSLR+1* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
719	Connection:	Schenectady	Painesville 10	
720		ObjectActivated		
721			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
722	TMIR			
723		Object:NextProcessDefined		
724			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
725			Expression	caskwtempty = 205562
726			Expression	costrailshipD = 2630
727			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
728			Function Call	Call ObjectActivated() In RailShipCostCalc
729	Connection:	TMIR	ColumbianaNE	
730		ObjectActivated		

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
731			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
732	VYR			
733		Object:NextProcessDefined		
734			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
735			Expression	caskwtempy = 229800
736			Expression	costrailshipD = 2784
737			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
738			Function Call	Call ObjectActivated() In RailShipCostCalc
739	Connection:	VYR	Schenectady	
740		ObjectActivated		
741			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
742	WVR			
743		Object:NextProcessDefined		
744			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
745			Expression	caskwtempy = 179540
746			Expression	costrailshipD = 2396
747			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
748			Function Call	Call ObjectActivated() In RailShipCostCalc
749	Connection:	WVR	Painesville 10	
750		ObjectActivated		
751			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
752	YRHH			
753		ObjectProcessingCompleted		
754			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
755			Expression	caskwtempy = 272900
756			Expression	costrailshipD = 2735
757			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
758			Function Call	Call ObjectActivated() In RailShipCostCalc
759	Connection:	YRHH	Painesville 10	

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
760		ObjectActivated		
761			Expression	costcumSLR = costcumSLR+5* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
762	Connection:	YRR	YRHH	
763		ObjectActivated		
764			Comment	HH use based on load+unload+travel time All HH use for cost estimate is in this extension
765			Expression	costHHusecum = costHHusecum+2*(0.11)+ costHHunloadsteps+ costHHloadsteps
766	Connection:	BVT	Youngstown1 5 5	
767		ObjectActivated		
768			Expression	costcumSLT = costcumSLT+2* costSLrateT
769	CCT			
770		ObjectActivated		
771			Expression	= SignalEvent(ModelID, 'trCCT')
772			Expression	= SignalEvent(ModelID, 'trTruck')
773		Object:NextProcessDefined		
774			Expression	costruckshipD = 2658
775			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
776			Function Call	Call ObjectActivated() In TruckShipCostCalc6
777	Connection:	CCT	Youngstown1 5 5	
778		ObjectActivated		
779			Expression	costcumSLT = costcumSLT+3* costSLrateT
780	Connection:	FITT	Painesville 5	
781		ObjectActivated		
782			Expression	costcumSLT = costcumSLT+2* costSLrateT
783	GINT			
784		Object:NextProcessDefined		
785			Expression	costruckshipD = 2541
786			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
787			Function Call	Call ObjectActivated() In TruckShipCostCalc6
788			Expression	costtruckdemcum = costtruckdemcum+1968
789	Connection:	GINT	Painesville 5	
790		ObjectActivated		
791			Expression	costcumSLT = costcumSLT+2* costSLrateT
792	Connection:	HADT	Youngstown1 5 5	
793		ObjectActivated		
794			Expression	costcumSLT = costcumSLT+5* costSLrateT

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
795	Connection:	HCT	Youngstown1 5 5	
796		ObjectActivated		
797			Expression	costcumSLT = costcumSLT+3* costSLrateT
798	IPT			
799		Object:NextProcessDefined		
800			Expression	costruckshipD = 2723
801			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
802			Function Call	Call ObjectActivated() In TruckShipCostCalc6
803			Expression	costruckdemcum = costruckdemcum+1968
804	Connection:	IPT	Youngstown1 5 5	
805		ObjectActivated		
806			Expression	costcumSLT = costcumSLT+3* costSLrateT
807	Connection:	LIMT	Youngstown1 5 5	
808		ObjectActivated		
809			Expression	costcumSLT = costcumSLT+2* costSLrateT
810	MILT			
811		Object:NextProcessDefined		
812			Expression	costruckshipD = 2813
813			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
814			Function Call	Call ObjectActivated() In TruckShipCostCalc6
815			Expression	costruckdemcum = costruckdemcum+1968
816	Connection:	MILT	Youngstown1 5 5	
817		ObjectActivated		
818			Expression	costcumSLT = costcumSLT+4* costSLrateT
819	Connection:	MYT	Painesville 5	
820		ObjectActivated		
821			Expression	costcumSLT = costcumSLT+6* costSLrateT
822	Connection:	NAT	Cincinnati 5 5	
823		ObjectActivated		
824			Expression	costcumSLT = costcumSLT+4* costSLrateT
825	NMPT			
826		Object:NextProcessDefined		
827			Expression	costruckshipD = 2631
828			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
829			Function Call	Call ObjectActivated() In TruckShipCostCalc6
830	Connection:	NMPT	Painesville 5	
831		ObjectActivated		
832			Expression	costcumSLT = costcumSLT+2* costSLrateT

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
833	OCT			
834		Object:NextProcessDefined		
835			Expression	costtruckseccum = costtruckseccum+ costtrucksecmile* costruckshipD
836			Expression	costruckshipD = 2749
837			Function Call	Call ObjectActivated() In TruckShipCostCalc6
838	Connection:	OCT	Youngstown1 5 5	
839		ObjectActivated		
840			Expression	costcumSLT = costcumSLT+3* costSLrateT
841	Connection:	PEAT	Youngstown1 5 5	
842		ObjectActivated		
843			Expression	costcumSLT = costcumSLT+2* costSLrateT
844	PILT			
845		Object:NextProcessDefined		
846			Expression	costruckshipD = 2934
847			Expression	costtruckseccum = costtruckseccum+ costtrucksecmile* costruckshipD
848			Function Call	Call ObjectActivated() In TruckShipCostCalc6
849			Expression	costruckdemcum = costtruckdemcum+1968
850	Connection:	PILT	Painesville 5	
851		ObjectActivated		
852			Expression	costcumSLT = costcumSLT+4* costSLrateT
853	Connection:	Roanoke2 5	Cincinnati 5 5	
854		ObjectActivated		
855			Expression	costcumSLT = costcumSLT+2* costSLrateT
856	Connection:	SALT	Youngstown1 5 5	
857		ObjectActivated		
858			Expression	costcumSLT = costcumSLT+3* costSLrateT
859	Connection:	SEAT	Painesville 5	
860		ObjectActivated		
861			Expression	costcumSLT = costcumSLT+5* costSLrateT
862	SURT			
863		Object:NextProcessDefined		
864			Expression	costruckshipD = 2865
865			Expression	costtruckseccum = costtruckseccum+ costtrucksecmile* costruckshipD
866			Function Call	Call ObjectActivated() In TruckShipCostCalc6
867	Connection:	SURT	Cincinnati 5 5	
868		ObjectActivated		
869			Expression	costcumSLT = costcumSLT+4* costSLrateT
870	Connection:	SUST	Youngstown1 5 5	

