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COMPLEX-WIDE WASTE FLOW ANALYSIS V1.0 VERIFICATION AND VALIDATION REPORT

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VERIFICATION AND VALIDATION REPORT**

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Published 11/21/97

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CWWFA VERIFICATION & VALIDATION REPORT

1. Introduction

The Complex-Wide Waste Flow Analysis model (CWWFA) was developed to assist the Department of Energy (DOE) Environmental Management (EM) Office of Science and Technology (EM-50) to evaluate waste management scenarios with emphasis on identifying and prioritizing technology development opportunities to reduce waste flows and public risk. In addition, the model was intended to support the needs of the Complex-Wide Environmental Integration (EMI) team supporting the DOE's Accelerating Cleanup: 2006 Plan.

CWWFA represents an integrated environmental modeling system that covers the life cycle of waste management activities including waste generation, interim process storage, retrieval, characterization and sorting, waste preparation and processing, packaging, final interim storage, transport, and disposal at a final repository. The CWWFA shows waste flows through actual site-specific and facility-specific conditions. The system requirements for CWWFA are documented in the Technical Requirements Document (TRD)¹. The TRD is intended to be a "living document" that will be modified over the course of the execution of CWWFA development. Thus, it is anticipated that CWWFA will continue to evolve as new requirements are identified (i.e., transportation, small sites, new streams, etc.).

This report provides a documented basis for system verification of CWWFA requirements. System verification is accomplished through formal testing and evaluation to ensure that all performance requirements as specified in the TRD have been satisfied. A Requirement Verification Matrix (RVM) was used to map the technical requirements to the test procedures. The RVM is attached as Appendix A.

Since February of 1997, substantial progress has been made toward development of the CWWFA to meet the system requirements. This system verification activity provides a baseline on system compliance to requirements and also an opportunity to reevaluate what requirements need to be satisfied in FY-98.

¹ Technical Requirements Document Complex-Wide Waste Flow Analysis (INEL/95-00340, March 1997)

2. System Engineering Approach

A proven Lockheed Martin Corporation systems engineering approach was used in the development of the CWWFA model. This approach included the development of the technical requirements and decomposition into design specifications² and prototyping activities. This approach is now applied to CWWFA verification and validation activities. As illustrated in Figure 1, the general approach consists of defining the requirements, identifying alternatives, analyzing the alternatives, verifying, and implementing the results. Additionally, the verification approach is consistent with IEEE Standard 730-1989 and with LMITCO Quality Level 2 standards.

Figure 1. Systems engineering process

3. Objective

The objective of this report is to describe the test planning, verification method, summary of results, and corrective actions that emerge from the test and evaluation activities. The focus of the testing is meeting performance requirements (e.g., model must be capable of performing analyses on waste

² Complex-Wide Waste Flow Analysis v1.0 Design Specification Document (INEL/97-00339, March 1997)

flow, capacity planning, cost, risk, stakeholder perception, transportation, and other factors) as defined in the RVM.

4. Test Planning

The testing program evaluates compliance to requirements with regard to multiple planning factors: waste flow, cost, risk, facility operational performance, decision analysis, equity (stakeholder position), transportation, and technology performance. These factors represent an integrated environmental management system that covers waste stream disposition from current state to final disposal.

The EMI team has developed waste disposition maps that are graphical depictions of waste streams moving through the system from the current state to final disposition. These disposition maps detail the waste disposition at 11 major DOE sites. Figure 2 shows an example of a waste disposition map for the Hanford site.

Figure 2. Waste Disposition Map

The CWWFA was developed to provide dynamic assessments of waste flow as shown in the disposition maps. Thus, test plans were needed to demonstrate that CWWFA results show reasonable behaviors that accurately depict the waste flow of various waste streams.

Test planning consisted of establishing test procedures (as described below) that satisfied verification of each requirement listed in the RVM. There were test procedures developed to address seven major performance areas. Each performance area includes one or more technical requirements. A total of 22

requirements were tested for compliance. Details of the test procedures and test results can be found in Appendix B. Test procedures are listed as follows:

1. TP3.1.1 – Waste Flow Analysis and Scheduling
2. TP3.1.2 – Mortgage Reduction Performance
3. TP3.1.3 – Health and Safety Risk
4. TP3.1.4 – Facility Operational Performance
5. TP3.1.5 – Decision Analysis
6. TP3.1.6 – Equity Performance
7. TP3.1.7 – Technology Performance

Each test procedure provides a description of the test methods (or inspection), waste stream configuration (e.g., site, waste types, quantities, etc.), and appropriate test data. A typical profile includes facility, waste stream, waste type, shipping schedule, conversion profile, risk, and cost. A stakeholder profile is used for specific equity analysis testing.

Since CWWFA is capable of modeling multiple sites, waste types, waste streams, and routes (e.g., hundreds of configurations), specific test cases and test data were used to provide representation of CWWFA waste streams. The test cases were chosen to support rigorous testing of CWWFA processes.

After the testing and evaluation was completed, the results were analyzed for compliance and mapped to the RVM for completeness. Results of pass and failure were documented and corrective actions were defined to resolve the deficiencies.

5. Verification Method

Two methods will be used to verify requirements during test and evaluation of CWWFA.

- Inspection – an observation or examination to verify conformity with requirements.
- Test – an exercise wherein quantitative performance is compared to requirements and is documented.

6. Summary of Results

Below is a summary of the testing results presented in a table format. The test results are verified against all requirements and acknowledged as either pass or fail. Failed items are addressed in the corrective action section.

Summary of Results

Requirement	Test Procedure	Pass / Fail	Comment
3.1.1.1 - Provide quick interactive analysis of the effects of waste flow over time to analyze storage requirements, transportation, and disposal bottlenecks.	TP3.1.1	Pass	For every unit of waste, the model tracks a volume in cubic meters and a density in kilograms per cubic meter. With both of these numbers the model can convert between volume and mass as necessary. Note: the dynamic scheduling capability of CWWFA needs to be explained in the user's manual and specification document.
3.1.1.2 - Summarize impacts of acceleration and delays associated with the management of waste (reduction of untreated waste inventories, reclassification of wastes, accumulation in storage, buildup of waste in disposal).	TP3.1.1	Pass	Model behaves as expected .
3.1.1.3 - Identify need for new (or underutilized) facilities in the DOE complex that could be used to process bottlenecks.	TP3.1.1	Pass	The facility capacity detail chart identifies bottlenecks due to insufficient processing capacity or a timing conflict at the next facility in the routing.
3.1.1.4 - Identify impacts from transportation bottlenecks and alternatives. Include alternative packaging and transport mode options.	TP3.1.1	Fail	The model does not constrain the number of transport or the number of packages. Thus no bottlenecks will occur due to transportation limitations. The model does not allow alternative packages to be used for transportation. The model only has transport mode by road..
3.1.1.5 - Summarize system impacts from future ER and D&D waste sources (show when/how much the current maximum disposal receipt rate (m^3 /yr) is impacted by input from waste sources)	TP3.1.1	Pass	The model supports addition of new generation volumes for a waste stream. The new generation volumes can be interpreted as incoming waste from environmental restoration or decontamination and decommissioning activities.
3.1.1.6 - Method 1 Show processing flow effects from varying split of waste processed by alternative processes (e.g., WIPP Waste Acceptance Criteria, versus treatment to land disposal restricted, volume reduction, waste form density changes, and secondary waste production.	TP3.1.1	Pass	The model allows the volume change factor for a facility to be changed by the user.
3.1.1.6 - Method 2 Show processing flow effects for secondary waste generation	TP3.1.1	Fail	The model does not support secondary waste generation from processing. However, the user could specify an additional shipping route to duplicate the results of a secondary waste stream due to processing. But this would have to be done on a stream by stream basis as opposed to a single facility producing secondary waste regardless of the characteristics of the waste being processed.

3.1.1.7 - Allow separation of wastes after processing into separate fractions (e.g., HLW is split into high and low activity wastes).	TP3.1.1	Pass	The model supports multiple shipping routes between facilities. Each shipping route can represent a fraction of waste generated from a processing facility.
3.1.1.8 - Show impacts from consolidated treatment, storage, and disposal of similar wastes (e.g., aMLLW and mixed TRU).	TP3.1.1	Pass	All charts within CWWFA matched those produced by the Excel spreadsheet.
3.1.1.9 - Allow new system capacity expansion to support processing volume increases resulting from increased waste generation or changes in the waste fraction of the waste stream. Incorporate capacities at nominal and maximum conditions.	TP3.1.1	Fail	The model only supports operating capacities at nominal.
3.1.1.10 - Identify orphan wastes that do not have a disposition path.	TP3.1.1	Pass	Model behaves as expected.
3.1.2.1 - Alternatives shall be compared against the baseline (Ten Year Plan) with delta costs identified.	TP3.1.2	Pass	Minor correction to the LLW storage unit cost value.
3.1.2.2 - Allow input of applicable cost information (when cost data are available)	TP3.1.2	Fail	A user input screen to enter cost data is not available.
3.1.3.1 - Provide limited Health and Safety risk to workers and the public. Utilize waste flow results to illustrate alternatives with potential risk reduction potential (e.g., reduced material handling, less storage, less transportation)	TP3.1.3	Fail	There is a major conflict between the static risk calculation used by EMI and the dynamic approach used in CWWFA, which can cause inconsistent risk results. A review and validation of the method is needed.
3.1.3.2 - Indicate risk reduction as a function of the volume of waste removed from sites with high populations.	TP3.1.3	Fail	Same issue as above.
3.1.3.3 - Indicate transportation risk reduction as a function of number of shipments and number of transport miles	TP3.1.3	Fail	Same issue as above.
3.1.4.1 - Measure utilization of treatment/processing and disposal facilities. Compare maximum total processing/ disposal needed to capacities actually utilized. Provide identification of redundant capabilities, including existing DOE facilities and private sector capabilities. Identify applications for use of excess capacity	TP3.1.4	Pass Fail Fail Fail	There are four sub-requirements that were evaluated. 1. Measure utilization at facilities - pass 2. Compare maximum capacities - current output charts are not scaled to maximum capacity. 3. Provide identification of redundant capabilities - model is inadequate to meet this requirement. 4. Identify application for use of excess capacity - model is inadequate to meet this requirement.
3.1.5.1 - Optimize systems based on performance criteria.	TP3.1.5	Fail	No optimization capability is present.

3.1.5.2 - Ability to address variable uncertainty and sensitivity to the expected values and system choices.	TP3.1.5	Pass	Variable uncertainty is demonstrated with the drivers diagram on specific variables. Inspection of the program code reveals a limited sensitivity analysis capability in the model. Sensitivity is conducted on a set list of variables. The user cannot choose individual variable to perform sensitivity analysis. This requirement will be reevaluated in the FY-98 technical requirements document.
3.1.6.1 - (Phase 2, FY-97) Incorporate generic equity analysis capability using existing stakeholder data. Develop capability for analysts to weight positive and negative influences. Provide graphical representation of projected state equity positions based on modeled results from the CWWFA. Incorporate input/output diagrams as relevant for equity analysis.	TP3.1.6	Pass	Minor corrections on stakeholder threshold values.
3.1.6.2 - Incorporate actual stakeholder equity analysis by identifying (weighting) stakeholder (including DOE site management, tribal governments, state and local governments, special interest groups) criteria on a site-to-site, state-to-state, and EM complex basis. Provide for stakeholder input from geographically diverse locations (regionally or nationally). Provide for open and unrestricted stakeholder involvement. Aggregate and summarize stakeholder comments into a manageable number of criteria (ten or less). Provide stakeholder involvement from a generic waste management perspective without specific knowledge of CWWFA model results	TP3.1.6	N/A	Capability is planned for inclusion into the model in 1998.
3.1.7.1 - Analyze new technology systems (e.g., mobile characterization is substituted for small volumes of waste instead of using fixed facilities. New systems would be substituted for existing capabilities, and wastes would be rerouted for processing.	TP3.1.7	Pass	Minor correction on route and shipping schedule input screen.
3.1.7.2 - Define technology performance specifications (e.g., volume reduction) required to achieve required outputs or goals	TP3.1.7	Pass	Model behaves as expected.

7. Corrective Actions

Based on the test results above, deficiencies are segregated depending on the level of effort that will take to correct the deficiencies. The deficiencies are divided into category 1 and 2.

Category 1 includes all items that require minor corrections. The definition of a minor correction is one that has not failed a requirement and can be accomplished by the end of this calendar year (1997). From the test results, most of the minor deficiencies are related to the graphical user interface (GUI) applications. For the minor corrections, a list has been prepared and a dedicated GUI designer has been tasked to correct the deficiency. The CWWFA lead software designer will be responsible for ensuring completion and signed off of the work.

Category 2 includes all items that require significant corrections. The definition of a significant correction is one that has not satisfied a requirement and requires effort beyond 1997. In general, many of the category 2 items have not satisfied their respective requirements due to the following reasons:

- Some modeling features were intentionally deferred until FY-98 when key data and algorithms describing the system processes (required to support the model features) are expected to be available from the DOE 2006 Plan. The completion of the model function in FY-97 would not be useful without supporting data/algorithms. This applies to several requirements that were not met (e.g., number of transports, packages, secondary waste generation, facility operating capacities).
- Funding was not available in FY-97 to support development of all modeling functions and requirements. For example, model enhancements for transportation were deferred to begin until September 1997 when National Transportation Program funding was received.
- Some requirements were reprioritized as a result of the review with the EMI Core Team on July 29, 1997. Additional model development on total life cycle cost, health and safety risk, and decision analysis (optimization) was deferred as a result of this review.

The category 2 corrective activities will be addressed as part of CWWFA maintenance task in FY-98. The TRD will be updated to reflect added, modified, or deleted requirements as a result of the CWWFA verification. The CWWFA project manager is responsible for ensuring the disposition of the corrective actions.

Below is a list of the category 2 items and the corrective actions for gaining compliance.

