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Scientific Notebook # 352
Q200010040002



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Felicia Guzmán

Lietai Yang

Oct. 27, 1999 — July 21, 2000

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Felicia C. Guzmán

The following Entry will be made by L. Yang 10/27/99

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Title: TWRSP Inspection Database Date: 06/14/99 -
 Name: Felicia Guzmán 07/23/99

Objectives:

- 1) Identify the structures, systems, and components present in BNFL, Inc.'s Hanford site design
- 2) Identify the hazards associated with each SSC.
- 3) Develop a database structure into which the information will be included

Purpose:

- 1) Allow a person to choose a piece of equipment, view its role in the process, and find out what hazards are associated with it.
- 2) Choose a specific hazard, and view all pieces of equipment that might lead to that hazard.

Procedure:

- 1) Prepare a list of SSCs from BNFL technical reports.
- 2) Prepare a list of hazards and process constraints associated with each SSC.
- 3) Develop an Access database based on users' needs and input data.

I Development of Database Structure

It has been decided that users will need to be able to access information in three ways:

1) [facility] → [vessel] → [components] →
[hazards] → [hazardous/current conditions]
 → [controls] → [lessons learned]

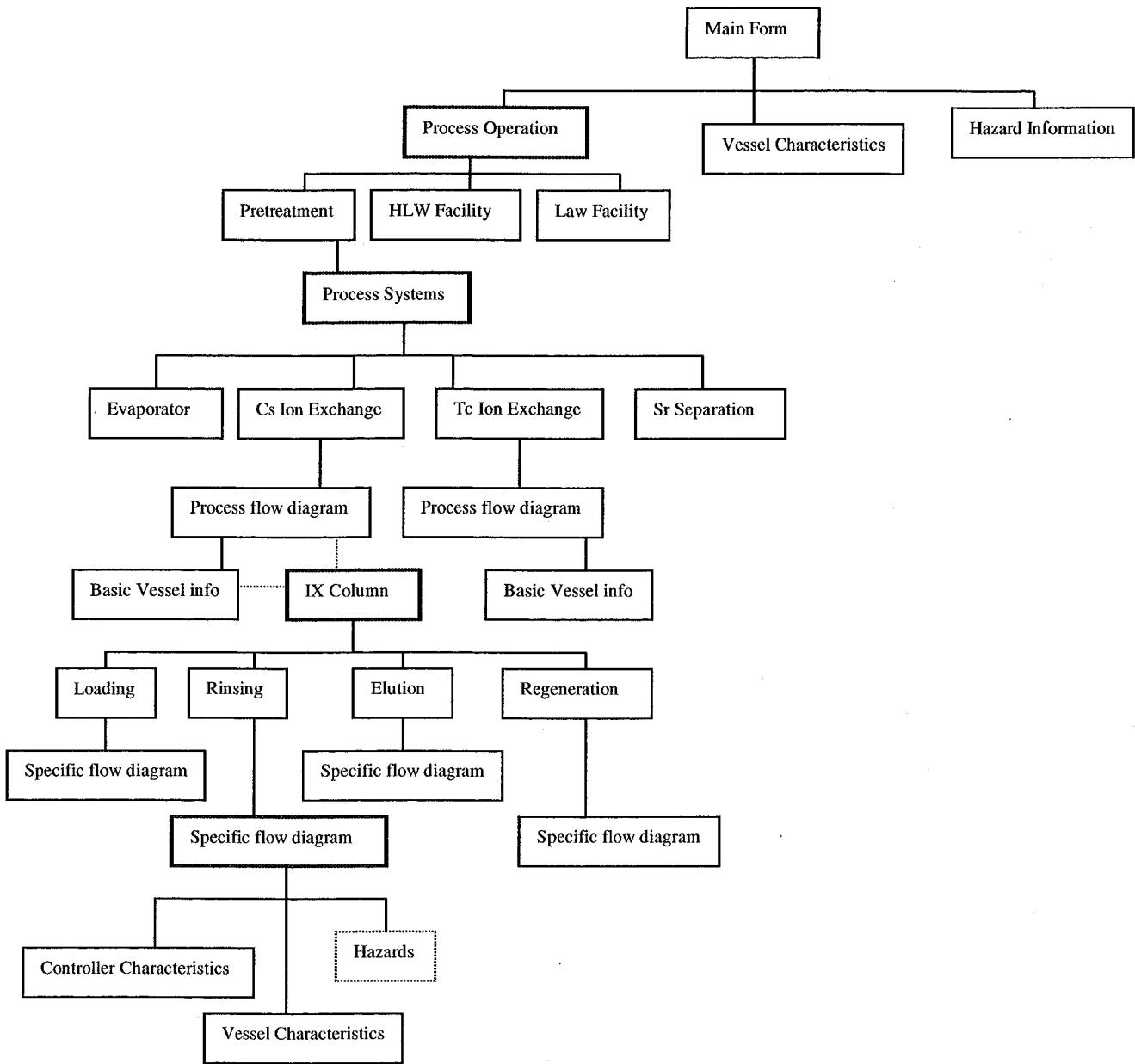
2) [hazards] → [vessel and components] →
[hazardous/current conditions]

3) edit data

FG

Therefore, the proposed database structure is described in the following flowsheet (which is specific for the pretreatment facility):

TWRS-P Hazard Information Database – 06/29/99



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II Database Organization

The input data was gathered from BNFL's preliminary PID diagrams. This data was organized into the following seven tables:

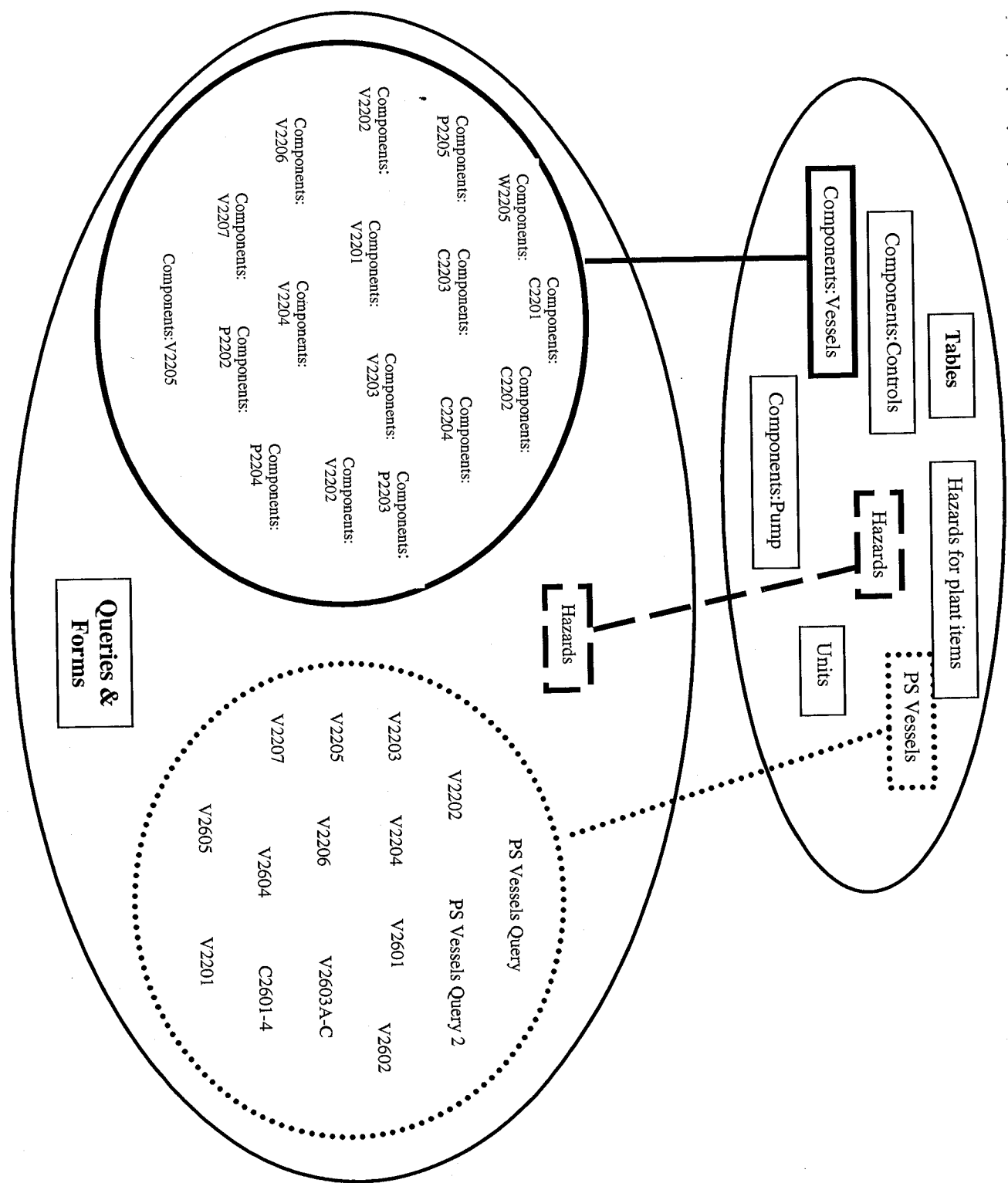
Table	Description
1) Components: Controls	Indicates location & function of control
2) Components: Pumps	Indicated function & design specs
3) Component: Vessels	Includes pump, column, and tank specs & descriptions
4) Hazards	Indicates hazard type & causes
5) Hazards for plant items*	Indicates hazard, event, & control based on vessel
6) PS vessels	Indicates position of vessel in overall process (operation & stage)
7) Units*	Displays units used in specs, for editing purpose

The asterisk denotes tables that were imported from the database, *ver7moc*.

The following queries and forms were based on the information in the tables:

Query/Form	Description
1) C2601-4 (Q&F)	Indicates overall position of vessel
2) V2201 (Q&F)	Indicates overall position of vessel
3) V2202 (Q&F)	Indicates overall position of vessel
4) V2203 (Q&F)	Indicates overall position of vessel
5) V2205 (Q&F)	Indicates overall position of vessel
6) V2206 (Q&F)	Indicates overall position of vessel
7) V2207 (Q&F)	Indicates overall position of vessel
8) V2601 (Q&F)	Indicates overall position of vessel
9) V2602 (Q&F)	Indicates overall position of vessel
10) V2603A-C (Q&F)	Indicates overall position of vessel
11) V2604 (Q&F)	Indicates overall position of vessel
12) V2605 (Q&F)	Indicates overall position of vessel
13) Components:C2201 (Q&F)	Indicates design specs for vessel
14) Components:C2202 (Q&F)	Indicates design specs for vessel
15) Components:C2203 (Q&F)	Indicates design specs for vessel
16) Components:C2204 (Q&F)	Indicates design specs for vessel
17) Components:P2202 (Q&F)	Indicates design specs for vessel
18) Components:P2203 (Q&F)	Indicates design specs for vessel
19) Components:P2204 (Q&F)	Indicates design specs for vessel
20) Components:P2205 (Q&F)	Indicates design specs for vessel
21) Components:V2201 (Q&F)	Indicates design specs for vessel
22) Components:V2202 (Q&F)	Indicates design specs for vessel
23) Components:V2203 (Q&F)	Indicates design specs for vessel
24) Components:V2204 (Q&F)	Indicates design specs for vessel
25) Components:V2205 (Q&F)	Indicates design specs for vessel
26) Components:V2206 (Q&F)	Indicates design specs for vessel
27) Components:V2207 (Q&F)	Indicates design specs for vessel
28) Components:W2205 (Q&F)	Indicates design specs for vessel
29) PS vessels Query (Q)	Indicates overall position of vessel
30) PS Vessels Query 2 (Q)	Indicates overall position of vessel
31) Components: Controls (F)	Indicates description & position of control
32) Disposal (F)	LAW Facility process flow diagram
33) Edit (F)	Edit vessel records
34) Edit Controller (F)	Edit controller records
35) Edit Hazards (F)	Edit hazard information
36) Elution (F)	Cs Ion Exchange: Column elution flow diagram
37) Hazards (F)	Displays hazard type & cause
38) Hazards Subform1 (F)	Choose by vessel ID
39) Hazards Subform2 (F)	Choose by hazard type
40) Loading (F)	Cs Ion Exchange: Column loading flow diagram

The following web diagram illustrates which tables were used to create the queries/forms



- | | |
|--------------------------------------|---|
| 41) Main Form (F) | Selection menu |
| 42) Pretreatment Process Systems (F) | Choose systems |
| 43) Process Flowsheet (F) | Cs process flow diagram |
| 44) Regeneration (F) | Cs Ion Exchange: Column regeneration flow diagram |
| 45) Rinsing (F) | Cs Ion Exchange: Column rinsing flow diagram |
| 46) Search Hazards (F) | Incorporates subform1 &2 |
| 47) Tc Process Flowsheet (F) | Tc flow diagram |
| 48) Vessel Characteristics (F) | Choose vessel ID to see characteristics |

Additions and Corrections to the list of forms:
 PS vessels query & PS vessels query2 are now, C2201-4 and V2204 respectively.

Components:C2601, Components:P2601A/B, Components:V2601, Components:V2602, Components:V2603A, Components:V2604, Components:V2605 were added to provide information on the Tc IX process.

Disposal is now called LAW Facility. HLW Facility was also added.

Edit Hazards2, hazard query form, Select Hazard, select hazard query, Select Hazard2, Selected Hazard Form, Tc Elution, Tc Loading, Tc Regeneration, Tc Rinsing were also added.

III Database Overview

The current database design allows the user to choose from three categories. Those categories are 1.) Process Systems, 2) Vessel Records, and 3) Hazards. Choices are displayed as command buttons on the "Main Form".

TWRS-P Inspection Guide

1. Process Systems

View the process flow diagram for each system

Pretreatment

HLW Facility

Under Construction ...

LAW Facility

Under Construction ...