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
871		ObjectActivated		
872			Expression	costcumSLT = costcumSLT+2* costSLrateT
873	Connection:	TMIT	Youngstown1 5 5	
874		ObjectActivated		
875			Expression	costcumSLT = costcumSLT+2* costSLrateT
876	VYT			
877		Object:NextProcessDefined		
878			Expression	costruckshipD = 2868
879			Expression	costtruckseccum = costtruckseccum+ costtrucksecmile* costruckshipD
880			Function Call	Call ObjectActivated() In TruckShipCostCalc6
881	Connection:	VYT	Painesville 5	
882		ObjectActivated		
883			Expression	costcumSLT = costcumSLT+3* costSLrateT
884	Connection:	WVT	Painesville 5	
885		ObjectActivated		
886			Expression	costcumSLT = costcumSLT+2* costSLrateT
887	Connection:	YRT	Painesville 5	
888		ObjectActivated		
889			Expression	costcumSLT = costcumSLT+3* costSLrateT
890	Connection:	Blair6 6	Uvada1 6 6	
891		ObjectActivated		
892			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
893	CGSR			
894		Object:NextProcessDefined		
895			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
896			Expression	caskwtempty = 229800
897			Expression	costrailshipD = 1209
898			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
899			Function Call	Call ObjectActivated() In RailShipCostCalc
900	Connection:	CGSR	Uvada1 6 6	
901		ObjectActivated		
902			Expression	costcumSLR = costcumSLR+4* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
903	CPRB			
904		ObjectProcessingCompleted		

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
905			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
906			Expression	caskwtempy = 229800
907			Expression	costrailshipD = 1349
908			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
909			Expression	costbargeloadcum = costbargeloadcum+(costrailshipcaskcars*(costbargeloadsteps/3)* costbargeloadpercask)
910			Function Call	Call ObjectActivated() In RailShipCostCalc
911	Connection:	CPRB	Omaha	
912		ObjectActivated		
913			Expression	costcumSLR = costcumSLR+1* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
914	Connection:	CPRR	CPRB	
915		ObjectActivated		
916			Comment	Barge use is the input total travel barge time per cask in steps (to and from B and R site)
917			Expression	costbargeusecum = costbargeusecum+2.6
918			Comment	Increment the number of port uses per cask = 2
919			Expression	costbargeportnumcum = costbargeportnumcum+2
920	Connection:	Denver1 6 6	Uvada1 6 6	
921		ObjectActivated		
922			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
923	FCHH			
924		ObjectProcessingCompleted		
925			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
926			Expression	caskwtempy = 229800
927			Expression	costrailshipD = 1329
928			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
929			Function Call	Call ObjectActivated() In RailShipCostCalc
930	Connection:	FCHH	Blair6 6	
931		ObjectActivated		
932			Expression	costcumSLR = costcumSLR+1* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
933	Connection:	FCR	FCHH	

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
934		ObjectActivated		
935			Comment	HH use based on load+unload+travel time All HH use for cost estimate is in this extension
936			Expression	costHHusecum = costHHusecum+2*(0.07)+ costHHunloadsteps+ costHHloadsteps
937	FSVR			
938		Object:NextProcessDefined		
939			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
940			Expression	caskwtempy = 191200
941			Expression	costrailshipD = 720
942			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
943			Function Call	Call ObjectActivated() In RailShipCostCalc
944	HANR			
945		Object:NextProcessDefined		
946			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
947			Expression	caskwtempy = 265512
948			Expression	costrailshipD = 1093
949			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
950			Function Call	Call ObjectActivated() In RailShipCostCalc
951	Connection:	HANR	Uvada1 6 6	
952		ObjectActivated		
953			Expression	costcumSLR = costcumSLR+4* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
954	HUMB			
955		ObjectProcessingCompleted		
956			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
957			Expression	caskwtempy = 229800
958			Expression	costrailshipD = 738
959			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
960			Expression	costbargeloadcum = costbargeloadcum+(costrailshipcaskcars*(costbargeloadsteps/3)* costbargeloadpercask)
961			Function Call	Call ObjectActivated() In RailShipCostCalc
962	Connection:	HUMR	HUMB	
963		ObjectActivated		

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
964			Comment	Barge use is the input total travel barge time per cask in steps (to and from B and Rsite)
965			Expression	costbargeusecum = costbargeusecum+9.6
966			Comment	Increment the number of port uses per cask = 2
967			Expression	costbargeportnumcum = costbargeportnumcum+2
968	Connection:	Harlan 6	Blair6 6	
969		ObjectActivated		
970			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
971	INLR			
972		Object:NextProcessDefined		
973			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
974			Expression	caskwtempy = 265512
975			Expression	costrailshipD = 550
976			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
977			Function Call	Call ObjectActivated() In RailShipCostCalc
978	Connection:	INLR	Uvada1 6 6	
979		ObjectActivated		
980			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
981	Connection:	KansasCity1 6 6	Uvada1 6 6	
982		ObjectActivated		
983			Expression	costcumSLR = costcumSLR+5* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
984	MONR			
985		Object:NextProcessDefined		
986			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
987			Expression	caskwtempy = 229800
988			Expression	costrailshipD = 1795
989			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
990			Function Call	Call ObjectActivated() In RailShipCostCalc
991	Connection:	Minneapolis	Denver1 6 6	
992		ObjectActivated		