Requirement	Corrective Action
3.1.1.4	Programming change - Modify algorithm to provide maximum number of transports or packages; providing for alternative packages; and providing for transport via road or rail.
3.1.1.6	Reevaluate current EMI need for requirement
3.1.1.9	Reevaluate requirement and obtain data on maximum capacity if required.
3.1.2.2	Programming change – develop a user input screen to allow direct input of cost data into the model.
3.1.3.1, 3.1.3.2, 3.1.3.3	Phase 1 – simplify the method to provide relative risk. Phase 2 – reevaluate the risk method to support a dynamic risk calculation.
3.1.4.1	Obtain facility capacity from DOE sites, subject matter experts, or industrial sources. Reevaluate requirement to provide identification of redundant capabilities. Reevaluate requirement to provide identification of excess capacities.
3.1.5.1	This requirement will be changed to remove optimization based on DOE direction.
3.1.5.2	Programming change – provide for sensitivity analysis on full set of variables.

Appendix A – Requirements Verification Matrix

Requirement	Verification Method
3.1.1 WFA/Scheduling	
<p>3.1.1.1 Provide quick interactive analysis of the effects of waste flow over time to analyze storage requirements, transportation, and disposal bottlenecks.</p> <p>Mass and volume flows will be developed as a function of time.</p> <p>Constraints associated with the waste streams will be identified</p>	<p>Test-TP3.1.1</p> <p>Inspection-TP3.1.1</p> <p>Test- TP3.1.1</p>
<p>3.1.1.2 Summarize impacts of acceleration and delays associated with the management of waste (reduction of untreated waste inventories, reclassification of wastes, accumulation in storage, buildup of waste in disposal).</p>	Test-TP3.1.1
<p>3.1.1.3 Identify need for new (or underutilized) facilities in the DOE complex that could be used to process bottlenecks.</p> <p>Allow facility use preference to facilitate analysis of capacity utilization</p>	<p>Test-TP3.1.1</p> <p>Inspection- TP3.1.1</p>
<p>3.1.1.4 Identify impacts from transportation bottlenecks and alternatives.</p> <p>Include alternative packaging and transport mode options.</p>	Inspection- TP3.1.1
<p>3.1.1.5 Summarize system impacts from future ER and D&D waste sources (show when/how much the current maximum disposal receipt rate (m^3/yr) is impacted by input from waste sources)</p>	Test & inspection TP3.1.1
<p>3.1.1.6 Show processing flow effects from varying split of waste processed by alternative processes (e.g., WIPP Waste Acceptance Criteria, versus treatment to land disposal restricted, volume reduction, waste form density changes, and secondary waste production.</p>	Test & Inspection TP3.1.1
<p>3.1.1.7 Allow separation of wastes after processing into separate fractions (e.g., HLW is split into high and low activity wastes). Separated waste fractions can be directed to alternative management processes</p>	Inspection -TP3.1.1
<p>3.1.1.8 Show impacts from consolidated treatment, storage, and disposal of similar wastes (e.g., aMLLW and mixed TRU).</p>	Test-TP3.1.1
<p>3.1.1.9 Allow new system capacity expansion to support processing volume increases resulting from increased waste generation or changes in the waste fraction of the waste stream.</p>	Inspection-TP3.1.1

Incorporate capacities at nominal and maximum conditions.	
3.1.1.10 Identify orphan wastes that do not have a disposition path.	Test-TP3.1.1
3.1.2 Mortgage Reduction Performance	
3.1.2.1 Alternatives shall be compared against the baseline (Ten Year Plan) with delta costs identified.	Test-TP3.1.2
3.1.2.2 Allow input of applicable cost information (when cost data are available)	Test-TP3.1.2
3.1.3 Risk Reduction	
3.1.3.1 Provide limited Health and Safety risk to workers and the public. Utilize waste flow results to illustrate alternatives with potential risk reduction potential (e.g., reduced material handling, less storage, less transportation)	Test-TP3.1.3
3.1.3.2 Indicate risk reduction as a function of the volume of waste removed from sites with high populations. Risk is assumed to be reduced due to offsite population no longer exposed to the potential hazards of the wastes.	Test-TP3.1.3
3.1.3.3 Indicate transportation risk reduction as a function of number of shipments and number of transport miles	Test-TP3.1.3
Facility Operational Performance	
3.1.4.1 Measure utilization of treatment/processing and disposal facilities. Compare maximum total processing/ disposal needed to capacities actually utilized. Provide identification of redundant capabilities, including existing DOE facilities and private sector capabilities. Identify applications for use of excess capacity	Test-TP3.1.4
3.1.5 Decision Analysis	
3.1.5.1 Optimize systems based on performance criteria (e.g., identify alternatives that maximize waste moved to final disposition during the next ten years.	Test-TP3.1.5
3.1.5.2 Ability to address variable uncertainty and sensitivity to the expected values and system choices.	Test-TP3.1.5
3.1.6 Other Performance Measures (Equity)	
3.1.6.1 (Phase 2, FY-97) Incorporate generic equity analysis capability using existing stakeholder data. Develop capability for analysts to weight positive and negative influences. Provide graphical representation of projected state equity positions based on	Test-TP3.1.6

modeled results from the CWWFA.	
Incorporate input/output diagrams as relevant for equity analysis.	
<p>3.1.6.2 (FY-98)</p> <p>Incorporate actual stakeholder equity analysis by identifying (weighting) stakeholder (including DOE site management, tribal governments, state and local governments, special interest groups) criteria on a site-to-site, state-to-state, and EM complex basis.</p> <p>Provide for stakeholder input from geographically diverse locations (regionally or nationally).</p> <p>Provide for open and unrestricted stakeholder involvement.</p> <p>Aggregate and summarize stakeholder comments into a manageable number of criteria (ten or less).</p> <p>Provide stakeholder involvement from a generic waste management perspective without specific knowledge of CWWFA model results</p>	Test-TP3.1.6
3.1.7 Technology Performance	
<p>3.1.7.1</p> <p>Analyze new technology systems (e.g., mobile characterization is substituted for small volumes of waste instead of using fixed facilities. New systems would be substituted for existing capabilities, and wastes would be rerouted for processing.</p>	Test-TP3.1.7
<p>3.1.7.2</p> <p>Define technology performance specifications (e.g., volume reduction) required to achieve required outputs or goals</p>	Test-TP3.1.7

APPENDIX B
TEST PROCEDURES

TEST PROCEDURE – TP 3.1.1

Waste Flow and Scheduling

Purpose

This test procedure has been designed to test the waste flow aspects of the CWWFA. The ability to track the movement or flow of waste between facilities provides the basis for all other functions of CWWFA (i.e., risk, cost, equity analysis). Waste flow is the scheduling of waste between facilities for processing, storage, or disposal. This procedure will be designed to verify requirements 3.1.1 through 3.1.10 in the Requirements Verification Matrix in Appendix A.

Objective

This test procedure is designed to exercise the waste flow aspect of the CWWFA. The requirements for the waste flow functionality will be verified by inspection and testing. When the requirement is verified by testing, the CWWFA output charts will be compared against a spreadsheet.

Test Method

Method 1 - Verification of output charts related to waste flow. This method is comprised of several cases. Each case increases in complexity and is intended to verify the requirements over the full spectrum of potential use. General guidelines for case methodology are described in the Case Discussion below. The tester will use these guidelines to define the case. Input Parameter Recording Sheets will be used to document the conditions under which the test is executed. After running the model, the tester will compare the results with a spreadsheet. If the model results are within $\pm 10\%$, the test passes. If the model results are outside the acceptable range, corrective action will be identified and the model will be re-tested. After the corrective action has been implemented, earlier tests will be rerun to ensure that there were no unexpected effects of the action. Rerunning the previous tests is at the discretion of the Software Lead.

Case 1

- Transfer of waste from legacy storage to treatment
- New generation schedule and transfer of combined legacy and newGen to treatment
- Treatment facility volume changes
- Orphan waste due to conversion profiles and shipping route conflict
- Back-end storage on treatment facility when next facility is unavailable

Case 2

- Transportation of waste from one site's legacy storage to another site's treatment for three different waste types (HLW, TRU, and MLLW).
- Transportation of one site's combined legacy and new generation of waste to another site's treatment. Effect of multiple treatment facility volume changes and density changes (TRUW) on transportation shipments and packages.

Case 3

- Multiple shipping routes from legacy storage
- Multiple shipping schedules per shipping route

Case 4

- Multiple shipping routes from legacy storage and treatment
- Multiple shipping schedules per shipping route
- Effects of facility conversion profiles

Case 5

- Multiple waste streams requiring processing or disposal at a single facility

Method 2 – Units of waste flow. Verify via discussions with programmers the units in which flows are tracked.

Method 3 – Bottleneck processing. Verify via inspection the ability to identify under or over utilized facilities within the system that could impact possible bottlenecks. Verify via inspection the ability to impact bottlenecks by re-routing waste volumes to a different facility.

Method 4 – Transportation bottlenecks. Verify via discussions with programmers the system constraints that are imposed on transportation.

Method 5 – Alternative packaging and transport mode options. Verify via discussions with programmers the available transportation packaging and mode options.

Method 6 – Addition of new volumes. Verify via inspection the ability to input new volumes to accommodate future environmental restoration or decontamination and decommissioning waste volumes.

Method 7 – Treatment facility characteristics. Verify via inspection, the ability to change treatment facility characteristics.

Method 8 – Secondary waste production. Verify via inspection, the capability to incorporate secondary waste production.

Method 9 – Fractionate waste. Verify via inspection the ability to separate a single waste stream after processing into fractions and the ability to have each fraction further processed in a different manner.

Method 10 – Nominal and maximum operating capacities of facilities. Verify via discussions with programmers the ability to have more than one operating capacity for a facility.

Reporting

TP – Test Procedure
 REQD – Requirement
 P/F – Pass/Fail

TP	REQD	Result/Comment	P/F
TP3.1.1 Method 1	3.1.1.1, 3.1.1.2, 3.1.1.5, 3.1.1.6, 3.1.1.8, 3.1.1.10	<p>All charts within CWWFA matched those produced by the Excel spreadsheet with the following exception: CASE2E the disposal facility's facility capacity detail chart did not show the receipt of waste. However, the underlying data for the chart is correct.</p> <p>Additional comment: the dynamic scheduling capability of the CWWFA needs to be explained in the user's manual and the specification document. This capability worked correctly, but was not incorporated in to the test procedure.</p>	Pass – need minor correction
TP3.1.1 Method 2	3.1.1.1	For every unit of waste, the model tracks a volume in cubic meters and a density in kilograms per cubic meter. With both of these numbers the model can convert between volume and mass as necessary.	Pass
TP3.1.1 Method 3	3.1.1.3	<p>The facility capacity detail chart identifies bottlenecks due to insufficient processing capacity or a timing conflict at the next facility in the routing.</p> <p>In the shipping route window for a waste stream, the user can change the destination facilities according to their preference or add a new routing if a bottleneck is encountered.</p>	Pass
TP3.1.1 Method 4	3.1.1.4	The model does not constrain the number of transports or the number of packages. Thus no bottlenecks will occur due to transportation limitations.	Fail
TP3.1.1 Method 5	3.1.1.4	The model does not allow alternative packages to be used for transportation. It also only transports waste via road.	Fail
TP3.1.1 Method 6	3.1.1.5	The model supports addition of new generation volumes for a waste stream. The new generation volumes can be interpreted as incoming waste from environmental restoration or decontamination and decommissioning activities.	Pass
TP3.1.1 Method 7	3.1.1.6	The model allows the volume change factor for a facility to be changed by the user. The user may also change the conversion profile for a processing facility to impact physical characteristics of the waste exiting the facility.	Pass

TP3.1.1 Method 8	3.1.1.6	The model does not support secondary waste generation from processing. However, the user could specify an additional shipping route to duplicate the results of a secondary waste stream due to processing. But this would have to be done on a stream by stream basis as opposed to a single facility producing secondary waste regardless of the characteristics of the waste being processed.	Fail
TP3.1.1 Method 9	3.1.1.7	The model supports multiple shipping routes between facilities. Each shipping route can represent a fraction of waste generated from a processing facility.	Pass
TP3.1.1 Method 10	3.1.19	The model only supports operating capacities at nominal.	Fail

Case Discussion

The fundamental basis of the CWWFA is the ability to track waste as it “flows” between facilities for processing, storage, or disposal. Five test cases have been established to examine how the CWWFA behaves under certain conditions. The test cases increase in level of complexity and the tests are targeted toward a specific functionality with CWWFA.

Functionality that has been previously tested is not re-tested in subsequent cases. Specific details regarding the initial parameters and settings for each case can be found in Appendix A.