2. Vessel Records

View and edit vessel information

Edit Vessel Records

GO

View Vessel Characteristics

GO

3. Hazards ***** Items Currently Under Construction *****

View and search hazard information

Search Hazard Information

GO

Hazard Query by Hazard

GO

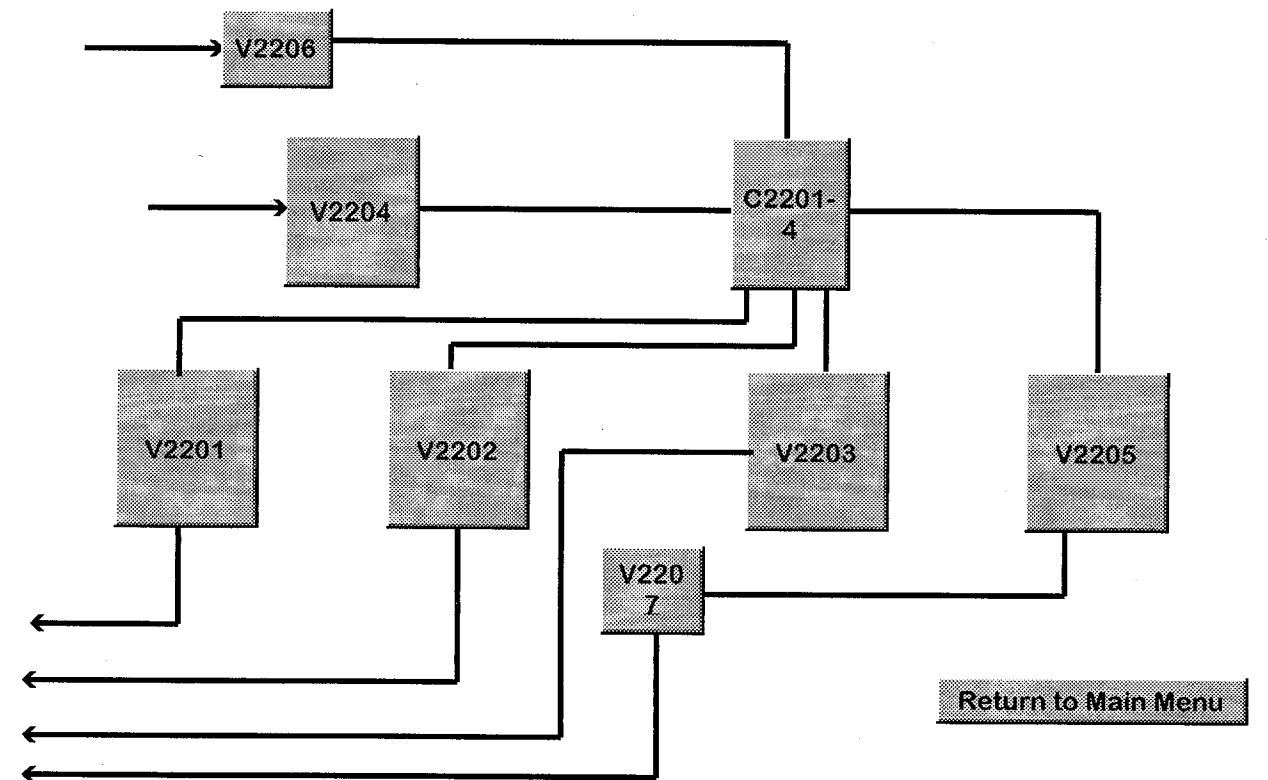
Hazard Characteristic

Extras

GO

Exit

The process flowsheets are designed to be familiar to the engineers. This was done by creating command buttons which open relevant queries/forms. These buttons were then arranged in a flowsheet design. "Process Flowsheet" was designed in this fashion.



Back

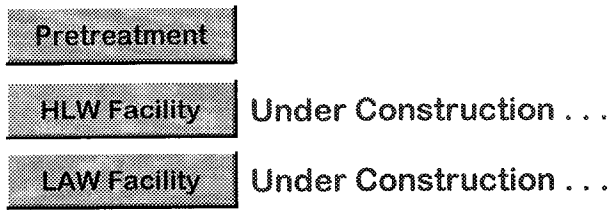
III Database Overview

The current database design allows the user to choose from three categories. Those categories are 1) Process Systems, 2) Vessel Records, and 3) Hazards. Choices are displayed as command buttons on the "Main Form".