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
993			Expression	costcumSLR = costcumSLR+5* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
994	Connection:	Omaha	Uvada1 6 6	
995		ObjectActivated		
996			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
997	Connection:	Plattsmouth6	Denver1 6 6	
998		ObjectActivated		
999			Expression	costcumSLR = costcumSLR+1* costSLrateR+ GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1000	RSR			
1001		Object:NextProcessDefined		
1002			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1003			Expression	caskwtempy = 191200
1004			Expression	costrailshipD = 720
1005			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1006			Function Call	Call ObjectActivated() In RailShipCostCalc
1007	Connection:	Red Oak 6	Blair6 6	
1008		ObjectActivated		
1009			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1010	Connection:	StPaul1 6 6	Blair6 6	
1011		ObjectActivated		
1012			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1013	TROR			
1014		Object:NextProcessDefined		
1015			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1016			Expression	caskwtempy = 229800
1017			Expression	costrailshipD = 1316
1018			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1019			Function Call	Call ObjectActivated() In RailShipCostCalc

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1020	Connection:	TROR	Uvada1 6 6	
1021		ObjectActivated		
1022			Expression	costcumSLR = costcumSLR+4* costSLrateR* GetNumberOfPartsOfType(ModellID, ObjectReferenceID, 'Caskonrail')
1023	CGST			
1024		Object:NextProcessDefined		
1025			Expression	costruckshipD = 1168
1026			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
1027			Function Call	Call ObjectActivated() In TruckShipCostCalc6
1028	Connection:	CGST	St. George1	
1029		ObjectActivated		
1030			Expression	costcumSLT = costcumSLT+6* costSLrateT
1031	CPRT			
1032		Object:NextProcessDefined		
1033			Expression	costruckshipD = 1568
1034			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
1035			Function Call	Call ObjectActivated() In TruckShipCostCalc6
1036			Expression	costruckdemcum = costruckdemcum+1968
1037	Connection:	CPRT	Omaha 1	
1038		ObjectActivated		
1039			Expression	costcumSLT = costcumSLT+1* costSLrateT
1040	FCT			
1041		Object:NextProcessDefined		
1042			Expression	costruckshipD = 1459
1043			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
1044			Function Call	Call ObjectActivated() In TruckShipCostCalc6
1045			Expression	costruckdemcum = costruckdemcum+1968
1046	Connection:	FCT	St. George1	
1047		ObjectActivated		
1048			Expression	costcumSLT = costcumSLT+5* costSLrateT
1049	FSVT			
1050		Object:NextProcessDefined		
1051			Expression	costruckshipD = 1087
1052			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
1053			Function Call	Call ObjectActivated() In TruckShipCostCalc6
1054	HANT			

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1055		Object:NextProcessDefined		
1056			Expression	costruckshipD = 1169
1057			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
1058			Function Call	Call ObjectActivated() In TruckShipCostCalc6
1059			Expression	costruckdemcum = costruckdemcum+1968
1060	Connection:	HANT	St. George1	
1061		ObjectActivated		
1062			Expression	costcumSLT = costcumSLT+6* costSLrateT
1063	INLT			
1064		Object:NextProcessDefined		
1065			Expression	costruckshipD = 746
1066			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
1067			Function Call	Call ObjectActivated() In TruckShipCostCalc6
1068			Expression	costruckdemcum = costruckdemcum+1968
1069	Connection:	INLT	St. George1	
1070		ObjectActivated		
1071			Expression	costcumSLT = costcumSLT+4* costSLrateT
1072	MONT			
1073		Object:NextProcessDefined		
1074			Expression	costruckshipD = 1866
1075			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
1076			Function Call	Call ObjectActivated() In TruckShipCostCalc6
1077			Expression	costruckdemcum = costruckdemcum+1968
1078	Connection:	Oakley1 1	St. George1	
1079		ObjectActivated		
1080			Expression	costcumSLT = costcumSLT+5* costSLrateT
1081	Connection:	Omaha 1	St. George1	
1082		ObjectActivated		
1083			Expression	costcumSLT = costcumSLT+4* costSLrateT
1084	Connection:	St. George1	YMT	
1085		ObjectActivated		
1086			Expression	costcumSLT = costcumSLT+0* costSLrateT
1087	Connection:	St. Joseph1	Omaha 1	
1088		ObjectActivated		
1089			Expression	costcumSLT = costcumSLT+2* costSLrateT
1090	Connection:	TROT	St. George1	
1091		ObjectActivated		
1092			Expression	costcumSLT = costcumSLT+6* costSLrateT

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1093	c226	BuyCask226	226Dist	
1094		ObjectProcessingCompleted		
1095			Comment	Increment cask cost
1096			Expression	costcumcaskS = costcumcaskS+ costcaskov
1097	c247	BuyCask247	247Dist	
1098		ObjectProcessingCompleted		
1099			Comment	Increment cask cost
1100			Expression	costcumcaskS = costcumcaskS+ costcaskov
1101	c58B	BuyCask58	58Dist	
1102		ObjectProcessingCompleted		
1103			Comment	Increment cumulative cask cost
1104			Expression	costcumcaskR = costcumcaskR+0
1105	c68B	BuyCask68	68Dist	
1106		ObjectProcessingCompleted		
1107			Comment	Increment cumulative cask cost
1108			Expression	costcumcaskR = costcumcaskR+ costcaskbarebasket
1109	c69B	BuyCask69	69Dist	
1110		ObjectProcessingCompleted		
1111			Comment	Increment cumulative cask cost
1112			Expression	costcumcaskR = costcumcaskR+ costcaskbarebasket
1113	c70B	BuyCask70	70Dist	
1114		ObjectProcessingCompleted		
1115			Comment	Increment cumulative cask cost
1116			Expression	costcumcaskR = costcumcaskR+ costcaskbarebasket
1117	RailShipCostCalc			
1118		ObjectActivated		
1119			Comment	Cost calculation for rail shipment costs, use call function from all rail processes
1120			Expression	costrailshipFC = 0.0065* (caskwtemp/2000)* costrailshipD+.3772* costrailshipD+214
1121			Expression	costrailshipBC = .548* costrailshipD+175
1122			Expression	costrailshipEC = .612* costrailshipD+176
1123			Expression	costrailshipempty = (costrailshipcaskcars* costrailshipP1*costrailshipFC)+ costrailshipP2*(2* costrailshipBC+ costrailshipEC)
1124			Expression	costrailshipA = EXP(-1.009*LN(costrailshipcaskcars)-3.9287)
1125			Expression	costrailshipB = 19.6167/costrailshipcaskcars
1126			Expression	costrailshipC = EXP(-0.568*LN(costrailshipcaskcars)+7.4935)
1127			Expression	costrailshiptrwt = costrailshipcaskcars* ((caskwtemp/2000)+113)+288