Case	Target Functionality	Description
1	Scheduling	<p>This case involves a single waste stream being processed and disposed at the same site. The type of waste is not significant for this test. Variations within this case include adding a new generation volume, changing the shipping schedules between facilities, changing the volume change factor of the treatment facility, and adding a conversion split with a waste type change.</p>
2	Transportation and Conversion Profile	<p>As with Case 1 this case involves a single waste stream. As the target functionality of this test is transportation, it is necessary to incur off-site transport. Each color of box represents a different site. In this case there are two sites involved. The transportation variables (i.e., number of packages, number of shipments) are dependent upon the type of waste being transported. Variations within this case include changing the density and waste type in the treatment conversion profile.</p>
3	Split from legacy storage	<p>For a single waste stream Case 3 involves two sites and multiple shipping routes between legacy storage and treatment. Variations within this case include changing the fraction of waste for each shipping route and multiple shipping schedules per shipping route.</p>

Case	Target Functionality	Description
4	Split from primary treatment	<p>Case 4 is similar to case three in that it focuses on multiple shipping routes departing from a single facility. Case 4 involves 3 sites. Variations within this case include multiple shipping routes from legacy storage and from each treatment facility. This case will also involve a fairly complex conversion profile for each treatment facility.</p>
5	Multiple waste stream feeds to a single facility	<p>Case 5 involves multiple waste streams from different sites feeding into a single facility. Variations within this case include varying the volumes and dates of waste transferred between facilities.</p>

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1a

DATE: 11/12/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	MOPL
Waste Stream ID & Name	MOPLWS1-Case1
Legacy volume (m3)	10,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C1a-1	Legacy-MOPL	MOPLFAC1-CASE1
C1a-2	MOPLFAC1-CASE1	MOPLFAC2-CASE1

1.3 Shipping Schedule(s)

Route ID: C1a-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	LLW	135.14

1.3 Shipping Schedule(s) (continued)

Route ID: C1a-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	LLW	135.14

2.0 Facility Information

Site	MOPL
Facility ID & Name	MOPLFAC1-CASE1
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	LLW	1197

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1a

DATE: 11/12/97

Evaluator: K B Oswald

2.0 Facility Information

Site	MOPL
Facility ID & Name	MOPLFAC2-CASE1
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1a

DATE: 11/12/97

Evaluator: K B Oswald

EXCEL CHART:

Waste Disposition

CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1a

DATE: 11/12/97

Evaluator: K B Oswald

EXCEL CHART (MOPLFAC1-CASE1):

Facility Capacity Detail

CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1b

DATE: 11/12/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	MOPL
Waste Stream ID & Name	MOPLWS1-Case1
Legacy volume (m3)	10,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C1b-1	Legacy-MOPL	MOPLFAC1-CASE1
C1b-2	MOPLFAC1-CASE1	MOPLFAC2-CASE1

1.3 Shipping Schedule(s)

Route ID: C1b-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2020	LLW	417

1.3 Shipping Schedule(s) (continued)

Route ID: C1b-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
2005	2070	LLW	152

2.0 Facility Information

Site	MOPL
Facility ID & Name	MOPLFAC1-CASE1
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	2

Conversion Profile

Percent	Waste Type	Density
100%	LLW	1197

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1b

DATE: 11/12/97

Evaluator: K B Oswald

EXCEL CHART:

Waste Disposition

CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1b

DATE: 11/12/97

Evaluator: K B Oswald

EXCEL CHART (MOPLFAC1-CASE1):

CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1c

DATE: 11/12/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	MOPL
Waste Stream ID & Name	MOPLWS1-Case1
Legacy volume (m3)	10,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C1c-1	Legacy-MOPL	MOPLFAC1-CASE1
C1c-2	MOPLFAC1-CASE1	MOPLFAC2-CASE1

1.3 Shipping Schedule(s)

Route ID: C1c-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2020	LLW	417

1.3 Shipping Schedule(s) (continued)

Route ID: C1c-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
2040	2070	LLW	100

2.0 Facility Information

Site	MOPL
Facility ID & Name	MOPLFAC1-CASE1
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	.5

Conversion Profile

Percent	Waste Type	Density
100%	LLW	1197

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1c

DATE: 11/12/97

Evaluator: K B Oswald

EXCEL CHART:

Waste Disposition

CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1c

DATE: 11/12/97

Evaluator: K B Oswald

EXCEL CHART (MOPLFAC1-CASE1):

CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1d

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	MOPL
Waste Stream ID & Name	MOPLWS1-Case1
Legacy volume (m3)	10,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C1d-1	Legacy-MOPL	MOPLFAC1-CASE1
C1d-2	MOPLFAC1-CASE1	MOPLFAC2-CASE1

1.3 Shipping Schedule(s)

Route ID: C1d-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2010	LLW	135.14
2011	2020	LLW	811

1.3 Shipping Schedule(s) (continued)

Route ID: C1d-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	LLW	135.14

2.0 Facility Information

Site	MOPL
Facility ID & Name	MOPLFAC1-CASE1
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	LLW	1197

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1d

DATE: 11/12/97

Evaluator: K B Oswald

EXCEL CHART:

Waste Disposition

CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1d

DATE: 11/12/97

Evaluator: K B Oswald

EXCEL CHART (MOPLFAC1-CASE1):

CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1e

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	MOPL
Waste Stream ID & Name	MOPLWS1-Case1
Legacy volume (m3)	10,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C1e-1	Legacy-MOPL	MOPLFAC1-CASE1
C1e-2	MOPLFAC1-CASE1	MOPLFAC2-CASE1

1.3 Shipping Schedule(s)

Route ID: C1e-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	LLW	135

1.3 Shipping Schedule(s) (continued)

Route ID: C1e-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2005	LLW	135
2060	2070	LLW	135

2.0 Facility Information

Site	MOPL
Facility ID & Name	MOPLFAC1-CASE1
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	LLW	1197

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1e

DATE: 11/12/97

Evaluator: K B Oswald

EXCEL CHART:

Waste Disposition

CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1e

DATE: 11/12/97

Evaluator: K B Oswald

EXCEL CHART (MOPLFAC2-CASE1):

Facility Capacity Detail

CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1f

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	MOPL
Waste Stream ID & Name	MOPLWS1-Case1
Legacy volume (m3)	10,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C1f-1	Legacy-MOPL	MOPLFAC1-CASE1
C1f-2	MOPLFAC1-CASE1	MOPLFAC2-CASE1

1.3 Shipping Schedule(s)

Route ID: C1f-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2010	LLW	135
2011	2020	LLW	300
2040	2050	LLW	500

1.3 Shipping Schedule(s) (continued)

Route ID: C1f-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2005	LLW	135
2020	2035	LLW	100
2060	2070	LLW	500

2.0 Facility Information

Site	MOPL
Facility ID & Name	MOPLFAC1-CASE1
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	LLW	1197

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1f

DATE: 11/13/97

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (MOPL, LLW):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1f

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY EXCEL CHART (MOPL, MOPLFAC1-CASE1):

Facility Capacity Detail

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1g

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	MOPL
Waste Stream ID & Name	MOPLWS1-Case1
Legacy volume (m3)	10,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
1997	2010	1000

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C1g-1	Legacy-MOPL	MOPLFAC1-CASE1
C1g-2	MOPLFAC1-CASE1	MOPLFAC2-CASE1

1.3 Shipping Schedule(s)

Route ID: C1g-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	LLW	135.14

1.3 Shipping Schedule(s) (continued)

Route ID: C1g-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	LLW	135.14

2.0 Facility Information

Site	MOPL
Facility ID & Name	MOPLFAC1-CASE1
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	LLW	1197

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1g

DATE: 11/13/97

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (MOPL, LLW):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1g

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY EXCEL CHART (MOPL, MOPLFAC2-CASE1):

Facility Capacity Detail

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1h
1.0 Waste Stream Information

DATE: 11/13/97

Evaluator: K B Oswald

Originating Site	MOPL
Waste Stream ID & Name	MOPLWS1-Case1
Legacy volume (m3)	10,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
1997	2010	1000
2040	2050	1500

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C1h-1	Legacy-MOPL	MOPLFAC1-CASE1
C1h-2	MOPLFAC1-CASE1	MOPLFAC2-CASE1

1.3 Shipping Schedule(s)

Route ID: C1h-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	LLW	135.14

1.3 Shipping Schedule(s) (continued)

Route ID: C1h-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	LLW	135.14

2.0 Facility Information

Site	MOPL
Facility ID & Name	MOPLFAC1-CASE1
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	LLW	1197

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1h

DATE: 11/13/97

Evaluator: K B Oswald

2.0 Facility Information

Site	MOPL
Facility ID & Name	MOPLFAC2-CASE1
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1h

DATE: 11/13/97

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (MOPL, LLW):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1h

DATE: 11/13/97

Evaluator: K B Oswald

WASTE STREAM DETAIL EXCEL CHART (MOPLWS1-CASE1):

Waste Stream Detail

WASTE STREAM DETAIL CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1h

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY EXCEL CHART (MOPL, MOPLFAC2-CASE1):

Facility Capacity Detail

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1i

DATE: 10/21/1997

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	MOPL
Waste Stream ID & Name	MOPLWS1-Case1
Legacy volume (m3)	10,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
1997	2020	1000
2040	2060	1500

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C1I-1	Legacy-MOPL	MOPLFAC1-CASE1
C1I-2	MOPLFAC1-CASE1	MOPLFAC2-CASE1

1.3 Shipping Schedule(s)

Route ID: C1I-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2010	LLW	200
2045	2060	LLW	900

1.3 Shipping Schedule(s) (continued)

Route ID: C1I-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2005	LLW	500
2060	2070	LLW	500

2.0 Facility Information

Site	MOPL
Facility ID & Name	MOPLFAC1-CASE1
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
80%	LLW	1197
20%	MLLW	500

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1i

DATE: 10/21/1997

Evaluator: K B Oswald

2.0 Facility Information

Site	MOPL
Facility ID & Name	MOPLFAC2-CASE1
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or Lifetime Facility Capacity (m3)	1,000,000
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1i

DATE: 10/21/1997

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (MOPL, LLW):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1i

DATE: 10/21/1997

Evaluator: K B Oswald

WASTE STREAM DETAIL EXCEL CHART (MOPLWS1-CASE1):

Waste Stream Detail

WASTE STREAM DETAIL CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 1i

DATE: 10/21/1997

Evaluator: K B Oswald

FACILITY CAPACITY EXCEL CHART (MOPL, MOPLFAC2-CASE1):

Facility Capacity Detail

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2a

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	WVDP
Waste Stream ID & Name	WVDPWS1-CASE2a
Originating Type	HLW
Legacy volume (m3)	15,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C2a-1	Legacy-WV	SARSFAC1-CASE2
C2a-2	SARSFAC1-CASE2	WVDPFAC1-CASE2
C2a-3	WVDPFAC1-CASE2	SARSFAC2-CASE2

1.3 Shipping Schedule(s)

Route ID: C2a-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	HLW	203

1.3 Shipping Schedule(s) (continued)

Route ID: C2a-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	HLW	203

1.3 Shipping Schedule(s) (continued)

Route ID: C2a-3			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	HLW	203

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2a

DATE: 11/13/97

Evaluator: K B Oswald

2.0 Facility Information

Site	SARS
Facility ID & Name	SARSFAC1-CASE2
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	HLW	650

2.0 Facility Information

Site	WVDP
Facility ID & Name	WVDPFAC1-CASE2
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100	HLW	1800

2.0 Facility Information

Site	SARS
Facility ID & Name	SARSFAC1-CASE2
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2a

DATE: 11/13/97

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (WVDP, HLW):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2a

DATE: 11/13/97

Evaluator: K B Oswald

WASTE STREAM DETAIL EXCEL CHART (WVDPWS1-CASE2a):

Waste Stream Detail

WASTE STREAM DETAIL CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2a

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY EXCEL CHART (WVDP, MOPLFAC2-CASE1):

Facility Capacity Detail

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2a

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS RECEIVED EXCEL CHART (MOPL):

SHIPMENTS RECEIVED CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2a

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS SENT EXCEL CHART (WVDP):

Shipments Sent

SHIPMENTS SENT CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2a

DATE: 11/13/97

Evaluator: K B Oswald

TRANSPORTATION COMPARISON EXCEL CHART:

TRANSPORTATION COMPARISON

TRANSPORTATION COMPARISON CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2b

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	WVDP
Waste Stream ID & Name	WVDPWS1-CASE2a
Originating Type	HLW
Legacy volume (m3)	15,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C2b-1	Legacy-WV	SARSFAC1-CASE2
C2b-2	SARSFAC1-CASE2	WVDPFAC1-CASE2
C2b-3	WVDPFAC1-CASE2	SARSFAC2-CASE2

1.3 Shipping Schedule(s)

Route ID: C2b-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2020	HLW	100
2021	2030	HLW	100
2031	2040	HLW	1160

1.3 Shipping Schedule(s) (continued)

Route ID: C2b-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2005	HLW	1000
2046	2055	HLW	600

1.3 Shipping Schedule(s) (continued)

Route ID: C2b-3			
Start Year	End Year	Waste Type	Annual Volume (m3)
2056	2065	HLW	1400
2066	2066	HLW	1000

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2b

DATE: 11/13/97

Evaluator: K B Oswald

2.0 Facility Information

Site	SARS
Facility ID & Name	SARSFAC1-CASE2
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	HLW	650

2.0 Facility Information

Site	WVDP
Facility ID & Name	WVDPFAC1-CASE2
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100	HLW	1800

2.0 Facility Information

Site	SARS
Facility ID & Name	SARSFAC1-CASE2
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2b

DATE: 11/13/97

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (WVDP, HLW):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2b

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY EXCEL CHART (WVDP, MOPLFAC2-CASE1):

Facility Capacity Detail

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2b

DATE: 11/13/97

Evaluator: K B Oswald

WASTE STREAM DETAIL EXCEL CHART (WVDPWS1-CASE2a):

Waste Stream Detail

WASTE STREAM DETAIL CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2b

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS RECEIVED EXCEL CHART (MOPL):

SHIPMENTS RECEIVED CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2b

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS SENT EXCEL CHART (WVDP):

Shipments Sent

SHIPMENTS SENT CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2b

DATE: 11/13/97

Evaluator: K B Oswald

TRANSPORTATION COMPARISON EXCEL CHART:

TRANSPORTATION COMPARISON

TRANSPORTATION COMPARISON CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2c

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	WVDP
Waste Stream ID & Name	WVDPWS1-CASE2a
Originating Type	HLW
Legacy volume (m3)	15,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
2031	2040	1000

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C2c-1	Legacy-WV	SARSFAC1-CASE2
C2c-2	SARSFAC1-CASE2	WVDPFAC1-CASE2
C2c-3	WVDPFAC1-CASE2	SARSFAC2-CASE2

1.3 Shipping Schedule(s)

Route ID: C2c-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	HLW	203

1.3 Shipping Schedule(s) (continued)

Route ID: C2c-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	HLW	203

1.3 Shipping Schedule(s) (continued)

Route ID: C2c-3			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	HLW	203

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2c

DATE: 11/13/97

Evaluator: K B Oswald

2.0 Facility Information

Site	SARS
Facility ID & Name	SARSFAC1-CASE2
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	HLW	650

2.0 Facility Information

Site	WVDP
Facility ID & Name	WVDPFAC1-CASE2
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100	LLW	1800

2.0 Facility Information

Site	SARS
Facility ID & Name	SARSFAC1-CASE2
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2c

DATE: 11/13/97

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (WVDP, HLW):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2c

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY EXCEL CHART (SARS, SARSFAC1-CASE2):

Facility Capacity Detail

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2c

DATE: 11/13/97

Evaluator: K B Oswald

WASTE STREAM DETAIL EXCEL CHART (WVDPWS1-CASE2a):

Waste Stream Detail

WASTE STREAM DETAIL CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2c

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS RECEIVED EXCEL CHART (MOPL):

SHIPMENTS RECEIVED CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2c

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS SENT EXCEL CHART (WVDP):