TWRS-P Inspection Guide

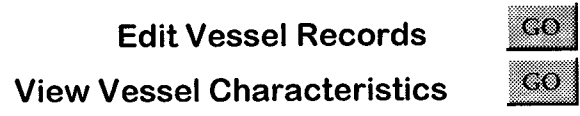
1. Process Systems

View the process flow diagram for each system



2. Vessel Records

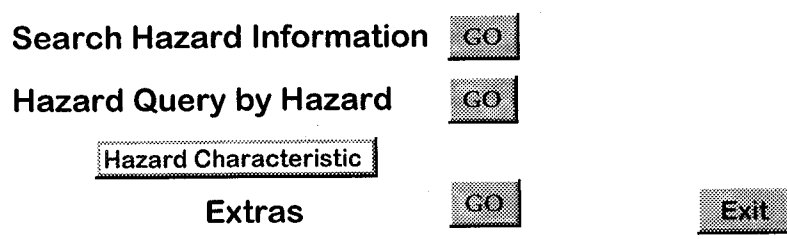
View and edit vessel information



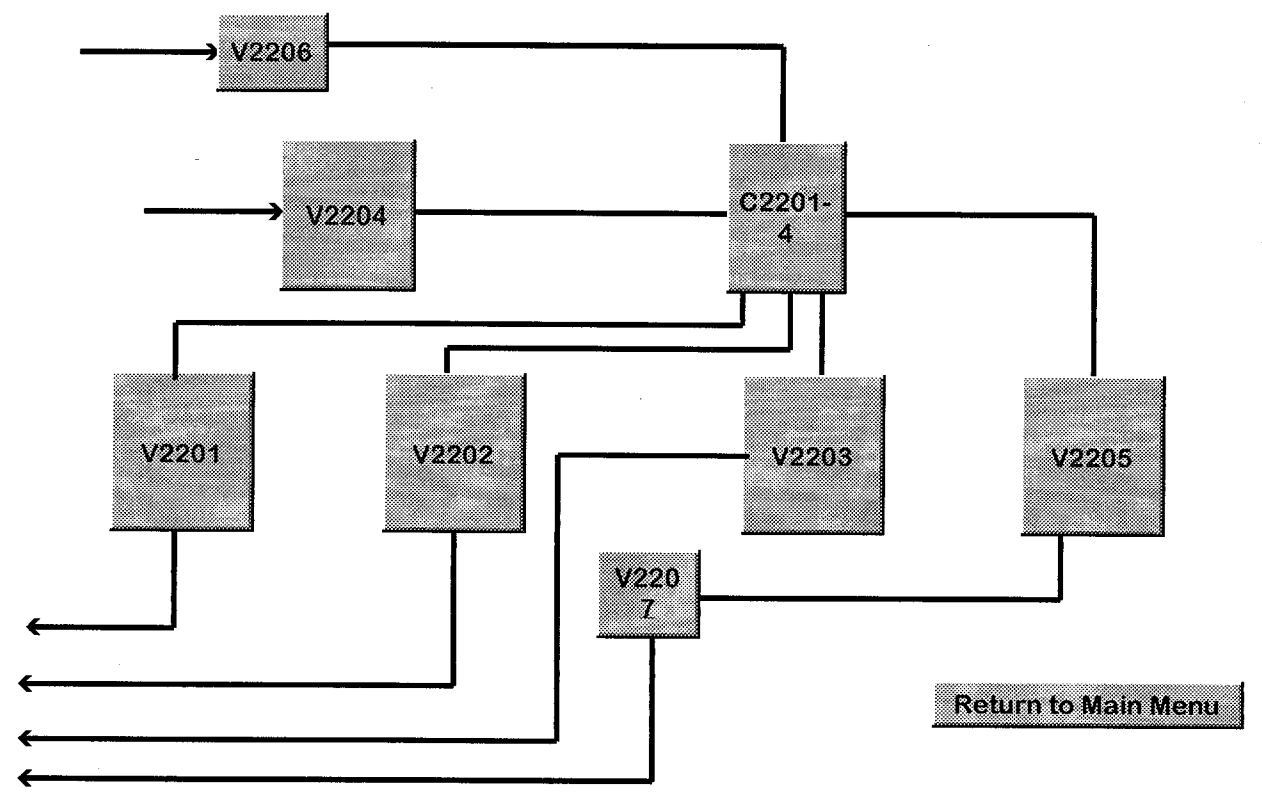
3. Hazards

***** Items Currently Under Construction *****

View and search hazard information

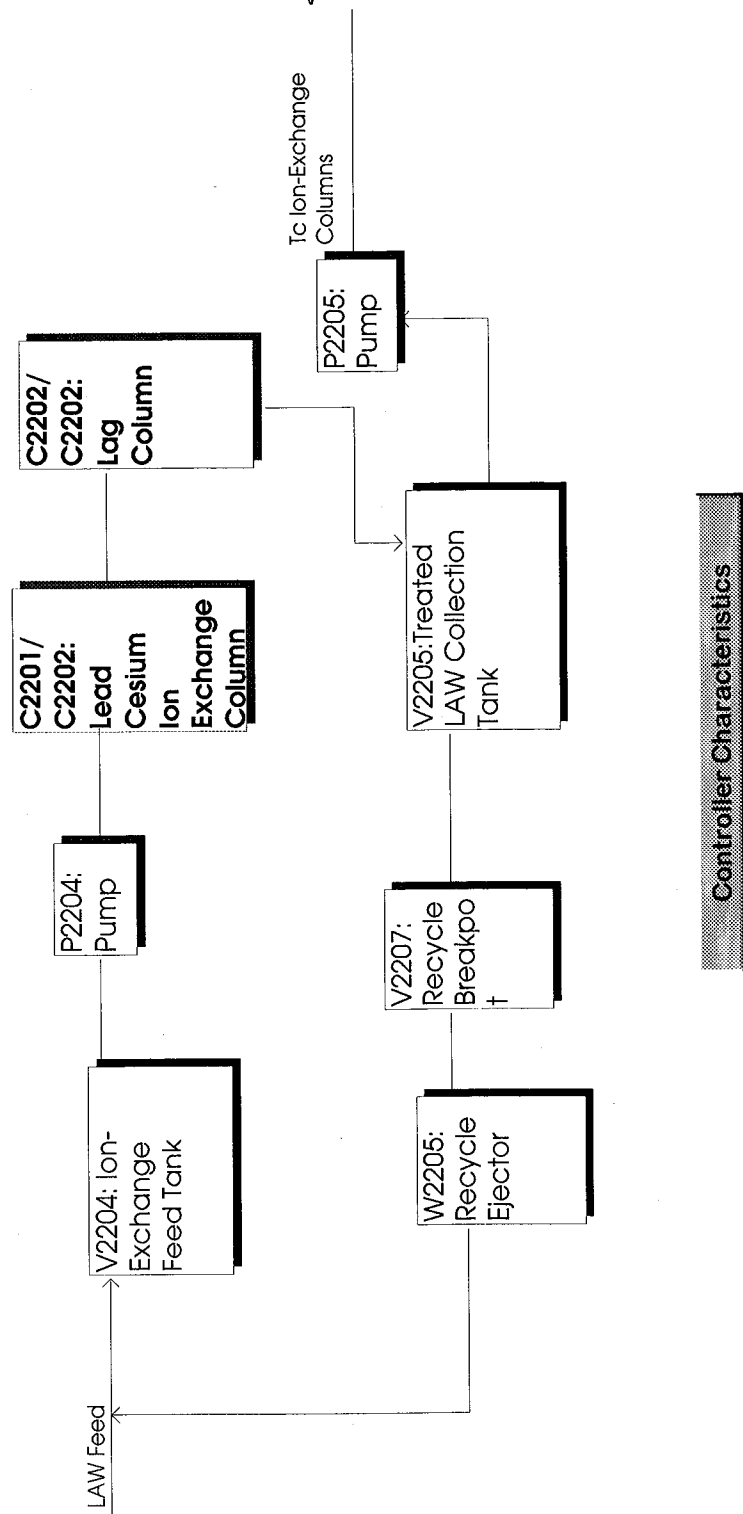


The process flowsheets are designed to be familiar to the engineers. This was done by creating command buttons which open relevant queries / forms. These button were then arranged in a flow sheet design. "Process FlowSheet" was designed in this fashion.



Back

The more specific flow diagrams such as "Loading" was made by making transparent command buttons placed on top of text boxes. This form displays the Cs IX loading cycle.



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Any equipment that must be added to the flow diagram must be added to the appropriate table(s). Subsequently, a query and form will also need to be made. This can be done rather easily by opening an existing query and changing the criteria. The new criteria must be saved under a different name. In order to add new information to tables, the appropriate edit forms can be used. This information will then appear in any database

FG

◀

Add New Record

▶

Vessel Description:	Cs ion exchange column	Inlet 2:	V2206	Outlet 6:	V2205 via 2201
Vessel I	C2201	Inlet 3:	V2902 via 2203	Outlet 7:	V2902
Operation	Pretreatment	Inlet 4:	C2202	Outlet 8:	V2301A/B via 2204
Max Duty		Inlet 5:	V2204/P2204	Outlet 9:	chilled H2O return to E5501/E5502
Max Capa	3.15 m3/h	Inlet 6:	chilled H2O supply from E5501/E5502		
Min Design Pressu		Inlet 7:			
Max Design Press		Outlet 1:	C2202		
Min Design Te		Outlet 2:	V2203		
Max Design Te		Outlet 3:	V2202		
Diameter (	770	Outlet 4:	V2201		
Length/Height (	5440	Outlet 5:	V2903		
Materials of Constru					
Number Install	1				
Inlet	V2801				

Edit Hazard Information

Edit Controller Information

Clos

IV Tables

The information and fields in the tables were decided on after discussion about the purpose of the database. All of the information is available from BNFL's technical reports and drawings. The following tables were obtained from excel files based on BNFL information:

- "Components: Controls"
- "Components: Vessels"
- "Components: Pumps."

The Excel files that contain this data are:
"components" → Cs IX
"Components" → Tc IX

- To import an excel file into Access:
- Click **New** under the Tables tab.
 - Select Import table and click **OK**.
 - Select the file you want to import.
 - Answer the Import Wizard's questions.
 - Click **Finish** when done.