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1128			Expression	$\text{costrailshiploaded} = (\text{costrailshipcaskcars} * \text{costrailshipP1}/3.51) * ((\text{costrailshipA} * \text{costrailshiptrwt} * \text{costrailshipD}) + \text{costrailshipB} * \text{costrailshipD} + \text{costrailshipC})$
1129			Expression	$\text{costcumrailship} = \text{costcumrailship} + \text{costrailshipempty} + \text{costrailshiploaded}$
1130	Connection:	BuyLoco	DistLoco	
1131		ObjectProcessingCompleted		
1132			Comment	Cost for 2 buffer cars and 1 crew car
1133			Expression	$\text{costrailcarscum} = \text{costrailcarscum} + ((2 * \text{costrailbufcar}) + \text{costrailcrewcar})$
1134	Connection:	Atlanta	Lawrenceville1 10 9	
1135		ObjectActivated		
1136			Expression	$\text{costcumSLR} = \text{costcumSLR} + 3 * \text{costSLrateR} * \text{GetNumberOfPartsOfType}(\text{ModelID}, \text{ObjectReferenceID}, \text{'Caskonrail'})$
1137	Connection:	Atlanta	Lawrenceburg1 10 9	
1138		ObjectActivated		
1139			Expression	$\text{costcumSLR} = \text{costcumSLR} + 2 * \text{costSLrateR} * \text{GetNumberOfPartsOfType}(\text{ModelID}, \text{ObjectReferenceID}, \text{'Caskonrail'})$
1140		ObjectProcessingCompleted		
1141			Expression	$\text{costrailshipcaskcars} = \text{GetNumberOfPartsOfType}(\text{ModelID}, \text{ObjectReferenceID}, \text{'Caskonrail'})$
1142			Expression	$\text{caskwtempy} = 229800$
1143			Expression	$\text{costrailshipD} = 2126$
1144			Expression	$\text{costrailsecmilecum} = \text{costrailsecmilecum} + \text{costrailshipD} * \text{costrailsecmile}$
1145			Expression	$\text{costbargeloadcum} = \text{costbargeloadcum} + (\text{costrailshipcaskcars} * (\text{costbargeloadsteps}/3) * \text{costbargeloadpercask})$
1146			Function Call	Call ObjectActivated() In RailShipCostCalc
1147	Connection:	BFB	Cairo	
1148		ObjectActivated		
1149			Expression	$\text{costcumSLR} = \text{costcumSLR} + 5 * \text{costSLrateR} * \text{GetNumberOfPartsOfType}(\text{ModelID}, \text{ObjectReferenceID}, \text{'Caskonrail'})$
1150	Connection:	BFR	BFB	
1151		ObjectActivated		
1152			Comment	Barge use is the input total travel barge time per cask in steps (to and from B and R site)
1153			Expression	$\text{costbargeusecum} = \text{costbargeusecum} + 1.3$
1154			Comment	Increment the number of port uses per cask = 2

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1155			Expression	costbargeportnumcum = costbargeportnumcum+2
1156	BRUR			
1157		Object:NextProcessDefined		
1158			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1159			Expression	caskwtempy = 229800
1160			Expression	costrailshipD = 2826
1161			Expression	costrailsecmilecum = constrailsecmilecum+ constrailsecmile* costrailshipD
1162			Function Call	Call ObjectActivated() In RailShipCostCalc
1163	Connection:	BRUR	Atlanta	
1164		ObjectActivated		
1165			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1166	CATR			
1167		Object:NextProcessDefined		
1168			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1169			Expression	caskwtempy = 229800
1170			Expression	costrailshipD = 2624
1171			Expression	costrailsecmilecum = constrailsecmilecum+ constrailsecmile* costrailshipD
1172			Function Call	Call ObjectActivated() In RailShipCostCalc
1173	Connection:	CATR	Lawrenceburg1 10 9	
1174		ObjectActivated		
1175			Expression	costcumSLR = costcumSLR+4* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1176	CRYR			
1177		Object:NextProcessDefined		
1178			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1179			Expression	caskwtempy = 229800
1180			Expression	costrailshipD = 2845
1181			Expression	costrailsecmilecum = constrailsecmilecum+ constrailsecmile* costrailshipD
1182			Function Call	Call ObjectActivated() In RailShipCostCalc
1183	Connection:	CRYR	Atlanta	
1184		ObjectActivated		

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1185			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1186	FARR			
1187		Object:NextProcessDefined		
1188			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1189			Expression	caskwtempy = 229800
1190			Expression	costrailshipD = 2750
1191			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1192			Function Call	Call ObjectActivated() In RailShipCostCalc
1193	Connection:	FARR	Atlanta	
1194		ObjectActivated		
1195			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1196	GGB			
1197		ObjectProcessingCompleted		
1198			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1199			Expression	caskwtempy = 229800
1200			Expression	costrailshipD = 2182
1201			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
1202			Expression	costbargeloadcum = costbargeloadcum+(costrailshipcaskcars*(costbargeloadsteps/3) *costbargeloadpercask)
1203			Function Call	Call ObjectActivated() In RailShipCostCalc
1204	Connection:	GGB	Deramus	
1205		ObjectActivated		
1206			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1207	Connection:	GGR	GGB	
1208		ObjectActivated		
1209			Comment	Barge use is the input total travel barge time per cask in steps (to and from B and R site)
1210			Expression	costbargeusecum = costbargeusecum+1.1
1211			Comment	Increment the number of port uses per cask = 2
1212			Expression	costbargeportnumcum = costbargeportnumcum+2
1213	HARR			