Shipments Sent

SHIPMENTS SENT CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2c

DATE: 11/13/97

Evaluator: K B Oswald

TRANSPORTATION COMPARISON EXCEL CHART:

TRANSPORTAION COMPARISON

TRANSPORTATION COMPARISON CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2d

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	WVDP
Waste Stream ID & Name	WVDPWS1-CASE2a
Originating Type	HLW
Legacy volume (m3)	15,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
2031	2040	1000

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C2d-1	Legacy-WV	SARSFAC1-CASE2
C2d-2	SARSFAC1-CASE2	WVDPFAC1-CASE2
C2d-3	WVDPFAC1-CASE2	SARSFAC2-CASE2

1.3 Shipping Schedule(s)

Route ID: C2d-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	HLW	203

1.3 Shipping Schedule(s) (continued)

Route ID: C2d-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	HLW	203

1.3 Shipping Schedule(s) (continued)

Route ID: C2d-3			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	HLW	203

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2d

DATE: 11/13/97

Evaluator: K B Oswald

2.0 Facility Information

Site	SARS
Facility ID & Name	SARSFAC1-CASE2
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	HLW	650

2.0 Facility Information

Site	WVDP
Facility ID & Name	WVDPFAC2-CASE2
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100	HLW	1800

2.0 Facility Information

Site	SARS
Facility ID & Name	SARSFAC1-CASE2
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2d

DATE: 11/13/97

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (WVDP, HLW):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2d

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY EXCEL CHART (WVDP, SARSFAC2-CASE2):

Facility Capacity Detail

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2d

DATE: 11/13/97

Evaluator: K B Oswald

WASTE STREAM DETAIL EXCEL CHART (WVDPWS1-CASE2a):

Waste Stream Detail

WASTE STREAM DETAIL CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2d

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS RECEIVED EXCEL CHART (WVDP):

SHIPMENTS RECEIVED CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2d

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS SENT EXCEL CHART (WVDP):

Shipments Sent

SHIPMENTS SENT CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2d

DATE: 11/13/97

Evaluator: K B Oswald

TRANSPORTATION COMPARISON EXCEL CHART (WVDP):

TRANSPORTAION COMPARISON

TRANSPORTATION COMPARISON CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2e
Oswald

DATE: 11/13/97

Evaluator: K B

1.0 Waste Stream Information

Originating Site	WVDP
Waste Stream ID & Name	WVDPWS1-CASE2a
Originating Type	HLW
Legacy volume (m3)	15,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
2031	2040	1000

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C2e-1	Legacy-WV	SARSFAC1-CASE2
C2e-2	SARSFAC1-CASE2	WVDPFAC1-CASE2
C2e-3	WVDPFAC1-CASE2	SARSFAC2-CASE2

1.3 Shipping Schedule(s)

Route ID: C2e-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	HLW	338

1.3 Shipping Schedule(s) (continued)

Route ID: C2e-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2020	HLW	338
2061	2070	HLW	1689

1.3 Shipping Schedule(s) (continued)

Route ID: C2e-3			
Start Year	End Year	Waste Type	Annual Volume (m3)
2061	2070	LLW	2500

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2e
Oswald

DATE: 11/13/97

Evaluator: K B

2.0 Facility Information

Site	SARS
Facility ID & Name	SARSFAC1-CASE2
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	HLW	650

2.0 Facility Information

Site	WVDP
Facility ID & Name	WVDPFAC1-CASE2
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100	LLW	1800

2.0 Facility Information

Site	SARS
Facility ID & Name	SARSFAC1-CASE2
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2e
Oswald

DATE: 11/13/97

Evaluator: K B

WASTE DISPOSITION - EXCEL CHART (WVDP, HLW):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2e
Oswald

DATE: 11/13/97

Evaluator: K B

FACILITY CAPACITY EXCEL CHART (SARS, SARSFAC2-CASE2):

Facility Capacity Detail

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2e
Oswald

DATE: 11/13/97

Evaluator: K B

WASTE STREAM DETAIL EXCEL CHART (WVDPWS1-CASE2a):

Waste Stream Detail

WASTE STREAM DETAIL CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2e
Oswald

DATE: 11/13/97

Evaluator: K B

SHIPMENTS RECEIVED EXCEL CHART (WVDP):

SHIPMENTS RECEIVED CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2e
Oswald

DATE: 11/13/97

Evaluator: K B

SHIPMENTS SENT EXCEL CHART (WVDP):

Shipments Sent

SHIPMENTS SENT CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 2e
Oswald

DATE: 11/13/97

Evaluator: K B

TRANSPORTATION COMPARISON EXCEL CHART (WVDP, LLW):

TRANSPORTATION COMPARISON

TRANSPORTATION COMPARISON CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3a

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	LANL
Waste Stream ID & Name	LANLWS1-CASE3
Originating Type	TRU
Legacy volume (m3)	20,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C3a-1	Legacy-LANL	RFTSFAC1-CASE3
C3a-2	Legacy-LANL	LANLFAC1-CASE3
C3a-3	RFTSFAC1-CASE3	LANLFAC2-CASE3
C3a-4	LANLFAC1-CASE3	RFTSFAC2-CASE3

1.3 Shipping Schedule(s)

Route ID: C3a-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	TRU	135

1.3 Shipping Schedule(s) (continued)

Route ID: C3a-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	TRU	135

1.3 Shipping Schedule(s) (continued)

Route ID: C3a-3			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	TRU	135

1.3 Shipping Schedule(s) (continued)

Route ID: C3a-4			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	TRU	135

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3a

DATE: 11/13/97

Evaluator: K B Oswald

2.0 Facility Information

Site	RFTS
Facility ID & Name	RFTSFAC1-CASE3
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or Lifetime Facility Capacity (m3)	1,000,000
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	TRU	1198

2.0 Facility Information

Site	RFTS
Facility ID & Name	RFTSFAC2-CASE3
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or Lifetime Facility Capacity (m3)	1,000,000
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

2.0 Facility Information

Site	LANL
Facility ID & Name	LANLFAC1-CASE3
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or Lifetime Facility Capacity (m3)	1,000,000
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100	TRU	1198

2.0 Facility Information

Site	LANL
Facility ID & Name	LANLFAC2-CASE3
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or Lifetime Facility Capacity (m3)	1,000,000
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3a

DATE: 11/13/97

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (LANL, TRU):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3a

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY EXCEL CHART (RFTS, RFTSFAC2-CASE3):

Facility Capacity Detail

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3a

DATE: 11/13/97

Evaluator: K B Oswald

WASTE STREAM DETAIL EXCEL CHART (LANLWS1-CASE3):

Waste Stream Detail

WASTE STREAM DETAIL CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3a

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS RECEIVED EXCEL CHART (LANL):

SHIPMENTS RECEIVED CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3a

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS SENT EXCEL CHART (LANL):

Shipments Sent

SHIPMENTS SENT CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3a

DATE: 11/13/97

Evaluator: K B Oswald

TRANSPORTATION COMPARISON EXCEL CHART (LANL):

TRANSPORTAION COMPARISON

TRANSPORTATION COMPARISON CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3b

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	LANL
Waste Stream ID & Name	LANLWS1-CASE3
Originating Type	TRU
Legacy volume (m3)	20,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C3a-1	Legacy-LANL	RFTSFAC1-CASE3
C3a-2	Legacy-LANL	LANLFAC1-CASE3
C3a-3	RFTSFAC1-CASE3	LANLFAC2-CASE3
C3a-4	LANLFAC1-CASE3	RFTSFAC2-CASE3

1.3 Shipping Schedule(s)

Route ID: C3a-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2026	TRU	200
2027	2070	TRU	136

1.3 Shipping Schedule(s) (continued)

Route ID: C3a-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2016	TRU	400
2017	2026	TRU	200

1.3 Shipping Schedule(s) (continued)

Route ID: C3a-3			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	TRU	135

1.3 Shipping Schedule(s) (continued)

Route ID: C3a-4			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	TRU	135

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3b

DATE: 11/13/97

Evaluator: K B Oswald

2.0 Facility Information

Site	RFTS
Facility ID & Name	RFTSFAC1-CASE3
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	TRU	1198

2.0 Facility Information

Site	RFTS
Facility ID & Name	RFTSFAC2-CASE3
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

2.0 Facility Information

Site	LANL
Facility ID & Name	LANLFAC1-CASE3
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100	TRU	1198

2.0 Facility Information

Site	LANL
Facility ID & Name	LANLFAC2-CASE3
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3b

DATE: 11/13/97

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (LANL, TRU):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3b

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY EXCEL CHART (RFTS, RFTSFAC2-CASE3):

Facility Capacity Detail

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3b

DATE: 11/13/97

Evaluator: K B Oswald

WASTE STREAM DETAIL EXCEL CHART (LANLWS1-CASE3):

Waste Stream Detail

WASTE STREAM DETAIL CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3b

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS RECEIVED EXCEL CHART (LANL):

SHIPMENTS RECEIVED CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3b

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS SENT EXCEL CHART (LANL):

Shipments Sent

SHIPMENTS SENT CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3b

DATE: 11/13/97

Evaluator: K B Oswald

TRANSPORTATION COMPARISON EXCEL CHART (LANL):

TRANSPORTAION COMPARISON

TRANSPORTATION COMPARISON CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3c

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	LANL
Waste Stream ID & Name	LANLWS1-CASE3
Originating Type	TRU
Legacy volume (m3)	20,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C3a-1	Legacy-LANL	RFTSFAC1-CASE3
C3a-2	Legacy-LANL	LANLFAC1-CASE3
C3a-3	RFTSFAC1-CASE3	LANLFAC2-CASE3
C3a-4	LANLFAC1-CASE3	RFTSFAC2-CASE3

1.3 Shipping Schedule(s)

Route ID: C3a-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	TRU	243

1.3 Shipping Schedule(s) (continued)

Route ID: C3a-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	TRU	27

1.3 Shipping Schedule(s) (continued)

Route ID: C3a-3			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	TRU	243

1.3 Shipping Schedule(s) (continued)

Route ID: C3a-4			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	TRU	27

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3c

DATE: 11/13/97

Evaluator: K B Oswald

2.0 Facility Information

Site	RFTS
Facility ID & Name	RFTSFAC1-CASE3
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	TRU	1198

2.0 Facility Information

Site	RFTS
Facility ID & Name	RFTSFAC2-CASE3
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

2.0 Facility Information

Site	LANL
Facility ID & Name	LANLFAC1-CASE3
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100	TRU	1198

2.0 Facility Information

Site	LANL
Facility ID & Name	LANLFAC2-CASE3
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3c

DATE: 11/13/97

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (LANL, TRU):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3c

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY EXCEL CHART (LANL, RFTSFAC2-CASE3):

Facility Capacity Detail

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3c

DATE: 11/13/97

Evaluator: K B Oswald

WASTE STREAM DETAIL EXCEL CHART (LANLWS1-CASE3):

Waste Stream Detail

WASTE STREAM DETAIL CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3c

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS RECEIVED EXCEL CHART (LANL):

SHIPMENTS RECEIVED CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3c

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS SENT EXCEL CHART (LANL):

Shipments Sent

SHIPMENTS SENT CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3c

DATE: 11/13/97

Evaluator: K B Oswald

TRANSPORTATION COMPARISON EXCEL CHART (LANL):

TRANSPORTATION COMPARISON

TRANSPORTATION COMPARISON CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3d

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	LANL
Waste Stream ID & Name	LANLWS1-CASE3
Originating Type	TRU
Legacy volume (m3)	20,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C3d-1	Legacy-LANL	RFTSFAC1-CASE3
C3d-2	Legacy-LANL	LANLFAC1-CASE3
C3d-3	RFTSFAC1-CASE3	LANLFAC2-CASE3
C3d-4	LANLFAC1-CASE3	RFTSFAC2-CASE3

1.3 Shipping Schedule(s)

Route ID: C3d-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2010	TRU	1000
2020	2029	TRU	400

1.3 Shipping Schedule(s) (continued)

Route ID: C3d-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2000	TRU	250
2001	2001	TRU	1000

1.3 Shipping Schedule(s) (continued)

Route ID: C3d-3			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	TRU	243

1.3 Shipping Schedule(s) (continued)

Route ID: C3d-4			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	TRU	27

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3d

DATE: 11/13/97

Evaluator: K B Oswald

2.0 Facility Information

Site	RFTS
Facility ID & Name	RFTSFAC1-CASE3
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	TRU	1198

2.0 Facility Information

Site	RFTS
Facility ID & Name	RFTSFAC2-CASE3
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

2.0 Facility Information

Site	LANL
Facility ID & Name	LANLFAC1-CASE3
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100	TRU	1198

2.0 Facility Information

Site	LANL
Facility ID & Name	LANLFAC2-CASE3
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3d

DATE: 11/13/97

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (LANL, TRU):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3d

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY EXCEL CHART (LANL, RFTSFAC2-CASE3):

Facility Capacity Detail

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3d

DATE: 11/13/97

Evaluator: K B Oswald

WASTE STREAM DETAIL EXCEL CHART (LANLWS1-CASE3):

Waste Stream Detail

WASTE STREAM DETAIL CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3d

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS RECEIVED EXCEL CHART (LANL):

SHIPMENTS RECEIVED CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3d

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS SENT EXCEL CHART (LANL):

Shipments Sent

SHIPMENTS SENT CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 3d

DATE: 11/13/97

Evaluator: K B Oswald

TRANSPORTATION COMPARISON EXCEL CHART (LANL):

TRANSPORTAION COMPARISON

TRANSPORTATION COMPARISON CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4a

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	HASI
Waste Stream ID & Name	HASIWS1-CASE4
Originating Type	HLW
Legacy volume (m3)	45,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C4a-1	Legacy-Hanf	SNLFAC1-CASE4
C4a-2	Legacy-Hanf	HASIFAC1-CASE4
C4a-3	SNLFAC1-CASE4	NVTSFAC1-CASE4
C4a-4	SNLFAC1-CASE4	HASIFAC3-CASE4
C4a-5	HASIFAC1-CASE4	SNLFAC2-CASE4
C4a-6	HASIFAC1-CASE4	HASIFAC2-CASE4

1.3 Shipping Schedule(s)

Route ID: C4a-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2010	HLW	1607

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2010	HLW	1607

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-3			
Start Year	End Year	Waste Type	Annual Volume (m3)
2011	2020	LLW	1125