V Queries

The queries can be made from design view. First, a table is added to the query. From there the fields that will be included in the query can be "dragged" to the appropriate field position. In most cases, it was necessary to include criteria in the query. In order for the command buttons to call up the correct information from the flowsheet, a query was made for each piece of equipment. The criteria used for each was based on the Vessel ID.

Example:

Field Table	Vessel ID	query design view ↙
Show	PS Vessels	
Criteria	"C2601-4"	

For the hazard queries, the criteria was:
[Forms]![select hazard query]![Hazard]

form name text box into which the hazard will be input.

This means that there will be a text box on the form "select hazard query" that will determine the criteria with which the query runs.

VI Forms

The forms were designed to make the database easy to use. The most important aspect of making such a form is knowing what the user already knows and what the user is trying to find out.

The forms that contain a drop down list were based on specific tables/queries. When this is done, the drop down list can be used to navigate through records from the same table on a single form. Otherwise, the form was made in design view. This type of form is used to link forms rather than to provide information.

V2201
Components: V2201
C2201-4
(close form)

V2202
Components: V2202
C2201-4
(close form)

V2207
Components: V2207
V2205
(close form)

V2203
Components: V2203
C2201-4
(close form)

V2205
Components: V2205
V2207
C2201-4
(close form)

V2605
Components: V2605
V2603A-C
(close form)

C2601-4
Components: C2601
V2603
V2602
V2604
Tc Loading
Tc Rinsing
Tc Elution
Tc Regeneration
(close form)

V2603A-C
Components: V2603A
C2601-4
V2605
(close form)

Edit
Edit Hazards
Edit Controller
(close form)

Tc Process Flowsheet
V2604
C2601-4
V2601
V2602
V2605
V2603A-C
Main Form
(close form)

V2604
Components: V2604
C2601-4
V2601
(close form)

V2602
Components: V2602
C2601-4
(close form)

V2601
Components: V2601
V2604
(close form)

Edit Hazard
(close form)

Edit Controller
(close form)

Vessel Characteristics
Main Form
(exit access)

Search Hazards
[Hazards Subform1 & 2]
(close form)

select hazard query
hazard query form
(close form)

Hazards
Main Form
(exit access)

Select Hazard
Selected Hazard Form
Select Hazard2

VII Form Navigation

The following tables show which forms can be accessed from each single form.

hazard query form
(close form)

Select Hazard2
Edit Hazards2
(close form)

Selected Hazards Form

Edit Hazards2
(close form)

Elution
Components: V2206
Components: C2201
Components: Controls
(close form)

Loading
Components: V2204
Components: P2204
Components: C2201
Components: C2202
Components: W2205
Components: V2207
Components: V2205
Components: P2205
Components: Controls
(close form)

Regeneration
Components: V2206
Components: C2201
Components: V2202
Components: P2202A/B
Components: Controls
(close form)

Rinsing
Components: V2206
Components: C2201
Components: V2203
Components: P2203A/B
Components: V2202
Components: P2202A/B
Components: Controls
(close form)

Tc Elution
Components: V2604
Components: C2601
Components: V2603A
*Components: Controls
(close form)

Tc Loading
Components: V2601
Components: P2601A/B
Components: C2601
Components: V2603A
Components: Controls
(close form)

Tc Regeneration
Components: V2604
Components: V2601
Components: P2601A/B
Components: C2601
Components: Controls
(close form)

Tc Rinsing
Components: V2604
Components: C2601
Components: V2602
Components: P2601A/B
Components: V2601
Components: Controls
(close form)

24 Components: -----
forms only provide
information. They do not
link to further forms.

1 form each for the HLW
and LAW facilities that are
currently under
construction.

TOTAL: 66 forms

Main Form
Pretreatment Process Systems
HLW Facility
LAW Facility
Edit
Vessel Characteristics
Search Hazards
select hazard query
Hazards
Select Hazard

Pretreatment Process Systems
Process Flowsheet
Tc Process Flowsheet
Main Menu

Process Flowsheet
V2206
V2204
C2201-4
V2201
V2202
V2203
V2205
V2207
Main Menu
(close form)

V2206
Components: V2206
C2201-4
(close form)

V2204
Components: V2204
C2201-4
(close form)

C2201-4
Components: C2201
V2204
V2206
V2201
V2202
V2203
V2205
Loading
Rinsing
Elution
Regeneration
(close form)

Notes

- 1) The process flowsheets include a footer that contains the source of information for the flowsheets and vessel information. It will be necessary to UPDATE this source info.
- 2) It might also be necessary to identify the source of the hazard definitions and characteristics.
- 3) There was a question concerning readjusting the size of the form, in order to fit whatever screen resolution the user has. The search for a solution led to a couple of Access support sites:

<http://www.athree.com> → includes a forum where questions can be posted.

<http://www.microsoft.com/support/default.htm> → includes technical articles.

No solution was found for the sizing problem. apparently, setting the forms to maximize on open did not work. Scroll bars might aid in helping to view the complete form. Some software was found that allows the forms to readjust spacing and font size in order to best fit the screen. This software can be found at: (sample version)

→ ShrinkerStretcher

<http://www.peterssoftware.com/>

The software is a demo that you can download. For a working version the cost is approximately \$30-40.

Another support page is:

<http://home.att.net/~dashish/index.htm>

- 4) At the moment two types of hazard information are included in the database. It will be necessary to determine which one will be used and how that information will be linked to the rest of the database objects.

Questions

These are a few brainstorming question that I came across while developing the database:

- 1) What kind of information will the user of this database have?
- 2) If the user does not know the ID for the vessel, would they want to look at the process flowsheet and then choose to see the hazards from there?
Would it be better to have hazard info linked to the process buttons instead of the vessel characteristics?
- 3) Would the person want to directly enter the vessel ID and receive hazard info?
- 4) Would the user want to enter a type of hazard & get a list of vessels associated with that hazard?

TWRS Inspection database requires
no further work at this time per
NRC guidance.

This notebook will be used to
record excel spreadsheet development
of the TWRS process.

Data will be recorded by
Liatai Yang.

[Signature]
Dr. Vijay Jain
CNSC 10/27/99.

10/28/99

Project : Development of a Spreadsheet-based
Mass Balance Model for Hanford
Tank Waste Pretreatment Processes
-Proposed by BNFL, inc.

Project No: 20 1403 106

Objectives

Information potentially subject to copyright protection was redacted from pages 19 through 58. The redacted material is from the reference listed at the top of this page of this scientific notebook.

BNFL Inc. 1998. Tank Waste Remediation System Privatization Project Technical Report. BNFL-5193-TR-01. Revision 0. Richland, WA: BNFL Inc.

Approach:

See Next Page

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Verification of PRETREAT Feed unit.

- (a) Not available
- (b) Mass Balance:

Total Flow in = 61.0069 + 6.6217 + 0
= 67.6281 mt/d

Total Flow out = 67.6281, O.k.

Na in = $82 \frac{g}{L} \times \frac{10^{-6}}{10^{-3}} \times 61.0069$
+ $68.212 \frac{g}{L} \times \frac{10^{-6}}{10^{-3}} \times 6.6217$
= 5.4542 mt/d.

Na out = $80.5737 \times \frac{10^{-6}}{10^{-3}} \times 67.6281$
= 4.6733 mt/d O.k.