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1214		Object:NextProcessDefined		
1215			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1216			Expression	caskwtempy = 229800
1217			Expression	costrailshipD = 2765
1218			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1219			Function Call	Call ObjectActivated() In RailShipCostCalc
1220	Connection:	HARR	Atlanta	
1221		ObjectActivated		
1222			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1223	HATR			
1224		Object:NextProcessDefined		
1225			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1226			Expression	caskwtempy = 229800
1227			Expression	costrailshipD = 2692
1228			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1229			Function Call	Call ObjectActivated() In RailShipCostCalc
1230	Connection:	HATR	Atlanta	
1231		ObjectActivated		
1232			Expression	costcumSLR = costcumSLR+1* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1233	MGR			
1234		Object:NextProcessDefined		
1235			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1236			Expression	caskwtempy = 272900
1237			Expression	costrailshipD = 2684
1238			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1239			Function Call	Call ObjectActivated() In RailShipCostCalc
1240	Connection:	MGR	Atlanta	
1241		ObjectActivated		
1242			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1243	OCOHH			
1244		ObjectProcessingCompleted		
1245			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1246			Expression	caskwtempy = 186262
1247			Expression	costrailshipD = 2573
1248			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
1249			Function Call	Call ObjectActivated() In RailShipCostCalc
1250	Connection:	OCOHH	Lawrenceburg1 10 9	
1251		ObjectActivated		
1252			Expression	costcumSLR = costcumSLR+4* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1253	Connection:	OCOR	OCOHH	
1254		ObjectActivated		
1255			Comment	Barge use based on load+unload+travel time All HH use for cost estimate is in this extension
1256			Expression	costHHusecum = costHHusecum+2*(0.19)+ costHHunloadsteps+ costHHloadsteps
1257	RBR			
1258		Object:NextProcessDefined		
1259			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1260			Expression	caskwtempy = 229800
1261			Expression	costrailshipD = 2146
1262			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1263			Function Call	Call ObjectActivated() In RailShipCostCalc
1264	Connection:	RBR	Shreveport2 10 9	
1265		ObjectActivated		
1266			Expression	costcumSLR = costcumSLR+1* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1267	ROBR			
1268		Object:NextProcessDefined		
1269			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1270			Expression	caskwtempy = 229800
1271			Expression	costrailshipD = 2667

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1272			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1273			Function Call	Call ObjectActivated() In RailShipCostCalc
1274	Connection:	ROBR	Atlanta	
1275		ObjectActivated		
1276			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1277	SEQR			
1278		Object:NextProcessDefined		
1279			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1280			Expression	caskwtempy = 229800
1281			Expression	costrailshipD = 2342
1282			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1283			Function Call	Call ObjectActivated() In RailShipCostCalc
1284	Connection:	SEQR	Lawrenceburg1 10 9	
1285		ObjectActivated		
1286			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1287	SLB			
1288		ObjectProcessingCompleted		
1289			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1290			Expression	caskwtempy = 229800
1291			Expression	costrailshipD = 3096
1292			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
1293			Expression	costbargeloadcum = costbargeloadcum+ (costrailshipcaskcars*(costbargeloadsteps/3)*costbargeloadpercask)
1294			Function Call	Call ObjectActivated() In RailShipCostCalc
1295	Connection:	SLB	Atlanta	
1296		ObjectActivated		
1297			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1298	Connection:	SLR	SLB	
1299		ObjectActivated		

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1300			Comment	Barge use is the input total travel barge time per cask in steps (to and from B and R sites)
1301			Expression	costbargeusecum = costbargeusecum+3.1
1302			Comment	Increment the number of port uses per cask = 2
1303			Expression	costbargeportnumcum = costbargeportnumcum+2
1304	SRSR			
1305		Object:NextProcessDefined		
1306			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1307			Expression	caskwtempy = 265512
1308			Expression	costrailshipD = 2582
1309			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1310			Function Call	Call ObjectActivated() In RailShipCostCalc
1311	Connection:	SRSR	Atlanta	
1312		ObjectActivated		
1313			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1314	SUMR			
1315		Object:NextProcessDefined		
1316			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1317			Expression	caskwtempy = 229800
1318			Expression	costrailshipD = 2584
1319			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1320			Function Call	Call ObjectActivated() In RailShipCostCalc
1321	Connection:	SUMR	Lawrenceburg1 10 9	
1322		ObjectActivated		
1323			Expression	costcumSLR = costcumSLR+4* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1324	TPB			
1325		ObjectProcessingCompleted		
1326			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1327			Expression	caskwtempy = 181323
1328			Expression	costrailshipD = 3122
1329			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1330			Expression	costbargeloadcum = costbargeloadcum+(costrailshipcaskcars* (costbargeloadsteps/3)*costbargeloadpercask)
1331			Function Call	Call ObjectActivated() In RailShipCostCalc
1332	Connection:	TPB	Atlanta	
1333		ObjectActivated		
1334			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1335	Connection:	TPR	TPB	
1336		ObjectActivated		
1337			Comment	Barge use is the input total travel barge time per cask in steps (to and from B and R site)
1338			Expression	costbargeusecum = costbargeusecum+1.2
1339			Comment	Increment the number of port uses per cask = 2
1340			Expression	costbargeportnumcum = costbargeportnumcum+2
1341	VOGR			
1342		Object:NextProcessDefined		
1343			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1344			Expression	caskwtempy = 229800
1345			Expression	costrailshipD = 2727
1346			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1347			Function Call	Call ObjectActivated() In RailShipCostCalc
1348	Connection:	VOGR	Atlanta	
1349		ObjectActivated		
1350			Expression	costcumSLR = costcumSLR+1* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1351	WATR			
1352		Object:NextProcessDefined		
1353			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1354			Expression	caskwtempy = 229800
1355			Expression	costrailshipD = 2314
1356			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1357			Function Call	Call ObjectActivated() In RailShipCostCalc
1358	Connection:	WATR	Lunita1 9	
1359		ObjectActivated		