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-4			
Start Year	End Year	Waste Type	Annual Volume (m3)
2021	2030	LLW	1125

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4a

DATE: 11/13/97

Evaluator: K B Oswald

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-5			
Start Year	End Year	Waste Type	Annual Volume (m3)
2011	2020	TRU	2025

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-6			
Start Year	End Year	Waste Type	Annual Volume (m3)
2021	2030	TRU	225

2.0 Facility Information

Site	SNLN
Facility ID & Name	SNLFAC1-CASE4
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	LLW	1800

2.0 Facility Information

Site	HASI
Facility ID & Name	HASIFAC1-CASE4
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100	TRU	1800

2.0 Facility Information

Site	NVTS
Facility ID & Name	NVTSFAC1-CASE4
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4a

DATE: 11/13/97

Evaluator: K B Oswald

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2.0 Facility Information

Site	HASI
Facility ID & Name	HASIFAC3-CASE4
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

2.0 Facility Information

Site	SNLN
Facility ID & Name	SNLFAC2-CASE4
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

2.0 Facility Information

Site	HASI
Facility ID & Name	HASIFAC2-CASE4
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4a

DATE: 11/13/97

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (HASI, HLW):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4a

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY EXCEL CHART (NVTs, NVTsFAC1-CASE4):

Facility Capacity Detail

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4a

DATE: 11/13/97

Evaluator: K B Oswald

WASTE STREAM DETAIL EXCEL CHART (HASIWS1-CASE4):

Waste Stream Detail

WASTE STREAM DETAIL CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4a

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS RECEIVED EXCEL CHART (SNLN, TRU):

SHIPMENTS RECEIVED CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4a

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS SENT EXCEL CHART (SNLN):

Shipments Sent

SHIPMENTS SENT CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4a

DATE: 11/13/97

Evaluator: K B Oswald

TRANSPORTATION COMPARISON EXCEL CHART (SNLN, LLW):

TRANSPORTAION COMPARISON

TRANSPORTATION COMPARISON CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4b

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	HASI
Waste Stream ID & Name	HASIWS1-CASE4
Originating Type	HLW
Legacy volume (m3)	45,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C4a-1	Legacy-Hanf	SNLFAC1-CASE4
C4a-2	Legacy-Hanf	HASIFAC1-CASE4
C4a-3	SNLFAC1-CASE4	NVTSFAC1-CASE4
C4a-4	SNLFAC1-CASE4	HASIFAC3-CASE4
C4a-5	HASIFAC1-CASE4	SNLFAC2-CASE4
C4a-6	HASIFAC1-CASE4	HASIFAC2-CASE4

1.3 Shipping Schedule(s)

Route ID: C4a-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2010	HLW	1607

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2010	HLW	1607

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-3			
Start Year	End Year	Waste Type	Annual Volume (m3)
2011	2020	LLW	1125

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-4			
Start Year	End Year	Waste Type	Annual Volume (m3)
2021	2030	HLW	1125

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4b

DATE: 11/13/97

Evaluator: K B Oswald

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-5			
Start Year	End Year	Waste Type	Annual Volume (m3)
2011	2020	HLW	2025

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-6			
Start Year	End Year	Waste Type	Annual Volume (m3)
2021	2030	LLW	225

2.0 Facility Information

Site	SNLN
Facility ID & Name	SNLFAC1-CASE4
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or Lifetime Facility Capacity (m3)	1,000,000
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
50%	LLW	1800
50%	HLW	1800

2.0 Facility Information

Site	HASI
Facility ID & Name	HASIFAC1-CASE4
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or Lifetime Facility Capacity (m3)	1,000,000
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
90	HLW	1800
10	LLW	1800

2.0 Facility Information

Site	NVTS
Facility ID & Name	NVTSFAC1-CASE4
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or Lifetime Facility Capacity (m3)	1,000,000
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4b

DATE: 11/13/97

Evaluator: K B Oswald

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2.0 Facility Information

Site	HASI
Facility ID & Name	HASIFAC3-CASE4
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

2.0 Facility Information

Site	SNLN
Facility ID & Name	SNLFAC2-CASE4
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

2.0 Facility Information

Site	HASI
Facility ID & Name	HASIFAC2-CASE4
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4b

DATE: 11/13/97

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (HASI, HLW):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4b

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY EXCEL CHART (HASI, NVTSFAC1-CASE4):

Facility Capacity Detail

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4b

DATE: 11/13/97

Evaluator: K B Oswald

WASTE STREAM DETAIL EXCEL CHART (HASIWS1-CASE4):

Waste Stream Detail

WASTE STREAM DETAIL CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4b

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS RECEIVED EXCEL CHART (HASI):

SHIPMENTS RECEIVED CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4b

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS SENT EXCEL CHART (HASI):

Shipments Sent

SHIPMENTS SENT CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4b

DATE: 11/13/97

Evaluator: K B Oswald

TRANSPORTATION COMPARISON EXCEL CHART (HASI):

TRANSPORTAION COMPARISON

TRANSPORTATION COMPARISON CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4c

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	HASI
Waste Stream ID & Name	HASIWS1-CASE4
Originating Type	HLW
Legacy volume (m3)	45,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C4a-1	Legacy-Hanf	SNLFAC1-CASE4
C4a-2	Legacy-Hanf	HASIFAC1-CASE4
C4a-3	SNLFAC1-CASE4	NVTSFAC1-CASE4
C4a-4	SNLFAC1-CASE4	HASIFAC3-CASE4
C4a-5	HASIFAC1-CASE4	SNLFAC2-CASE4
C4a-6	HASIFAC1-CASE4	HASIFAC2-CASE4

1.3 Shipping Schedule(s)

Route ID: C4a-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2010	HLW	1000
2011	2015	HLW	1700

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2010	HLW	1000
2011	2015	HLW	1700

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-3			
Start Year	End Year	Waste Type	Annual Volume (m3)
2011	2020	LLW	1000
2021	2025	LLW	250

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-4			
Start Year	End Year	Waste Type	Annual Volume (m3)
2021	2030	LLW	1125

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4c

DATE: 11/13/97

Evaluator: K B Oswald

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-5			
Start Year	End Year	Waste Type	Annual Volume (m3)
2011	2015	TRU	1000
2016	2020	TRU	3050

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-6			
Start Year	End Year	Waste Type	Annual Volume (m3)
2021	2030	TRU	225

2.0 Facility Information

Site	SNLN
Facility ID & Name	SNLFAC1-CASE4
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	LLW	1800

2.0 Facility Information

Site	HASI
Facility ID & Name	HASIFAC1-CASE4
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100	TRU	1800

2.0 Facility Information

Site	NVTS
Facility ID & Name	NVTSFAC1-CASE4
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4c

DATE: 11/13/97

Evaluator: K B Oswald

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2.0 Facility Information

Site	HASI
Facility ID & Name	HASIFAC3-CASE4
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

2.0 Facility Information

Site	SNLN
Facility ID & Name	SNLFAC2-CASE4
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

2.0 Facility Information

Site	HASI
Facility ID & Name	HASIFAC2-CASE4
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4c

DATE: 11/13/97

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (HASI, HLW):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4c

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY EXCEL CHART (NVTs, NVTsFAC1-CASE4):

Facility Capacity Detail

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4c

DATE: 11/13/97

Evaluator: K B Oswald

WASTE STREAM DETAIL EXCEL CHART (HASIWS1-CASE4):

Waste Stream Detail

WASTE STREAM DETAIL CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4c

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS RECEIVED EXCEL CHART (HASI):

Shipments Received

SHIPMENTS RECEIVED CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4c

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS SENT EXCEL CHART (HASI):

Shipments Sent

SHIPMENTS SENT CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4c

DATE: 11/13/97

Evaluator: K B Oswald

TRANSPORTATION COMPARISON EXCEL CHART (HASI):

TRANSPORTAION COMPARISON

TRANSPORTATION COMPARISON CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4d

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	HASI
Waste Stream ID & Name	HASIWS1-CASE4
Originating Type	HLW
Legacy volume (m3)	45,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
1997	2005	100
2006	2010	200

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C4a-1	Legacy-Hanf	SNLFAC1-CASE4
C4a-2	Legacy-Hanf	HASIFAC1-CASE4
C4a-3	SNLFAC1-CASE4	NVTSFAC1-CASE4
C4a-4	SNLFAC1-CASE4	HASIFAC3-CASE4
C4a-5	HASIFAC1-CASE4	SNLFAC2-CASE4
C4a-6	HASIFAC1-CASE4	HASIFAC2-CASE4

1.3 Shipping Schedule(s)

Route ID: C4a-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2010	HLW	1000
2011	2015	HLW	1700

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2010	HLW	1000
2011	2015	HLW	1700

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-3			
Start Year	End Year	Waste Type	Annual Volume (m3)
2011	2020	HLW	1000
2021	2025	HLW	250

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-4			
Start Year	End Year	Waste Type	Annual Volume (m3)
2021	2030	LLW	1125

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4d

DATE: 11/13/97

Evaluator: K B Oswald

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-5			
Start Year	End Year	Waste Type	Annual Volume (m3)
2011	2015	HLW	1000
2016	2020	HLW	3050

1.3 Shipping Schedule(s) (continued)

Route ID: C4a-6			
Start Year	End Year	Waste Type	Annual Volume (m3)
2021	2030	LLW	225

2.0 Facility Information

Site	SNLN
Facility ID & Name	SNLFAC1-CASE4
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
50%	LLW	1800
50%	HLW	1800

2.0 Facility Information

Site	HASI
Facility ID & Name	HASIFAC1-CASE4
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
90	HLW	1800
10	LLW	1800

2.0 Facility Information

Site	NVTS
Facility ID & Name	NVTSFAC1-CASE4
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4d

DATE: 11/13/97

Evaluator: K B Oswald

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2.0 Facility Information

Site	HASI
Facility ID & Name	HASIFAC3-CASE4
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

2.0 Facility Information

Site	SNLN
Facility ID & Name	SNLFAC2-CASE4
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

2.0 Facility Information

Site	HASI
Facility ID & Name	HASIFAC2-CASE4
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4d

DATE: 11/13/97

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (HASI, HLW):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4d

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY EXCEL CHART (NVTs, NVTsFAC1-CASE4):

Facility Capacity Detail

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4d

DATE: 11/13/97

Evaluator: K B Oswald

WASTE STREAM DETAIL EXCEL CHART (HASIWS1-CASE4):

Waste Stream Detail

WASTE STREAM DETAIL CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4d

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS RECEIVED EXCEL CHART (HASI, HLW):

SHIPMENTS RECEIVED CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4d

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS SENT EXCEL CHART (HASI):

Shipments Sent

SHIPMENTS SENT CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 4d

DATE: 11/13/97

Evaluator: K B Oswald

TRANSPORTATION COMPARISON EXCEL CHART (HASI, HLW):

TRANSPORTAION COMPARISON

TRANSPORTATION COMPARISON CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5a

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	INEEL
Waste Stream ID & Name	INELWS1-Case5 (Originating Type – MLLW)
Legacy volume (m3)	25,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C5a-1	Legacy-INEEL	INELFAC1-CASE5
C5a-2	INELFAC1-CASE5	INELFAC2-CASE5

1.3 Shipping Schedule(s)

Route ID: C5a-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	338

1.3 Shipping Schedule(s) (continued)

Route ID: C5a-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	338

1.0 Waste Stream Information

Originating Site	FEMP
Waste Stream ID & Name	FEMPWS1-Case5 (Originating Type – MLLW)
Legacy volume (m3)	30,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C5a-3	Legacy-FN	INELFAC1-CASE5
C5a-4	INELFAC1-CASE5	INELFAC2-CASE5

1.3 Shipping Schedule(s)

Route ID: C5a-3			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	405

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5a

DATE: 11/13/97

Evaluator: K B Oswald

1.3 Shipping Schedule(s) (continued)

Route ID: C5a-4			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	405

1.0 Waste Stream Information

Originating Site	OAKR
Waste Stream ID & Name	OAKRWS1-Case5 (Originating Type – MLLW)
Legacy volume (m3)	35,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C5a-5	Legacy-OR	INELFAC1-CASE5
C5a-6	INELFAC1-CASE5	INELFAC2-CASE5

1.3 Shipping Schedule(s)

Route ID: C5a-5			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	473

1.3 Shipping Schedule(s) (continued)

Route ID: C5a-6			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	473

1.0 Waste Stream Information

Originating Site	OAKR
Waste Stream ID & Name	OAKRWS2-Case5 (Originating Type – MLLW)
Legacy volume (m3)	40,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5a

DATE: 11/13/97

Evaluator: K B Oswald

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C5a-7	Legacy-OR	INELFAC2-CASE5

1.3 Shipping Schedule(s)

Route ID: C5a-7			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	541

2.0 Facility Information

Site	INEEL
Facility ID & Name	INELFAC1-CASE5
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	MLLW	1198

2.0 Facility Information

Site	INEEL
Facility ID & Name	INELFAC2-CASE5
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5a

DATE: 11/13/97

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (INEEL, MLLW):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5a

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY DETAIL EXCEL CHART:

Facility Capacity Detail *INELFAC11-ASE5*

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5a

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY DETAIL EXCEL CHART:

Facility Capacity Detail

INELFAC2-CASE5

FACILITY CAPACITY DETAIL CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5a

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS RECEIVED EXCEL CHART (INEEL):

SHIPMENTS RECEIVED CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5a

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS SENT EXCEL CHART (INEEL):

Shipments Sent

SHIPMENTS SENT CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5a

DATE: 11/13/97

Evaluator: K B Oswald

TRANSPORTATION COMPARISON EXCEL CHART (INEEL):

TRANSPORTAION COMPARISON

TRANSPORTATION COMPARISON CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5b

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	INEEL
Waste Stream ID & Name	INELWS1-Case5 (Originating Type – MLLW)
Legacy volume (m3)	25,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C5a-1	Legacy-INEEL	INELFAC1-CASE5
C5a-2	INELFAC1-CASE5	INELFAC2-CASE5