(c) Out-in all close to "Zero"

Units	in	in	in	out	out-in
Feed					
Stream Name	LAW Feeds	Recycled Strs HLW	Env. D I Feeds to Evaporator		
Stream No:	2	4	6	8	
Tot Mass (Mt)	61.0069	6.6212	0.0000	67.6281	0.0000
Tot Vol (m3)	52.0000	6.0000	0.0000	58.0000	0.0000
Density (Mg/m3)	1.1732	1.1035	NA	1.1660	
Tot Act (Bq)	6.983E+14	9.433E+11	0.000E+00	6.992E+14	-0.1250
Temperat. (oC)	20.0000	25.0000	20.0000	20.0000	
Feed Type:	A	D			
Ionlc Comp	g/L	g/L	g/L	g/L	kg/d
Al	12.0000	0.0000	0.0000	10.7586	0.0000
B	0.0000	0.0000	0.0000	0.0000	0.0000
Ba	0.0000	0.0000	0.0000	0.0000	0.0000
CN	0.0000	0.2000	0.0000	0.0207	0.0000
C as CO3	0.0000	0.1000	0.0000	0.0103	0.0000
Ca	0.0000	0.0000	0.0000	0.0000	0.0000
Cd	0.0000	0.0000	0.0000	0.0000	0.0000
Cl	3.0000	1.9900	1.9951	2.8955	0.0000
Cr	0.1799	0.1500	0.1799	0.1768	0.0000
F	0.0000	0.0000	0.0000	0.0000	0.0000
Fe	0.2953	0.0030	0.0030	0.2650	0.0000
H2O	981.5694	900.0000	981.5694	973.1312	0.0000
Hg	0.0000	0.0000	0.0000	0.0000	0.0000
K	1.8935	1.8935	1.8935	1.8935	0.0000
La	0.0000	0.0000	0.0000	0.0000	0.0000
Li	0.0000	0.0000	0.0000	0.0000	0.0000
Mg	0.0000	0.0000	0.0000	0.0000	0.0000
Mn	0.0000	0.0000	0.0000	0.0000	0.0000
Na	82.0000	68.2120	68.2120	80.5737	0.0000
Ni	0.0000	0.0000	0.0000	0.0000	0.0000
NO2	23.4087	23.4087	23.4087	23.4087	0.0000
NO3	50.9215	50.9215	50.9215	50.9215	0.0000
OH	5.0000	43.6823	43.6823	9.0016	0.0000
Pb	0.0000	0.0000	0.0000	0.0000	0.0000
P as PO4	0.7389	0.7389	0.7389	0.7389	0.0000
Pu (total)	0.0000	0.0000	0.0000	0.0000	0.0000
Si	0.0000	0.0000	0.0000	0.0000	0.0000
S as SO4	1.7374	1.7200	1.7374	1.7356	0.0000
Sr	0.0000	0.0000	0.0000	0.0000	0.0000
U (total)	0.0000	0.0000	0.0000	0.0000	0.0000
Zn	0.0000	0.0000	0.0000	0.0000	0.0000
Zr	0.0000	0.0000	0.0000	0.0000	0.0000
Mo	0.0000	0.0000	0.0000	0.0000	0.0000
Others	0.0000	0.0000	0.0000		
Precip.	0.1000	0.0000	0.0000	0.0897	0.0000
Solids	18.3926	18.3926	18.3926	18.3926	0.0000
TIC	7.5000	7.5052	7.5052	7.5005	0.0000
TOC	2.9641	3.2000	2.9641	2.9885	0.0000
Gases	g/L	g/L	g/L	g/L	
CH4	0.0000	0.0000	0.0000	0.0000	0.0000
H2	0.0000	0.0000	0.0000	0.0000	0.0000
N2	0.0000	0.0000	0.0000	0.0000	0.0000
NH3	0.0000	0.0000	0.0000	0.0000	0.0000
NO	0.0000	0.0000	0.0000	0.0000	0.0000
NO2(g)	0.0000	0.0000	0.0000	0.0000	0.0000
Fluoride	g/L	g/L	g/L	g/L	
Pu239/241	0.0000	0.0000	0.0000	0.0000	0.0000
U-235	0.0000	0.0000	0.0000	0.0000	0.0000
Activity	Bq/m3	Bq/m3	Bq/m3	Bq/m3	Bq/d
Am241	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000
Ba137m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000
Co60	1.30E+01	1.34E+08	1.34E+08	1.38E+07	0.0000
Cs137	1.27E+13	1.27E+06	1.27E+13	1.14E+13	0.0000
Eu154/155	4.12E+09	4.12E+09	4.12E+09	4.12E+09	0.0000
Ni63/59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000
Pu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000
Sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000
Sr90	1.30E+11	1.30E+11	1.30E+11	1.30E+11	0.0000
Tc99	2.11E+10	2.11E+10	2.11E+10	2.11E+10	0.0000
TRU	1.42E+09	1.42E+09	1.42E+09	1.42E+09	0.0000
Y-90	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000
Solid	5.22E+11	5.22E+05	5.22E+11	4.88E+11	0.0000