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1360			Expression	costcumSLR = costcumSLR+1* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1361	WBR			
1362		Object:NextProcessDefined		
1363			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1364			Expression	caskwtempy = 229800
1365			Expression	costrailshipD = 2307
1366			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1367			Function Call	Call ObjectActivated() In RailShipCostCalc
1368	Connection:	WBR	Lawrenceburg1 10 9	
1369		ObjectActivated		
1370			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1371	Connection:	BFT	Metropolis1 4 4	
1372		ObjectActivated		
1373			Expression	costcumSLT = costcumSLT+4* costSLrateT
1374	BRUT			
1375		Object:NextProcessDefined		
1376			Expression	costruckshipD = 2966
1377			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
1378			Function Call	Call ObjectActivated() In TruckShipCostCalc6
1379	Connection:	BRUT	Roanoke 4 4	
1380		ObjectActivated		
1381			Expression	costcumSLT = costcumSLT+2* costSLrateT
1382	Connection:	CATT	Metropolis1 4 4	
1383		ObjectActivated		
1384			Expression	costcumSLT = costcumSLT+5* costSLrateT
1385	CRYT			
1386		Object:NextProcessDefined		
1387			Expression	costruckshipD = 2905
1388			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
1389			Function Call	Call ObjectActivated() In TruckShipCostCalc6
1390	Connection:	CRYT	Metropolis1 4 4	
1391		ObjectActivated		
1392			Expression	costcumSLT = costcumSLT+5* costSLrateT

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1393	Connection:	FART	Shreveport2 4 4	
1394		ObjectActivated		
1395			Expression	costcumSLT = costcumSLT+3* costSLrateT
1396	Connection:	GGT	Shreveport2 4 4	
1397		ObjectActivated		
1398			Expression	costcumSLT = costcumSLT+2* costSLrateT
1399	Connection:	HART	Roanoke 4 4	
1400		ObjectActivated		
1401			Expression	costcumSLT = costcumSLT+2* costSLrateT
1402	Connection:	HATT	Metropolis1 4 4	
1403		ObjectActivated		
1404			Expression	costcumSLT = costcumSLT+4* costSLrateT
1405	MCGT			
1406		Object:NextProcessDefined		
1407			Expression	costruckshipD = 2701
1408			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
1409			Function Call	Call ObjectActivated() In TruckShipCostCalc6
1410	Connection:	MCGT	Roanoke 4 4	
1411		ObjectActivated		
1412			Expression	costcumSLT = costcumSLT+2* costSLrateT
1413	OCOT			
1414		Object:NextProcessDefined		
1415			Expression	costruckshipD = 2615
1416			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
1417			Function Call	Call ObjectActivated() In TruckShipCostCalc6
1418	Connection:	OCOT	Metropolis1 4 4	
1419		ObjectActivated		
1420			Expression	costcumSLT = costcumSLT+5* costSLrateT
1421		Object:NextProcessDefined		
1422			Expression	costruckshipD = 2162
1423			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
1424			Function Call	Call ObjectActivated() In TruckShipCostCalc6
1425	Connection:	RBT	Shreveport2 4 4	
1426		ObjectActivated		
1427			Expression	costcumSLT = costcumSLT+1* costSLrateT
1428	ROBT			
1429		Object:NextProcessDefined		
1430			Expression	costruckshipD = 2776

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1431			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
1432			Function Call	Call ObjectActivated() In TruckShipCostCalc6
1433	Connection:	ROBT	Metropolis1 4 4	
1434		ObjectActivated		
1435			Expression	costcumSLT = costcumSLT+5* costSLrateT
1436	Connection:	SEQT	Metropolis1 4 4	
1437		ObjectActivated		
1438			Expression	costcumSLT = costcumSLT+3* costSLrateT
1439	SLT			
1440		Object:NextProcessDefined		
1441			Expression	costruckshipD = 3072
1442			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
1443			Function Call	Call ObjectActivated() In TruckShipCostCalc6
1444			Expression	costruckdemcum = costruckdemcum+1968
1445	Connection:	SLT	Metropolis1 4 4	
1446		ObjectActivated		
1447			Expression	costcumSLT = costcumSLT+5* costSLrateT
1448	Connection:	SRST	Metropolis1 4 4	
1449		ObjectActivated		
1450			Expression	costcumSLT = costcumSLT+5* costSLrateT
1451	Connection:	SUMT	Metropolis1 4 4	
1452		ObjectActivated		
1453			Expression	costcumSLT = costcumSLT+5* costSLrateT
1454	TPT			
1455		Object:NextProcessDefined		
1456			Expression	costruckshipD = 3230
1457			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
1458			Function Call	Call ObjectActivated() In TruckShipCostCalc6
1459	Connection:	TPT	Metropolis1 4 4	
1460		ObjectActivated		
1461			Expression	costcumSLT = costcumSLT+5* costSLrateT
1462	Connection:	VOGT	Metropolis1 4 4	
1463		ObjectActivated		
1464			Expression	costcumSLT = costcumSLT+5* costSLrateT
1465	Connection:	WATT	Shreveport2 4 4	
1466		ObjectActivated		
1467			Expression	costcumSLT = costcumSLT+1* costSLrateT
1468	Connection:	WBT	Metropolis1 4 4	

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1469		ObjectActivated		
1470			Expression	costcumSLT = costcumSLT+3* costSLrateT
1471	c229	BuyCask229	229Dist	
1472		ObjectProcessingCompleted		
1473			Comment	Increment cask cost
1474			Expression	costcumcaskS = costcumcaskS+ costcaskov
1475	c60B	BuyCask60	60Dist	
1476		ObjectProcessingCompleted		
1477			Comment	Increment cumulative cask cost
1478			Expression	costcumcaskR = costcumcaskR+ costcaskbarebasket
1479	ANOR			
1480		Object:NextProcessDefined		
1481			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1482			Expression	caskwtempy = 229800
1483			Expression	costrailshipD = 1861
1484			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1485			Function Call	Call ObjectActivated() In RailShipCostCalc
1486	Connection:	ANOR	Kansas City	
1487		ObjectActivated		
1488			Expression	costcumSLR = costcumSLR+1* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1489	Connection:	Barstow	NVR	
1490		ObjectActivated		
1491			Expression	costcumSLR = costcumSLR+2* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1492	CPR			
1493		Object:NextProcessDefined		
1494			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1495			Expression	caskwtempy = 229800
1496			Expression	costrailshipD = 1687
1497			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1498			Function Call	Call ObjectActivated() In RailShipCostCalc
1499	Connection:	CPR	Denver2 8 7	
1500		ObjectActivated		