1.3 Shipping Schedule(s)

Route ID: C5a-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	338

1.3 Shipping Schedule(s) (continued)

Route ID: C5a-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	338

1.0 Waste Stream Information

Originating Site	FEMP
Waste Stream ID & Name	FEMPWS1-Case5 (Originating Type – MLLW)
Legacy volume (m3)	30,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C5a-3	Legacy-FN	INELFAC1-CASE5
C5a-4	INELFAC1-CASE5	INELFAC2-CASE5

1.3 Shipping Schedule(s)

Route ID: C5a-3			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	405

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5b

DATE: 11/13/97

Evaluator: K B Oswald

1.3 Shipping Schedule(s) (continued)

Route ID: C5a-4			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	405

1.0 Waste Stream Information

Originating Site	OAKR
Waste Stream ID & Name	OAKRWS1-Case5 (Originating Type – MLLW)
Legacy volume (m3)	35,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C5a-5	Legacy-OR	INELFAC1-CASE5
C5a-6	INELFAC1-CASE5	INELFAC2-CASE5

1.3 Shipping Schedule(s)

Route ID: C5a-5			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	473

1.3 Shipping Schedule(s) (continued)

Route ID: C5a-6			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	473

1.0 Waste Stream Information

Originating Site	OAKR
Waste Stream ID & Name	OAKRWS2-Case5 (Originating Type – MLLW)
Legacy volume (m3)	40,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5b

DATE: 11/13/97

Evaluator: K B Oswald

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C5a-7	Legacy-OR	INELFAC2-CASE5

1.3 Shipping Schedule(s)

Route ID: C5a-7			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	608

2.0 Facility Information

Site	INEEL
Facility ID & Name	INELFAC1-CASE5
Function	Treatment
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	MLLW	1800

2.0 Facility Information

Site	INEEL
Facility ID & Name	INELFAC2-CASE5
Function	Disposal
Start Year	1997
End Year	2070
Annual Capacity (m3/year) or	1250
Lifetime Facility Capacity (m3)	37500
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5b

DATE: 11/13/97

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (INEEL, MLLW):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5b

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY EXCEL CHART (INEEL, INELFAC1-CASE5):

Facility Capacity Detail INELFAC11-ASE5

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5b

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY DETAIL EXCEL CHART:

Facility Capacity Detail

INELFAC2-CASE5

FACILITY CAPACITY DETAIL CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5b

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS RECEIVED EXCEL CHART (INEEL):

SHIPMENTS RECEIVED CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5b

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS SENT EXCEL CHART (INEEL):

Shipments Sent

SHIPMENTS SENT CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5b

DATE: 11/13/97

Evaluator: K B Oswald

TRANSPORTATION COMPARISON EXCEL CHART (INEEL):

TRANSPORTAION COMPARISON

TRANSPORTATION COMPARISON CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5c

DATE: 11/13/97

Evaluator: K B Oswald

1.0 Waste Stream Information

Originating Site	INEEL
Waste Stream ID & Name	INELWS1-Case5 (Originating Type – MLLW)
Legacy volume (m3)	25,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C5a-1	Legacy-INEEL	INELFAC1-CASE5
C5a-2	INELFAC1-CASE5	INELFAC2-CASE5

1.3 Shipping Schedule(s)

Route ID: C5a-1			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	338

1.3 Shipping Schedule(s) (continued)

Route ID: C5a-2			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	338

1.0 Waste Stream Information

Originating Site	FEMP
Waste Stream ID & Name	FEMPWS1-Case5 (Originating Type – MLLW)
Legacy volume (m3)	30,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C5a-3	Legacy-FN	INELFAC1-CASE5
C5a-4	INELFAC1-CASE5	INELFAC2-CASE5

1.3 Shipping Schedule(s)

Route ID: C5a-3			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	405

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5c

DATE: 11/13/97

Evaluator: K B Oswald

1.3 Shipping Schedule(s) (continued)

Route ID: C5a-4			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	405

1.0 Waste Stream Information

Originating Site	OAKR
Waste Stream ID & Name	OAKRWS1-Case5 (Originating Type – MLLW)
Legacy volume (m3)	35,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C5a-5	Legacy-OR	INELFAC1-CASE5
C5a-6	INELFAC1-CASE5	INELFAC2-CASE5

1.3 Shipping Schedule(s)

Route ID: C5a-5			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	473

1.3 Shipping Schedule(s) (continued)

Route ID: C5a-6			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	473

1.0 Waste Stream Information

Originating Site	OAKR
Waste Stream ID & Name	OAKRWS2-Case5 (Originating Type – MLLW)
Legacy volume (m3)	40,000

1.1 New Generation

Start Year	End Year	Annual Volume (m3)
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5c

DATE: 11/13/97

Evaluator: K B Oswald

1.2 Shipping Route(s)

Route ID	Source Facility	Destination Facility
C5a-7	Legacy-OR	INELFAC2-CASE5

1.3 Shipping Schedule(s)

Route ID: C5a-7			
Start Year	End Year	Waste Type	Annual Volume (m3)
1997	2070	MLLW	608

2.0 Facility Information

Site	INEEL
Facility ID & Name	INELFAC1-CASE5
Function	Treatment
Start Year	1997
End Year	2020
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
100%	MLLW	1198

2.0 Facility Information

Site	INEEL
Facility ID & Name	INELFAC2-CASE5
Function	Disposal
Start Year	2040
End Year	2060
Annual Capacity (m3/year) or	1,000,000
Lifetime Facility Capacity (m3)	
Volume Change Factor	1

Conversion Profile

Percent	Waste Type	Density
NA	NA	NA

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5c

DATE: 11/13/97

Evaluator: K B Oswald

WASTE DISPOSITION - EXCEL CHART (INEEL, MLLW):

Waste Disposition

WASTE DISPOSITION - CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5c

DATE: 11/13/97

Evaluator: K B Oswald

FACILITY CAPACITY EXCEL CHART (INEEL, INELFAC1-CASE5):

Facility Capacity Detail INELFAC1-CASE5

FACILITY CAPACITY CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5c

DATE: 11/13/97

Evaluator: K B Oswald

WASTE STREAM DETAIL EXCEL CHART:

Facility Capacity Detail

INELFAC2-CASE5

WASTE STREAM DETAIL CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5c

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS RECEIVED EXCEL CHART (INEEL):

SHIPMENTS RECEIVED CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5c

DATE: 11/13/97

Evaluator: K B Oswald

SHIPMENTS SENT EXCEL CHART (INEEL):

Shipments Sent

SHIPMENTS SENT CWWFA CHART:

INITIAL PARAMETERS & RESULTS REPORT

CASE: Case 5c

DATE: 11/13/97

Evaluator: K B Oswald

TRANSPORTATION COMPARISON EXCEL CHART (INEEL):

TRANSPORTAION COMPARISON

TRANSPORTATION COMPARISON CWWFA CHART:

TEST PROCEDURE – TP3.1.2

Mortgage Reduction Performance

Purpose

This test procedure has been designed to verify the CWWFA mortgage reduction results. The mortgage reduction performance refers to the reduction in total cost liability from waste being treated and disposed of as it moved through the system. This procedure will satisfy requirements 3.1.2.1 and 3.1.2.2 as referenced in Appendix A - Requirements Verification Matrix.

Objective

There are several objectives associated with this test procedure. The first objective is to evaluate for relative changes in cost (e.g., waste flow through the system) based on changes on waste quantities. The second objective includes a test on user ability to input cost data directly into the model using an input screen. The third objective is to evaluate the unit cost rates (e.g., fixed and variable costs) for waste processing and transportation.

Test Method

Method 1. – This test method is designed to verify the 1st and 2nd objectives. Two cases will be simulated based on the alternative case configuration. Test data are shown in Table 1. The test data are designed to show waste flow through a facility (i.e., HLW-SWF) at varying quantities. Since the same algorithm is used for all waste types, only HLW waste will be tested for compliance. Tester will input the test data directly into the model using the CWWFA input screen. After the simulation, an assessment of the impact will be conducted by examining the CWWFA mortgage liability reduction and transportation cost charts.

Table 1.			
Site	Facility	Quantity (m³)	Output Chart
Hanford	HLW-SWF	100,000	1) Mortgage liability reduction 2) Transportation cost
		166,000	1) Mortgage liability reduction 2) Transportation cost

Method 2 – This method is designed to verify the unit cost rates (e.g., disposal, treatment, storage, and shipment) and its usage in the model source codes. The first verification is conducted by evaluating the following sources for the unit cost rates.

1. INEEL Letter to File, Calculation of Cost Credits for the Complex-Wide Waste Flow Analysis Model – RPH-02-97, April 1997.

2. Feizollahi, F. H. and D. E. Shropshire, 1944a, Interim Report: Waste Management Facilities Cost Information for Transportation of Radioactive and Hazardous Materials, INEL-95/0300, Rev. 1, (formerly EGG-WM-10877, Rev. 1), June.

For the source code evaluation, the unit cost and transportation rate tables will be examined for accuracy (e.g., tables are properly chained to calling routines within the source program).

Reporting

TP - Test Procedure
REQD - Requirement
P/F - Pass/Fail

TP	REQD	Result/Comment	P/F
TP3.1.2 Method 1 1 st obj	3.1.2.1	Results from testing (shown on attached output charts) show a visible change in mortgage reduction and transportation costs as waste quantities are changed. This change is consistent with the expected behavior of the model. This test satisfied this requirement.	Pass
Method 2 3 rd obj		<p>Overall, unit costs and component costs (i.e., disposal, treatment, and storage) are consistent with the source document #1 listed above. There is a minor deficiency, listed below, that needs to be corrected.</p> <ol style="list-style-type: none"> on unit cost, LLW storage cost should be \$350.00 versus \$2,000.00 <p>Note: On mortgage rates, INEEL TRU treatment and storage rates are reversed from what is listed in the source document. However, this evaluation indicates that the inputs are correct in the model database and the source document is in error.</p> <p>Transportation unit costs were compared against source #2 and no deficiency was found.</p>	Pass – minor correction needed
TP3.1.2 Method 1 2 nd obj	3.1.2.2	There is not an available user input screen to enter cost data into the system. Cost data had to be loaded into the database via programming.	Fail

TP 3.1.2
METHOD 1
10/21/97

CHART#1
@166,000 m³

TP 3.1.2
METHOD 1
10/21/97

CHART#2
@100,000 m³

Site: HASI

Waste Type: HLW

Mortgage Liability Reduction
Hanford Site • HLW

■ Base Case wo-ER w-WWW
■ Alternative Case wo-ER w-WWW

Data has not been validated. Use for demonstration purposes only.
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TP 3.1.2
METHOD 1
10/21/97

CHART#3
@166,000 m³

te: HASI Waste Type: HLW

Transportation Cost
Hanford Site • HLW

Data has not been validated. Use for demonstration purposes only.
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TP 3.1.2
METHOD 1
10/21/97

CHART#4
@100,000 m³

Site: HASI Waste Type: HLW

Transportation Cost
Hanford Site • HLW

Data has not been validated. Use for demonstration purposes only.
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populateUnitCostRates

| type |

Dataset datasetAtCurrentVersion complex sites do:

[:site | site facilities do:

[:fac |

"TRU Cost"

type := Type new.

type unitCostRates disposalCostRate nominal: 0.

type unitCostRates treatmentCostRate nominal: 5500. ✓

type unitCostRates storageCostRate nominal: 700. ✓

fac costTypes at: #TRU put: type.

"MLLW Cost"

type := Type new.

type unitCostRates disposalCostRate nominal: 2000. ✓

type unitCostRates treatmentCostRate nominal: 14000. ✓

type unitCostRates storageCostRate nominal: 500. ✓

fac costTypes at: #MLLW put: type.

"LLW Cost"

type := Type new.

type unitCostRates disposalCostRate nominal: 2000. (#350)

type unitCostRates treatmentCostRate nominal: 3000.

type unitCostRates storageCostRate nominal: 2000.

fac costTypes at: #LLW put: type.

"HLW Cost"

type := Type new.

type unitCostRates disposalCostRate nominal: 0.

type unitCostRates treatmentCostRate nominal: 24000. ✓

type unitCostRates storageCostRate nominal: 450. ✓

fac costTypes at: #HLW put: type.

1.
1

TP 3.1.2

METHOD 2

10/21/97

populateMortgageRates

"populate mortgageRates"

type |

Dataset datasetAtCurrentVersion complex sites do:

[site | site name = 'HASI' ifTrue:[✓ ok

"TRU Mortgage Liability"

type := Type new.

type mortgageRates disposalRate: 0.

type mortgageRates treatmentRate: 100,500,000. ✓

type mortgageRates storageRate: 58,300,000. ✓

site mortgageTypes at: #TRU put: type.

"MLLW Mortgage Liability"

type := Type new.

type mortgageRates disposalRate: 17,100,000. ✓

type mortgageRates treatmentRate: 217,700,000. ✓

type mortgageRates storageRate: 112,600,000. ✓

site mortgageTypes at: #MLLW put: type.

"LLW Mortgage Liability"

type := Type new.

type mortgageRates disposalRate: 57,970,000.

type mortgageRates treatmentRate: 210,300,000.

type mortgageRates storageRate: 0.

site mortgageTypes at: #LLW put: type.

"HLW Mortgage Liability"

type := Type new.

type mortgageRates disposalRate: 0.

type mortgageRates treatmentRate: 265,630,000.

type mortgageRates storageRate: 1,607,600,000.

site mortgageTypes at: #HLW put: type.]

].

"populate mortgageRates"

Dataset datasetAtCurrentVersion complex sites do:

[site | site name = 'WVDP' ifTrue:[✓

"LLW Mortgage Liability"

type := Type new.

type mortgageRates disposalRate: 205,930,000.

type mortgageRates treatmentRate: 0.

type mortgageRates storageRate: 0.

site mortgageTypes at: #LLW put: type.

"HLW Mortgage Liability"

type := Type new.

type mortgageRates disposalRate: 0.

type mortgageRates treatmentRate: 615601000.
type mortgageRates storageRate: 0.
site mortgageTypes at: #HLW put: type.]

"populate mortgageRates"

Dataset datasetAtCurrentVersion complex sites do:
[:site | site name = 'INEEL' ifTrue:[

"TRU Mortgage Liability"
type := Type new.
type mortgageRates disposalRate: 0.
type mortgageRates treatmentRate: 762740000.
type mortgageRates storageRate: 331500000.
site mortgageTypes at: #TRU put: type.