Units		Preceding Strm only			
		in	out	out	out-in
Evaporation					
Stream Name	Auxiliar	Feeds to LAW LAW Concent Evaporator 0			
Stream No:	10	12	14	16	
Tot Mass (M)	0	67.6281	38.6546	28.9735	0.0000
Tot Vol (m3)	0	58.0000	29.0265	28.9735	0.0000
Density (M/L)	0	1.1660	1.3317	1.0000	
Tot Act. (Bq)	0	6.992E+14	6.992E+14	0.000E+00	0.0000
Temperat. (o)	0	20.0000	20.0000	20.0000	
Feed Type:	0.00E+00	A	A	A	
Ionic Comp	g/L	g/L	g/L	g/L	kg/d
Al	0	10.7586	21.4761	0.0215	0.0000
B	0	0.0000	0.0000	0.0000	0.0000
Ba	0	0.0000	0.0000	0.0000	0.0000
CN	0	0.0207	0.0413	0.0000	0.0000
C as CO3	0	0.0103	0.0207	0.0000	0.0000
Ca	0	0.0000	0.0000	0.0000	0.0000
Cd	0	0.0000	0.0000	0.0000	0.0000
Cl	0	2.8955	5.7857	0.0000	0.0000
Cr	0	0.1768	0.3534	0.0000	0.0000
F	0	0.0000	0.0000	0.0000	0.0000
Fe	0	0.2650	0.5296	0.0000	0.0000
H2O	0	973.1312	946.3116	1000.0000	0.0000
Hg	0	0.0000	0.0000	0.0000	0.0000
K	0	1.8935	3.7835	0.0000	0.0000
La	0	0.0000	0.0000	0.0000	0.0000
Li	0	0.0000	0.0000	0.0000	0.0000
Mg	0	0.0000	0.0000	0.0000	0.0000
Mn	0	0.0000	0.0000	0.0000	0.0000
Na	0	80.5737	161.0000	0.0000	0.0000
Ni	0	0.0000	0.0000	0.0000	0.0000
NO2	0	23.4087	46.7746	0.0000	0.0000
NO3	0	50.9215	101.7500	0.0000	0.0000
OH	0	9.0016	17.9868	0.0000	0.0000
Pb	0	0.0000	0.0000	0.0000	0.0000
P as PO4	0	0.7389	1.4765	0.0000	0.0000
Pu (total)	0	0.0000	0.0000	0.0000	0.0000
Si	0	0.0000	0.0000	0.0000	0.0000
S as SO4	0	1.7356	3.4680	0.0000	0.0000
Sr	0	0.0000	0.0000	0.0000	0.0000
U (total)	0	0.0000	0.0000	0.0000	0.0000
Zn	0	0.0000	0.0000	0.0000	0.0000
Zr	0	0.0000	0.0000	0.0000	0.0000
Mo	0	0.0000	0.0000	0.0000	0.0000
Others	0	0.0000	0.0000	0.0000	0.0000
Precip.	0	0.0897	0.1791	0.0000	0.0000
Solids	0	18.3928	36.7515	0.0000	0.0000
TIC	0	7.5005	14.9874	0.0000	0.0000
TOC	0	2.9885	2.9858	2.9912	0.0000
	0			#####	
	0			#####	
Gases	g/L	g/L	g/L	g/L	
CH4	0	0.0000	0.0000	0.0000	0.0000
H2	0	0.0000	0.0000	0.0000	0.0000
N2	0	0.0000	0.0000	0.0000	0.0000
NH3	0	0.0000	0.0000	0.0000	0.0000
NO	0	0.0000	0.0000	0.0000	0.0000
NO2(g)	0	0.0000	0.0000	0.0000	0.0000
Fissile	g/L	g/L	g/L	g/L	
Pu239/241	0	0.0000	0.0000	0.0000	0.0000
U-235	0	0.0000	0.0000	0.0000	0.0000
Activity	Bq/m3	Bq/m3	Bq/m3	Bq/m3	Bq/d
Am241	0	0.00E+00	0.00E+00	0.00E+00	0.0000
Ba137m	0	0.00E+00	0.00E+00	0.00E+00	0.0000
Co60	0	1.38E+07	2.77E+07	0.00E+00	0.0000
Cs137	0	1.14E+13	2.28E+13	0.00E+00	0.0000
Eu154/155	0	4.12E+09	8.23E+09	0.00E+00	0.0000
Ni63/59	0	0.00E+00	0.00E+00	0.00E+00	0.0000
Pu	0	0.00E+00	0.00E+00	0.00E+00	0.0000
Sm151	0	0.00E+00	0.00E+00	0.00E+00	0.0000
Sr90	0	1.30E+11	2.61E+11	0.00E+00	0.0000
Tc99	0	2.11E+10	4.21E+10	0.00E+00	0.0000
TRU	0	1.42E+09	2.84E+09	0.00E+00	0.0000
Y-90	0	0.00E+00	0.00E+00	0.00E+00	0.0000
Solid	0	4.88E+11	9.34E+11	0.00E+00	0.0000

Evaporation Unit

① Auxiliary Stream Zero (Stream 8 only)

② Examine Stream 12, it

equals to the values in
Stream 8 in previous
unit. (page 79)

③ Mass Balance in Unit

$$\text{Total Flow in: } 67.6281 + 0 = 67.6281 \text{ Mt/d}$$

$$\text{Total Flow out: } 38.6546 + 28.9735 = 67.6281 \text{ Mt/d}$$

O.k.

$$\text{Na in: } 80.5737 \times \frac{10^{-6}}{10^{-3}} \times 58 = 4.67327 \text{ Mt/d}$$

$$\text{Na out: } (161.000 \times 29.0265 + 0.0 \times 28.9735) \times \frac{10^{-6}}{10^{-3}} = 4.67327 \text{ Mt/d}$$

O.k.

④ all out-in = Zero

Units		Strm 10 only			
		in	out	OUT	out-in
Evaporation					
Stream Name	Auxiliar	Feeds to LAW LAW Concent Evaporator 0			
Stream No:	10	12	14	16	
Tot Mass (M)	76.01803	76.0160	39.1314	36.8847	0.0000
Tot Vol (m3)	64	64.0000	27.1153	36.8847	0.0000
Density (M/L)	1.187781	1.1878	1.4431	1.0000	
Tot Act. (Bq)	8.59E+14	8.594E+14	8.594E+14	-9.766E-04	-0.0010
Temperat. (o)	20.0000	20.0000	20.0000	20.0000	
Feed Type:	0.00E+00	0.0000	0.0000	0.0000	
Ionic Comp	g/L	g/L	g/L	g/L	kg/d
Al	0.01	0.0100	0.0236	0.0000	0.0000
B	0.1	0.1000	0.2360	0.0000	0.0000
Ba	0.1	0.1000	0.2360	0.0000	0.0000
CN	2.3	2.3000	5.4232	0.0040	0.0000
C as CO3	0.11	0.1100	0.2596	0.0000	0.0000
Ca	0	0.0000	0.0000	0.0000	0.0000
Cd	0	0.0000	0.0000	0.0000	0.0000
Cl	2.5	2.5000	5.9007	0.0000	0.0000
Cr	0.12	0.1200	0.2832	0.0000	0.0000
F	0	0.0000	0.0000	0.0000	0.0000
Fe	0.002953	0.0030	0.0070	0.0000	0.0000
H2O	981.5694	981.5694	956.4986	1000.0000	0.0000
Hg	0	0.0000	0.0000	0.0000	0.0000
K	1.893483	1.8935	4.4692	0.0000	0.0000
La	0.01	0.0100	0.0236	0.0000	0.0000
Li	0	0.0000	0.0000	0.0000	0.0000
Mg	0	0.0000	0.0000	0.0000	0.0000
Mn	0	0.0000	0.0000	0.0000	0.0000
Na	68.21205	68.2120	161.0000	0.0000	0.0000
Ni	0	0.0000	0.0000	0.0000	0.0000
NO2	23.4087	23.4087	55.2513	0.0000	0.0000
NO3	50.92153	50.9215	120.1894	0.0000	0.0000
OH	43.68231	43.6823	103.1028	0.0000	0.0000
Pb	0	0.0000	0.0000	0.0000	0.0000
P as PO4	0.738932	0.7389	1.7441	0.0000	0.0000
Pu (total)	0	0.0000	0.0000	0.0000	0.0000
Si	0	0.0000	0.0000	0.0000	0.0000
S as SO4	1.737412	1.7374	4.1008	0.0000	0.0000
Sr	0	0.0000	0.0000	0.0000	0.0000
U (total)	0	0.0000	0.0000	0.0000	0.0000
Zn	0	0.0000	0.0000	0.0000	0.0000
Zr	0	0.0000	0.0000	0.0000	0.0000
Mo	0	0.0000	0.0000	0.0000	0.0000
Others	0	0.0000	0.0000	0.0000	0.0000
Precip.	0	0.0000	0.0000	0.0000	0.0000
Solids	18.39255	18.3926	43.4117	0.0000	0.0000
TIC	7.505225	7.5052	17.7145	0.0000	0.0000
TOC	4	4.0000	4.7206	3.4703	0.0000
	0			#####	
	0			#####	
Gases	g/L	g/L	g/L	g/L	
CH4	0	0.0000	0.0000	0.0000	0.0000
H2	0	0.0000	0.0000	0.0000	0.0000
N2	0	0.0000	0.0000	0.0000	0.0000
NH3	0	0.0000	0.0000	0.0000	0.0000
NO	0	0.0000	0.0000	0.0000	0.0000
NO2(g)	0	0.0000	0.0000	0.0000	0.0000
Fissile	g/L	g/L	g/L	g/L	
Pu239/241	0.1	0.1000	0.2380	0.0000	0.0000
U-235	0	0.0000	0.0000	0.0000	0.0000
Activity	Bq/m3	Bq/m3	Bq/m3	Bq/m3	Bq/d
Am241	0	0.00E+00	0.00E+00	0.00E+00	0.0000
Ba137m	0	0.00E+00	0.00E+00	0.00E+00	0.0000
Co60	1.34E+08	1.34E+08	3.16E+08	0.00E+00	0.0000
Cs137	1.27E+13	1.27E+13	3.01E+13	0.00E+00	0.0000
Eu154/155	4.12E+09	4.12E+09	8.73E+09	0.00E+00	0.0000
Ni63/59	0	0.00E+00	0.00E+00	0.00E+00	0.0000
Pu	0	0.00E+00	0.00E+00	0.00E+00	0.0000
Sm151	0	0.00E+00	0.00E+00	0.00E+00	0.0000
Sr90	1.3E+11	1.30E+11	3.08E+11	-2.65E-05	0.0000
Tc99	2.11E+10	2.11E+10	4.97E+10	0.00E+00	0.0000
TRU	1.42E+09	1.42E+09	3.36E+09	0.00E+00	0.0000
Y-90	0	0.00E+00	0.00E+00	0.00E+00	0.0000
Solid	5.22E+11	5.22E+11	1.23E+12	0.00E+00	0.0000