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1501			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1502	DCHH			
1503		ObjectProcessingCompleted		
1504			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1505			Expression	caskwtempty = 229800
1506			Expression	costrailshipD = 507
1507			Expression	costrailsecmilecum = costrailsecmilecum+ costrailshipD* costrailsecmile
1508			Function Call	Call ObjectActivated() In RailShipCostCalc
1509	Connection:	DCR	DCHH	
1510		ObjectActivated		
1511			Comment	HH use based on load+unload+travel time All HH use for cost estimate is in this extension
1512			Expression	costHHusecum = costHHusecum+2*(0.48)+ costHHunloadsteps+ costHHloadsteps
1513	Connection:	DeramusSW	Kansas City	
1514		ObjectActivated		
1515			Expression	costcumSLR = costcumSLR+4* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1516	Connection:	Lake Charles 8 7	Barstow	
1517		ObjectActivated		
1518			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1519	Connection:	Lunita1 8 7	Denver2 8 7	
1520		ObjectActivated		
1521			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1522	PVR			
1523		Object:NextProcessDefined		
1524			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1525			Expression	caskwtempty = 272900
1526			Expression	costrailshipD = 714
1527			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1528			Function Call	Call ObjectActivated() In RailShipCostCalc
1529	Connection:	PVR	Barstow	
1530		ObjectActivated		
1531			Expression	costcumSLR = costcumSLR+1* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1532	SOR			
1533		Object:NextProcessDefined		
1534			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1535			Expression	caskwtempy = 210500
1536			Expression	costrailshipD = 465
1537			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1538			Function Call	Call ObjectActivated() In RailShipCostCalc
1539	STPR			
1540		Object:NextProcessDefined		
1541			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1542			Expression	caskwtempy = 221440
1543			Expression	costrailshipD = 2065
1544			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1545			Function Call	Call ObjectActivated() In RailShipCostCalc
1546	Connection:	STPR	Barstow	
1547		ObjectActivated		
1548			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1549	Connection:	ShreveportSW	Denver2 8 7	
1550		ObjectActivated		
1551			Expression	costcumSLR = costcumSLR+3* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1552	Connection:	Uvada2 8 7	NVR	
1553		ObjectActivated		
1554			Expression	costcumSLR = costcumSLR+1* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1555	WCR			
1556		Object:NextProcessDefined		

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1557			Expression	costrailshipcaskcars = GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1558			Expression	caskwtempy = 229800
1559			Expression	costrailshipD = 1560
1560			Expression	costrailsecmilecum = costrailsecmilecum+ costrailsecmile* costrailshipD
1561			Function Call	Call ObjectActivated() In RailShipCostCalc
1562	Connection:	WCR	Kansas City	
1563		ObjectActivated		
1564			Expression	costcumSLR = costcumSLR+1* costSLrateR* GetNumberOfPartsOfType(ModelID, ObjectReferenceID, 'Caskonrail')
1565	Connection:	ANOT	LV2 2 2	
1566		ObjectActivated		
1567			Expression	costcumSLT = costcumSLT+7* costSLrateT
1568	CPT			
1569		Object:NextProcessDefined		
1570			Expression	costruckshipD = 1736
1571			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
1572			Function Call	Call ObjectActivated() In TruckShipCostCalc6
1573	Connection:	CPT	LV2 2 2	
1574		ObjectActivated		
1575			Expression	costcumSLT = costcumSLT+6* costSLrateT
1576	Connection:	Fresno2 2	LV2 2 2	
1577		ObjectActivated		
1578			Expression	costcumSLT = costcumSLT+2* costSLrateT
1579	Connection:	PVT	LV2 2 2	
1580		ObjectActivated		
1581			Expression	costcumSLT = costcumSLT+3* costSLrateT
1582	SOT			
1583		ObjectActivated		
1584		Object:NextProcessDefined		
1585			Expression	costruckshipD = 431
1586			Expression	costruckseccum = costruckseccum+ costrucksecmile* costruckshipD
1587			Function Call	Call ObjectActivated() In TruckShipCostCalc6
1588	Connection:	SOT	LV2 2 2	
1589		ObjectActivated		
1590			Expression	costcumSLT = costcumSLT+2* costSLrateT
1591	Connection:	STPT	LV2 2 2	

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1592		ObjectActivated		
1593			Expression	costcumSLT = costcumSLT+5* costSLrateT
1594	Connection:	Shreveport1 2	LV2 2 2	
1595		ObjectActivated		
1596			Expression	costcumSLT = costcumSLT+6* costSLrateT
1597	Connection:	WCT	Oakley2 2 2	
1598		ObjectActivated		
1599			Expression	costcumSLT = costcumSLT+1* costSLrateT
1600	c28B	BuyCask28	28Dist	
1601		ObjectProcessingCompleted		
1602			Comment	Increment cumulative cask cost
1603			Expression	costcumcaskR = costcumcaskR+ costcaskmed
1604	c29B	BuyCask29	29Dist	
1605		ObjectProcessingCompleted		
1606			Comment	Increment cumulative cask cost
1607			Expression	costcumcaskR = costcumcaskR+ costcaskmed
1608	c30B	BuyCask30	30Dist	
1609		ObjectProcessingCompleted		
1610			Expression	costcumcaskR = costcumcaskR+ costcasksmall
1611	c31B	BuyCask31	31Dist	
1612		ObjectProcessingCompleted		
1613			Expression	costcumcaskR = costcumcaskR+ costcasksmall
1614	c208	BuyCask208	208Dist	
1615		ObjectProcessingCompleted		
1616			Comment	Increment cask cost
1617			Expression	costcumcaskTADOV = costcumcaskTADOV+ costTADSOV
1618	c253	BuyCask253	253Dist	
1619		ObjectProcessingCompleted		
1620			Expression	costcumcaskTADOV = costcumcaskTADOV+ costTADLMOV
1621	TADLargeBBare			
1622		ObjectActivated		
1623			Comment	Trigger Cask
1624			Expression	= SignalEvent(ModelID, 'trCask251Mon')
1625	c251	TADLargeBBare	251load	
1626		ObjectProcessingCompleted		
1627			Expression	costcumcaskTAD = costcumcaskTAD+ costTADLMB
1628	c254	TADLargePBare	254load	
1629		ObjectProcessingCompleted		
1630			Expression	costcumcaskTAD = costcumcaskTAD+ costTADLMP
1631	c206	TADSmallBBare	206load	
1632		ObjectProcessingCompleted		