"MLLW Mortgage Liability"
type := Type new.
type mortgageRates disposalRate: 0.
type mortgageRates treatmentRate: 207400000.
type mortgageRates storageRate: 15580000.
site mortgageTypes at: #MLLW put: type.

"LLW Mortgage Liability"
type := Type new.
type mortgageRates disposalRate: 155660000.
type mortgageRates treatmentRate: 89270000.
type mortgageRates storageRate: 0.
site mortgageTypes at: #LLW put: type.

"HLW Mortgage Liability"
type := Type new.
type mortgageRates disposalRate: 0.
type mortgageRates treatmentRate: 5465440000.
type mortgageRates storageRate: 170900000.
site mortgageTypes at: #HLW put: type.]

].

"populate mortgageRates"

Dataset datasetAtCurrentVersion complex sites do: ✓
[:site | site name = 'OAKR' ifTrue:[

"TRU Mortgage Liability"
type := Type new.
type mortgageRates disposalRate: 0.
type mortgageRates treatmentRate: 344400000.
type mortgageRates storageRate: 19600000.
site mortgageTypes at: #TRU put: type.

"MLLW Mortgage Liability"

type := Type new.

type mortgageRates disposalRate: 50200000.

type mortgageRates treatmentRate: 602200000.

type mortgageRates storageRate: 94000000.

site mortgageTypes at: #MLLW put: type.

"LLW Mortgage Liability"

type := Type new.

type mortgageRates disposalRate: 86300000.

type mortgageRates treatmentRate: 303200000.

type mortgageRates storageRate: 86200000.

site mortgageTypes at: #LLW put: type.]

].

"populate mortgageRates"

Dataset datasetAtCurrentVersion complex sites do:

[site | site name = 'SARS' ifTrue:[✓

"TRU Mortgage Liability"

type := Type new.

type mortgageRates disposalRate: 12363000.

type mortgageRates treatmentRate: 834373000.

type mortgageRates storageRate: 348459000.

site mortgageTypes at: #TRU put: type.

"MLLW Mortgage Liability"

type := Type new.

type mortgageRates disposalRate: 0.

type mortgageRates treatmentRate: 146477000.

type mortgageRates storageRate: 80261000.

site mortgageTypes at: #MLLW put: type.

"LLW Mortgage Liability"

type := Type new.

type mortgageRates disposalRate: 511754000.

type mortgageRates treatmentRate: 626031000.

type mortgageRates storageRate: 12125000.

site mortgageTypes at: #LLW put: type.

"HLW Mortgage Liability"

type := Type new.

type mortgageRates disposalRate: 0.

type mortgageRates treatmentRate: 6255888000.

type mortgageRates storageRate: 2299539000.

site mortgageTypes at: #HLW put: type.]

].

"populate mortgageRates"

Dataset datasetAtCurrentVersion complex sites do:
[:site | site name = 'NVTs' ifTrue:[

"TRU Mortgage Liability"
type := Type new.
type mortgageRates disposalRate: 0.
type mortgageRates treatmentRate: 0.
type mortgageRates storageRate: 15300000.
site mortgageTypes at: #TRU put: type.

"MLLW Mortgage Liability"
type := Type new.
type mortgageRates disposalRate: 10000000.
type mortgageRates treatmentRate: 5200000.
type mortgageRates storageRate: 0.
site mortgageTypes at: #MLLW put: type.]

].

"populate mortgageRates"

Dataset datasetAtCurrentVersion complex sites do:
[:site | site name = 'LANL' ifTrue:[

"TRU Mortgage Liability"
type := Type new.
type mortgageRates disposalRate: 0.
type mortgageRates treatmentRate: 131768000.
type mortgageRates storageRate: 84455000.
site mortgageTypes at: #TRU put: type.

"MLLW Mortgage Liability"
type := Type new.
type mortgageRates disposalRate: 99384000.
type mortgageRates treatmentRate: 19423000.
type mortgageRates storageRate: 39321000.
site mortgageTypes at: #MLLW put: type.

"LLW Mortgage Liability"
type := Type new.
type mortgageRates disposalRate: 97476000.
type mortgageRates treatmentRate: 86120000.
type mortgageRates storageRate: 19904000.
site mortgageTypes at: #LLW put: type.]

].

"populate mortgageRates"

Dataset datasetAtCurrentVersion complex sites do:
[:site | site name = 'FEMP' ifTrue:[

```
"MLLW Mortgage Liability"
type := Type new.
type mortgageRates disposalRate: 0.
type mortgageRates treatmentRate: 20817000.
type mortgageRates storageRate: 0.
site mortgageTypes at: #MLLW put: type.
```

```
"LLW Mortgage Liability"
type := Type new.
type mortgageRates disposalRate: 239947000.
type mortgageRates treatmentRate: 0.
type mortgageRates storageRate: 0.
site mortgageTypes at: #LLW put: type.]
```

```
].

"populate mortgageRates"
```

```
Dataset datasetAtCurrentVersion complex sites do:
[:site | site name = 'RFTS' ifTrue:[
```

```
"TRU Mortgage Liability"
type := Type new.
type mortgageRates disposalRate: 0.
type mortgageRates treatmentRate: 33556000.
type mortgageRates storageRate: 26474000.
site mortgageTypes at: #TRU put: type.
```

```
"MLLW Mortgage Liability"
type := Type new.
type mortgageRates disposalRate: 108480000.
type mortgageRates treatmentRate: 143095000.
type mortgageRates storageRate: 18462000.
site mortgageTypes at: #MLLW put: type.
```

```
"LLW Mortgage Liability"
type := Type new.
type mortgageRates disposalRate: 91983000.
type mortgageRates treatmentRate: 0.
type mortgageRates storageRate: 36708000.
site mortgageTypes at: #LLW put: type]
```

```
].

"populate mortgageRates"
```

```
Dataset datasetAtCurrentVersion complex sites do:
[:site | site name = 'SNLN' ifTrue:[
```

```
"TRU Mortgage Liability"
type := Type new.
type mortgageRates disposalRate: 0.
```


type mortgageRates treatmentRate: 0.
type mortgageRates storageRate: 0.
site mortgageTypes at: #TRU put: type.

"MLLW Mortgage Liability"

type := Type new.
type mortgageRates disposalRate: 0.
type mortgageRates treatmentRate: 0.
type mortgageRates storageRate: 0.
site mortgageTypes at: #MLLW put: type.

"LLW Mortgage Liability"

type := Type new.
type mortgageRates disposalRate: 0.
type mortgageRates treatmentRate: 0.
type mortgageRates storageRate: 0.
site mortgageTypes at: #LLW put: type.]

].

buildTable

| row |

row := TransportationConstants new.
row type: 'HLW'.
row mode: 'Road'.
row fixedCost: 8110.
row unitCost: 16.7.
row packagesPerShipment: 1.
row massCapacity: 909.
row volumeCapacity: 20.
self addRow: row.

row := TransportationConstants new.
row type: 'HLW'.
row mode: 'Rail'.
row fixedCost: 18000.
row unitCost: 127.
row packagesPerShipment: 1.
row massCapacity: 14545.
row volumeCapacity: 424.
self addRow: row.

row := TransportationConstants new.
row type: 'TRU'.
row mode: 'Road'.
row fixedCost: 4630.
row unitCost: 10.87.
row packagesPerShipment: 3.
row massCapacity: 9818.
row volumeCapacity: 8.68.
self addRow: row.

row := TransportationConstants new.
row type: 'TRU'.
row mode: 'Rail'.
row fixedCost: 9260.
row unitCost: 33.95.
row packagesPerShipment: 6.
row massCapacity: 19636.
row volumeCapacity: 17.37.
self addRow: row.

row := TransportationConstants new.
row type: 'MLLW'.
row mode: 'Road'.
row fixedCost: 880.
row unitCost: 4.95.
row packagesPerShipment: 1.
row massCapacity: 20000.
row volumeCapacity: 18.13.
self addRow: row.

row := TransportationConstants new.
row type: 'MLLW'.
row mode: 'Rail'.
row fixedCost: 2250.
row unitCost: 5.73.
row packagesPerShipment: 3.
row massCapacity: 54545.
row volumeCapacity: 47.14.
self addRow: row.

row := TransportationConstants new.
row type: 'LLW'.
row mode: 'Road'.

METHOD 2

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row fixedCost: 880.
row unitCost: 4.98.
row packagesPerShipment: 1.
row massCapacity: 20000.
row volumeCapacity: 18.13.
self addRow: row.

row := TransportationConstants new.
row type: 'LLW'.
row mode: 'Rail'.
row fixedCost: 2250.
row unitCost: 5.73.
row packagesPerShipment: 3.
row massCapacity: 54545.
row volumeCapacity: 47.14.
self addRow: row.

1P 3.1.2

METHOD 2

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TEST PROCEDURE – TP3.1.3

Health and Safety

Purpose

This test procedure has been designed to validate the CWWFA risk results. The risk incorporated into the CWWFA used the Simplified Risk Model developed by LMITCO.¹ This procedure will satisfy requirements 3.1.3.1, 3.1.3.2, and 3.1.3.3 as referenced in Appendix A – Requirements Verification Matrix.

Objective

The baseline Ten Year Plan (TYP) risk information is grounded on the risk analysis performed by Steve Eide for the Environmental Management Integration (EMI) program. The objective is to utilize static summary risk output from the Eide's study to validate the CWWFA risk results.

Test Method

Method 1. – Site risk result evaluation. Isolate CWWFA risk results at Hanford for HLW waste and compare to the Treatment, Storage, Disposal (TSD) graph provided by Steve Eide.

Method 2. – Processing facility evaluation. Isolate a processing facility at Hanford (Sludge, Wash facility), material stream (HAN01), take out the time component by shipping all the waste in one year, ignore interim storage risk produced by CWWFA, and compare to the facility risk sheet results and TSD graph provided by Steve Eide.

¹ R. G. Peatross, S.A. Eide, *Users Guide for the Simplified Risk Model (SRM)*, INEL-96/0397, October 1996.

Reporting

TP - Test Procedure

REQD - Requirement

P/F - Pass/Fail

TP	REQD	Result/Comment	P/F
TP3.1.3 Method 1	3.1.3.1 3.1.3.2 3.1.3.3	<p>The total relative risk result from the Eide TSD graph is approximately 1,173 for Hanford HLW. The CWWFA risk result is 143.02. There is a difference of 1,029.98.</p> <p>Comments: There are two facilities in CWWFA that are not calculating risk. The risk numbers are not loaded for the facilities.</p>	Fail
TP3.1.3 Method 2	3.1.3.1 3.1.3.2 3.1.3.3	<p>The total relative risk from Eide TSD graph for the sludge, wash facility is approximately 141. The CWWFA risk result is 48.1. There is a difference of 92.9.</p> <p>Comments: In further investigation discovered that Eide results had two sets of facility constants for the 4x5a-Fac term. This is because the Eide had more information on the HAN01 material stream than was provided in the EMI disposition maps. This information is not displayed on the disposition map and therefore not included in the CWWFA data set. When comparing sludge, wash phase 1 sheet (from Eide's results) that had the same constants that were loaded into CWFA, the results were 1 factor higher in CWWFA (exactly 10 times Steve's results for each term). Will need to find out why (probably just have one term which is an order of magnitude high). Will need to validate the facility constants.</p> <p>Alternatives – support multiple risk facility constants, average the values, or take the set of facility constants that have the greater risk (Eide's recommendation).</p> <p><u>Other Findings</u></p> <p>Eide does not have temporary storage risk in his calculations. There is a temporary risk storage calculation in CWWFA, which was implemented per direction from Eide. Not sure how to validate these results?</p> <p>Eide includes chemical constants as part of his risk calculations. There is no chemical data risk in CWWFA.</p> <p>In processing facilities after risk is calculated and the conversion profile applies the actinide and nonactinide percentages the</p>	Fail

		<p>buckets that are sent to storage (with the new actinide and nonactinide percentages) do not contain destination information. The nonactinide and actinide percentages are derived based on the assumption of where the waste will be sent. The end result is that this causes the risk for various facility to be erroneous. This only occurs where the processing facility has waste splits. A solution would be to create a destination "facilityId" instances variable for the Bucket, and Conversion Split Classes. Populate the facilityId variable in the Conversion Split Class and when the Conversion Splits are applied in Treatment assign the destination facilityId to the Bucket facilityId. Subsequently, when the buckets are gathered in storage for shipment the destination facility can be validated. Therefore, the percentages of actinides and nonactinides are sent to the correct destination and the risk will be comparable to Steve Eides' risk.</p> <p>Need to add the constant factors for the handling risk to the total disposal risk calculations for disposal facilities.</p> <p>Transportation risk needs to be validated.</p> <p>In summary the CWWFA calculates risk differently then Eide's risk results. The more CWWFA deviates from Eide's process of calculating risk numbers the more difficult the validation effort becomes because we can no longer use Eide's risk results as a baseline. A corrective action is to follow a static risk calculation (exactly like Eide) or in order to support a dynamic model like CWWFA to change our approach to risk (risk based on waste type or some other simplified approach).</p>	
--	--	---	--

TEST PROCEDURE – TP3.1.4

Facility Operational Performance

Purpose

This test procedure has been designed to verify the CWWFA facility operational performance results. The facility operational performance refers to optimal utilization of treatment, storage, or disposal facilities, and identification of redundant capacities. This procedure will satisfy requirements 3.1.4.1 as referenced in Appendix A - Requirements Verification Matrix.

Objective

The objective of this procedure is to verify that CWWFA supports determination of facility utilization and redundant capacities by analysis.

Test Method

This test method relies on an analysis approach to make a determination of facility utilization. Table 1 represents varying sites, waste types, and facilities that are chosen for the analysis. After the simulation, an assessment of the impact will be conducted by examining the CWWFA facility capacity detail charts.

Table1.		
Site	Waste Type	Facility
Hanford	HLW	HLW vitrification
INEEL	TRU	INEL2.1-T
SRS	LLW	Legacy-SRS

Reporting

TP – Test Procedure
 REQD – Requirement
 P/F – Pass/Fail

TP	REQD	Result/Comment	P/F
TP3.1.4	3.1.4.1	<p>This requirement has four parts that need to be addressed. The following discussion will be tailored to address each part respectively.</p> <p>Measure utilization at facilities The attached output charts (charts #1-3) demonstrated the ability of the model to characterize the utilization capacity at different facilities. An analysis of annual receipt, storage limit, and annual output can be used to measure utilization at different facilities. This part complies with the requirement.</p> <p>Compare maximum capacities that are utilized It is not possible to compare maximum utilization unless the analyst has information regarding the facility maximum capacity. The current output charts are scaled to the waste volume that flows through the facility and not necessarily scaled to its maximum capacity. Therefore a comparison on maximum utilization cannot be made. This is a deficiency.</p> <p>Provide identification of redundant capabilities including existing DOE facilities and private sector capabilities. The model does not have current capabilities to identify redundancy (or to determine if the redundancy is good or bad) at the facility level, at other DOE facilities, or the private sector. This requirement is unclear. Recommend that this requirement be renegotiated for removal with the customer. This is a major deficiency.</p> <p>Identify applications for use of excess capacity This requirement is beyond the realm of this model. This is a simulation tool. This requirement is unclear. Recommend that this requirement be renegotiated for removal with the customer. This is a major deficiency.</p>	<p>Pass</p> <p>Fail</p> <p>Fail</p> <p>Fail</p>

TP 3.1.4
10/22/97
CHART#1

Site: HASI Waste Type: HLW Facility: HANF-HLVF-2

Facility Capacity Detail
Hanford Site • HLW • HLW Vitrification
Alternative Case wo-ER w-WW

- Annual Receipt
- Cumulative Storage
- Annual Output

Years

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TP 3.1.4
10/22/97
CHART#2

Site: INEEL Waste Type: TRU Facility: INEL2.1-T

Facility Capacity Detail
Idaho National Engineering & Environmental Laboratory • TRU • SWEPP Characterization
Alternative Case wo-ER w-WW

TP 3.1.4
10/22/97
CHART#3

Facility Capacity Detail
Savannah River Site • LLW • Legacy Facility
Alternative Case wo-ER w-WWW

▤ Annual Receipt
■ Cumulative Storage
▤ Annual Output

Years

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Test Procedures – TP3.1.6

Equity Analysis

Purpose

This test procedure is designed to test requirement 3.1.6.1 to incorporate generic equity analysis capability using existing stakeholder data. Requirement 3.1.6.2 refers to future enhancements of the model planned for FY98 and not currently present in the model.

Objective

The objectives are to confirm requirement 3.1.6.1 has been met by the following:

1. Calculations are correct compared to the expected results from the algorithm, and
2. Stakeholder positions changes with changes to off-site conditions.

Test Method

Method 1 - Calculations were tested by manually calculating equity positions and comparing the results to the model. The base case without wastewater or ER was compared to the alternative case with the same conditions.

Eight test cases were developed. Tests were developed by a random combination of sites, stakeholders, weighting, objectives and thresholds. All tests were based on High Level waste calculations. The possible value selections are as follows:

Sites	Stakeholders
1. Hanford	1. State government
1. INEEL	2. Tribal government
2. Savana River	3. Local Government
3. Oak Ridge	4. Environmental groups
4. WIPP	5. Civic and volunteer organizations
5. Yucca Mt.	6. General public
6. West Valley	7. Community leaders
7. Mound	8. Site administrators
8. Rocky Flats	
9. Las Alamos	
10. Sandia	
11. Fernald	

Weighting combinations

1. Site volume = 10%, Complex Volume = 75%, Transport = 15%
2. Site volume = 30, Complex Volume = 35%, Transport = 35%
3. Site volume = 75%, Complex Volume = 15%, Transport = 10%

Influence objective (one for each influence)
each influence)

1. Increase
2. Decrease

Threshold Value (one for
each influence)

1. Lowest
2. Mean
3. Highest

Method 2 -The purpose of this test was to ensure the model is reflecting complex wide interactions. Calculations were tested by observing stakeholders positions at a site before and after changes are made to conditions at another site. The base case without waste water or ER was compared to the alternative case with the same conditions. The hypothesis is that stakeholder positions at one site will change as the result of waste processing conditions at another site.

The test conditions:

1. Environmental stakeholders at Hanford and INEEL placed 100% of their weight on the site volume influence.
2. State government stakeholders at Oak Ridge placed 100% of their weight on Interstate Transportation.
3. The shipping schedules transferring HLW from Hanford and INEEL to Oak Ridge were altered to stop all shipping of HLW to Oak Ridge.

Reporting

TP – Test Procedure
REQD – Requirement
P/F – Pass/Fail

TP	REQD	Result/Comment	P/F
TP3.1.6 Method 1	3.1.6.1	Five of the eight test conditions ran as designed with the exception of the Mass value for transportation in Figure 1. This error appears to be present on all stakeholders	Pass – Minor correction

Method 2		<p>at Oak Ridge, but does not effect any other sites or stakeholders. See test conditions and results below.</p> <p>Three of the test conditions did not run because stakeholder threshold values have not been included in the model for these sites.</p>	
TP3.1.6	3.1.6.2	Not applicable. Capability is not scheduled for inclusion in the model at this time.	N/A

Test Conditions and Results of Test Method 1

INFLUENCE	STAKEHOLDER VALUES			CALCULATED VALUES				
	WEIGHT	OBJECTIVE	SIGNIFICANT DEVIATION	DEVIATION	MEASURE		MASS	
					expected	model	expected	model
Site Volume	10	Decrease	535	74581	-3	-3	-30	-30
Complex Volume	75	Increase	105530	2203035	3	3	225	225
Intersite								
Transportation	15	Decrease	11280	-61932	3	3	45	15
TOTAL	100							

Figure 1

Tribal Stakeholders at Oak Ridge

INFLUENCE	STAKEHOLDER VALUES			CALCULATED VALUES				
	WEIGHT	OBJECTIVE	SIGNIFICANT DEVIATION	DEVIATION	MEASURE		MASS	
					expected	model	expected	model
Site Volume	10	Increase	1730	3891	3	3	30	30
Complex Volume	75	Decrease	105530	2203035	-3	-3	-225	-225
Intersite								
Transportation	15	Decrease	1575	198361	-3	-3	-45	-45
TOTAL	100							

Figure 2

Environmental Stakeholders at Fernald

INFLUENCE	STAKEHOLDER VALUES			CALCULATED VALUES				
	WEIGHT	OBJECTIVE	SIGNIFICANT DEVIATION	DEVIATION	MEASURE		MASS	
					expected	model	expected	model
Site Volume	10	Increase			0		0	
Complex Volume	75	Decrease			0		0	
Intersite								
Transportation	15	Increase			0		0	
TOTAL	100							

Figure 3

Site Administrator Stakeholders at Yucca Mt.

INFLUENCE	STAKEHOLDER VALUES			CALCULATED VALUES				
	WEIGHT	OBJECTIVE	SIGNIFICANT DEVIATION	DEVIATION	MEASURE		MASS	
					expected	model	expected	model
Site Volume	30	Increase	3930	78966	3	3	90	90
Complex Volume	35	Decrease	211060	2203035	-3	-3	-105	-105
Intersite								
Transportation	35	Decrease	8490	9961	-2	2	-70	-70
TOTAL	100							

Figure 4

State Government stakeholders at INEEL

INFLUENCE	STAKEHOLDER VALUES			CALCULATED VALUES				
	WEIGHT	OBJECTIVE	SIGNIFICANT DEVIATION	DEVIATION	MEASURE		MASS	
					expected	model	expected	model
Site Volume	30	Decrease	72855	480546	-3	-3	-90	-90
Complex Volume	35	Increase	316590	2203035	3	3	105	105
Intersite								
Transportation	35	Increase	4415	96835	3	3	105	105
TOTAL	100							

Figure 5

Tribal Government Stakeholders at Hanford

INFLUENCE	STAKEHOLDER VALUES			CALCULATED VALUES				
	WEIGHT	OBJECTIVE	SIGNIFICANT DEVIATION	DEVIATION	MEASURE		MASS	
					expected	model	expected	model
Site Volume	30	Increase	112770	741220	3	3	90	90
Complex Volume	35	Increase	105530	2203035	3	3	105	105
Intersite								
Transportation	35	Decrease	14295	-210	1	1	35	35
TOTAL	100							

Figure 6

General Public Stakeholders at Savannah River

INFLUENCE	STAKEHOLDER VALUES			CALCULATED VALUES			
	WEIGHT	OBJECTIVE	SIGNIFICANT DEVIATION	DEVIATION	MEASURE expected model	MASS expected model	
Site Volume	10	Increase			0	0	
Complex Volume Intersite	75	Decrease			0	0	
Transportation	15	Increase			0	0	
TOTAL	100						

Figure 7

Site Administrator Stakeholders at Mound

INFLUENCE	STAKEHOLDER VALUES			CALCULATED VALUES			
	WEIGHT	OBJECTIVE	SIGNIFICANT DEVIATION	DEVIATION	MEASURE expected model	MASS expected model	
Site Volume	75	Decrease			0	0	
Complex Volume Intersite	15	Increase			0	0	
Transportation	10	Increase			0	0	
TOTAL	100						

Figure 8

General Public Stakeholders at WIPP

Test Conditions and Results of test Method 2

Stakeholder Positions (score) & Influence Value						
	Hanford Waste Volume		INEEL Waste Volume		Oak Ridge Transportation	
	Stakehold er Score	Influence Value	Stakehold er Score	Influence Value	Stakehold er Score	Influence Value
Before Change	-300	480,546	-300	78,967	300	-61,932
After Change	-300	498,064	-300	79,330	300	-75,904

The model did demonstrate the complex interactions by decreasing the waste transported to Oak Ridge (see influence values). However, the significant deviations at the sites involved were not sensitive enough to reflect a change in the stakeholder positions as the influence values changed.

TEST PROCEDURE – TP3.1.7

Technology Performance

Purpose

This test procedure has been designed to verify the technology performance assessment capability of CWWFA. Technology performance assessment refers to ability to analyze a new technology system or facility that can be substituted (e.g., rerouting of waste flow into a new facility) into the disposition path or to define a new specification (e.g., volume reduction) for existing facility. This procedure will satisfy requirements 3.1.7.1 and 3.1.7.2 as referenced in Appendix A - Requirements Verification Matrix.

Objective

There are two objectives associated with this procedure. The first objective is to verify that CWWFA provides for assessment of new system capabilities through rerouting of waste flow into a new facility. The second objective verifies the effect of changing specification through a volume reduction.

Test Method

Method 1 - This test method demonstrates a rerouting of waste from one facility (e.g., treatment or storage) to another within CWWFA. The rerouting of waste shows the impact on a facility behavior (i.e., increased waste volume and storage impacts). After the simulation, an assessment of the impacts will be conducted by examining the CWWFA facility capacity detail and waste stream detail charts. Table 1 and 1A provide the new shipping routes and schedules for this test. The CWWFA input screen will be used to input the new routing data.

Table 1. – Shipping Route			LANL/TRU/Waste Stream LANL2.4		
ID	Source Facility	Destination Facility	Transport Mode	Transport Package	Total Volume
1	Legacy-LANL	LANL1.5.9	Intrasite	Intrasite	93.0
2	LANL1.5.9	LANL-TRU-2	Intrasite	Intrasite	93.0

Table 1A. – Shipping Schedule			LANL/TRU/Waste Stream LANL2.4	
ID	Start Year	End Year	Waste Type	Annual Volume
1	1997	2004	TRU	12
2	1997	2004	TRU	12

Method 2 - This method demonstrates ability to define technology performance specifications through volume reduction at a facility. Table 1 and 1A Are used to demonstrate this test with a change in the annual volume shipping schedule from 12 m³ /year to 6 m³ /year. After the simulation, an assessment of the impacts will be conducted by examining the CWWFA facility capacity detail charts.

Reporting

TP – Test Procedure

REQD – Requirement

P/F – Pass/Fail

TP	REQD	Result/Comment	P/F
TP3.1.7 Method 1	3.1.7.1	<p>Charts #1- 4 verify that the model is behaving as expected. There is an increase in annual receipt to the affected facilities (LAN1.5.9-T and LANL-TRU-2). Storage also shows an impact due to facility capacity constraint. Chart #5 shows the impact to the entire waste stream. See charts below.</p> <p>As part of the testing requirement, the CWWFA input screen was used to input the changed data. However, the input screen failed to allow the user to input new routes or shipping schedules. The data was finally inputted into the model database via programming. This is a minor deficiency.</p>	Pass Pass – need minor correction
TP3.1.7 Method 2	3.1.7.2	Chart #6 verifies that the model behaves as expected due to a volume reduction through the facility. Storage has increased possibly because of unintended impact to the disposition schedule.	Pass

TP 3.1.7
METHOD 1
10/23/97
CHART#1

TP 3.1.7
METHOD 1
10/23/97
CHART#2
@ 12 m³

Site: LANL Waste Type: TRU Facility: LANL1.5.9-T

Facility Capacity Detail
Los Alamos National Laboratory • TRU • Mobile RTR
Alternative Case w-ER wo-WW

TP 3.1.7
METHOD 1
10/23/97
CHART#3

Site: LANL Waste Type: TRU Facility: LANL-TRU-2

Facility Capacity Detail
Los Alamos National Laboratory • TRU • TBD Mobile Size Reduction/Decon
Alternative Case w-ER wo-WW

- Annual Receipt
- Cumulative Storage
- Annual Output

Years

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TP 3.1.7
METHOD 1
10/23/97
CHART#4
@ 12 m³

Site: LANL Waste Type: TRU Facility: LANL-TRU-2

Facility Capacity Detail
Los Alamos National Laboratory • TRU • TBD Mobile Size Reduction/Decon
Alternative Case w-ER wo-WW

TP 3.1.7
METHOD 1
10/23/97
CHART#5

ROUTE WASTE FLOW

TP 3.1.7
METHOD 2
10/23/97
CHART#6

Site: LANL Waste Type: TRU Facility: LANL-TRU-2

Facility Capacity Detail
Los Alamos National Laboratory • TRU • TBD Mobile Size Reduction/Decon
Alternative Case w-ER wo-WWW

- Annual Receipt
- Cumulative Storage
- Annual Output

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