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1633			Expression	costcumcaskTAD = costcumcaskTAD+ costTADSB
1634	c209	TADSmallPBare	209load	
1635		ObjectProcessingCompleted		
1636			Expression	costcumcaskTAD = costcumcaskTAD+ costTADSP
1637	c102B	BuyCask102	102Dist	
1638		ObjectProcessingCompleted		
1639			Comment	Increment cumulative cask cost
1640			Expression	costcumcaskR = costcumcaskR+ costcaskbarebasket
1641	c217	BuyCask217	217Dist	
1642		ObjectProcessingCompleted		
1643			Comment	Increment cask cost
1644			Expression	costcumcaskS = costcumcaskS+ costcaskov
1645	c106B	BuyCask106	106Dist	
1646		ObjectProcessingCompleted		
1647			Comment	Increment cumulative cask cost
1648			Expression	costcumcaskR = costcumcaskR+ costcaskTSC
1649	c109B	BuyCask109	109Dist	
1650		ObjectProcessingCompleted		
1651			Comment	Increment cumulative cask cost
1652			Expression	costcumcaskR = costcumcaskR+ costcaskTSC
1653	c232B	BuyCask232	232Dist	
1654		ObjectProcessingCompleted		
1655			Comment	Increment cumulative cask cost
1656			Expression	costcumcaskR = costcumcaskR+ costcaskTSC
1657	c235B	BuyCask235	235Dist	
1658		ObjectProcessingCompleted		
1659			Comment	Increment cumulative cask cost
1660			Expression	costcumcaskR = costcumcaskR+ costcaskTSC
1661	c290B	BuyCask290	290Dist	
1662		ObjectProcessingCompleted		
1663			Comment	Increment cumulative cask cost
1664			Expression	costcumcaskR = costcumcaskR+ costcaskTSC
1665	c295B	BuyCask295	295Dist	
1666		ObjectProcessingCompleted		
1667			Comment	Increment cumulative cask cost
1668			Expression	costcumcaskR = costcumcaskR+ costcaskTSC
1669	c298B	BuyCask298	298Dist	
1670		ObjectProcessingCompleted		
1671			Comment	Increment cumulative cask cost
1672			Expression	costcumcaskR = costcumcaskR+ costcaskTSC
1673	c66B	BuyCask66	66Dist	

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1674		ObjectProcessingCompleted		
1675			Comment	Increment cumulative cask cost
1676			Expression	costcumcaskR = costcumcaskR+ costcaskTSC
1677	c76B	BuyCask76	76Dist	
1678		ObjectProcessingCompleted		
1679			Comment	Increment cumulative cask cost
1680			Expression	costcumcaskR = costcumcaskR+ costcaskTSC
1681	TruckShipCostCalc6			
1682		ObjectActivated		
1683			Comment	Calc Truck shipping cost, called from truck sites
1684			Expression	caskwtfull = 54242
1685			Expression	caskwtempty = 47582
1686			Condition	IF (costruckshipD*.65>450) is TRUE
1687			Expression	costruckshipQ = costruckshipD*.65
1688			Condition	END IF
1689			Condition	IF (costruckshipD*.65<=450) is TRUE
1690			Expression	costruckshipQ = 450
1691			Condition	END IF
1692			Condition	IF ((.00518* (caskwtempty/100)* costruckshipD)>1000) is TRUE
1693			Expression	costruckshipCE = .00518* costruckshipD*(caskwtempty/100)
1694			Condition	END IF
1695			Condition	IF ((.00518*(caskwtempty/100)*costruckshipD)<=1000) is TRUE
1696			Expression	costruckshipCE = 1000
1697			Condition	END IF
1698			Condition	IF (costruckshipD<100) is TRUE
1699			Expression	costruckshipAL = .03816
1700			Condition	END IF
1701			Condition	IF ((costruckshipD>=100) and (costruckshipD<250)) is TRUE
1702			Expression	costruckshipAL = .02603
1703			Condition	END IF
1704			Condition	IF ((costruckshipD>=250) and (costruckshipD<500)) is TRUE
1705			Expression	costruckshipAL = .01877
1706			Condition	END IF
1707			Condition	IF ((500<=costruckshipD) and (costruckshipD<750)) is TRUE
1708			Expression	costruckshipAL = .01266
1709			Condition	END IF
1710			Condition	IF ((750<=costruckshipD) and (costruckshipD<1000)) is TRUE
1711			Expression	costruckshipAL = .01155
1712			Condition	END IF
1713			Condition	IF (1000<costruckshipD) is TRUE
1714			Expression	costruckshipAL = .01104

Line	Process or Connection Name	Event Handler or Connection from	Line Type or connection to	Line Formula
1715			Condition	END IF
1716			Condition	IF ((costruckshipAL*(caskwtfull/100)* costruckshipD>1000)) is TRUE
1717			Expression	costruckshipCL = costruckshipAL*(caskwtfull/100)* costruckshipD
1718			Condition	END IF
1719			Condition	IF ((costruckshipAL*(costwtfull/100)*costruckshipD<=1000)) is TRUE
1720			Expression	costruckshipCL = 1000
1721			Condition	END IF
1722			Expression	costcumtruckship = costcumtruckship+ costruckshipQ+ costruckshipCE+ costruckshipCL
1723			Expression	costtruck2drivercum = costtruck2drivercum+(costtruck2driver*costruckshipD)
1724	c1b	BuyCask1	Cask1Distribute	
1725		ObjectProcessingCompleted		
1726			Expression	costcumcaskT = costcumcaskT+ costcasktruck
1727	c11b	BuyCask11	Cask11Distribute	
1728		ObjectProcessingCompleted		
1729			Expression	costcumcaskT = costcumcaskT+ costcasktruck
1730	c12b	BuyCask12	Cask12Distribute	
1731		ObjectProcessingCompleted		
1732			Expression	costcumcaskT = costcumcaskT+ costcasktruck
1733	c18B	BuyCask18	18Dist	
1734		ObjectProcessingCompleted		
1735			Comment	Increment cumulative cask cost
1736			Expression	costcumcaskR = costcumcaskR+ costcasktruck
1737	c6b	BuyCask6	Cask6Distribute	
1738		ObjectProcessingCompleted		
1739			Expression	costcumcaskT = costcumcaskT+ costcasktruck

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