March 61
28/00

Evaporation Unit.

② Stream 10 as input only

③ Examine Stream 12.

All parameters equal to that
in Stream 10.

O.k.

④ Mass Balance on K:

$$K_{in}: 1.8935 \times \frac{10^{-6}}{10^{-3}} \times 64 = 0.121184 \text{ Mt/d}$$

$$K_{out}: 4.4692 \times \frac{10^{-6}}{10^{-3}} \times 27.1153 + 0 = 0.121184 \text{ Mt/d}$$

O.k.

⑤ all out-in = Zero

Plants Units	IN in	IN in	IN in	out	out-in	Unit Balance	Strm 10 +8 Both	in	out	OUT out	Unit Bal
Stream Name	Feed					Evaporation					
Stream No:	LAW Feeds	Recycled Strs	HLW Env. D	Feeds to Evaporator	Auxiliary	Feeds to LAW	LAW Concent	Evaporator			
Tot Mass (M)	61.0069	6.6212	0.0000	67.6281	0.0000	76.01803	143.6441	77.7860	65.8581	0.0000	
Tot Vol (m3)	52.0000	6.0000	0.0000	58.0000	0.0000	84	122.0000	56.1419	65.8581	0.0000	
Density (MUr)	1.1732	1.1035 NA		1.1660		1.187751	1.1774	1.3855	1.0000		
Tot Act. (Bq)	6.983E+14	9.433E+11	0.000E+00	6.992E+14	-0.1250	8.59E+14	1.559E+15	1.559E+15	1.892E+03	0.5019	
Temperat. (o)	20.0000	25.0000	20.0000	20.0000			40.0000	20.0000	20.0000		
Feed Type:	A	D	A			0.00E+00	0.0000	0.0000	0.0000		
Ionic Comp	g/L	g/L	g/L	g/L	kg/d	g/L	g/L	g/L	g/L	kg/d	
Al	12.0000	0.0000	0.0000	10.7586	0.0000	0.01	5.1200	11.1150	0.0095	0.0000	
B	0.0000	0.0000	0.0000	0.0000	0.0000	0.1	0.0525	0.1140	0.0000	0.0000	
Ba	0.0000	0.0000	0.0000	0.0000	0.0000	0.1	0.0525	0.1140	0.0000	0.0000	
CN	0.0000	0.2000	0.0000	0.0207	0.0000	2.3	1.2164	2.6407	0.0023	0.0000	
C as CO3	0.0000	0.1000	0.0000	0.0103	0.0000	0.11	0.0626	0.1361	0.0000	0.0000	
Ca	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
Cd	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
Cl	3.0000	1.9900	1.9951	2.8955	0.0000	2.5	2.6880	5.8413	0.0000	0.0000	
Cr	0.1799	0.1500	0.1799	0.1768	0.0000	0.12	0.1470	0.3195	0.0000	0.0000	
F	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
Fe	0.2953	0.0030	0.0030	0.2650	0.0000	0.002953	0.1275	0.2772	0.0000	0.0000	
H2O	981.5694	900.0000	981.5694	973.1312	0.0000	981.5694	977.5578	951.2317	1000.0000	0.0000	
Hg	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
K	1.8935	1.8935	1.8935	1.8935	0.0000	1.893483	1.8935	4.1147	0.0000	0.0000	
La	0.0000	0.0000	0.0000	0.0000	0.0000	0.01	0.0052	0.0114	0.0000	0.0000	
Li	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
Mg	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
Mn	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
Na	82.0000	68.2120	68.2120	80.5737	0.0000	88.21205	74.0889	161.0000	0.0000	0.0000	
NI	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
NO2	23.4087	23.4087	23.4087	23.4087	0.0000	23.4087	23.4087	50.8686	0.0000	0.0000	
NO3	50.9215	50.9215	50.9215	50.9215	0.0000	50.92153	50.9215	110.6558	0.0000	0.0000	
OH	5.0000	43.6823	43.6823	9.0016	0.0000	43.68231	27.1948	59.0960	0.0000	0.0000	
Pb	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
P as PO4	0.7389	0.7389	0.7389	0.7389	0.0000	0.738932	0.7389	1.6057	0.0000	0.0000	
Pu (total)	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
SI	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
S as SO4	1.7374	1.7200	1.7374	1.7356	0.0000	1.737412	1.7366	3.7736	0.0000	0.0000	
Sr	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
U (total)	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
Zn	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
Zr	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
Mo	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
Others	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
Precip. Solids	0.1000	0.0000	0.0000	0.0897	0.0000	0	0.0426	0.0926	0.0000	0.0000	
TIC	18.3926	18.3926	18.3926	18.3926	0.0000	18.39255	18.3926	39.9892	0.0000	0.0000	
TOC	7.5000	7.5052	7.5052	7.5005	0.0000	7.505225	7.5030	16.3045	0.0000	0.0000	
	2.9841	3.2000	2.9841	2.9885	0.0000		3.5181	3.8236	3.2585	0.0000	
											#####
											#####
Gases	g/L	g/L	g/L	g/L	g/L	g/L	g/L	g/L	g/L	g/L	
CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
H2	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
N2	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
NH3	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
NO	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
NO2(g)	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
Fissile	g/L	g/L	g/L	g/L	g/L	g/L	g/L	g/L	g/L	g/L	
Pu239/241	0.0000	0.0000	0.0000	0.0000	0.0000	0.1	0.0525	0.1140	0.0000	0.0000	
U-235	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	
Activity	Bq/m3	Bq/m3	Bq/m3	Bq/m3	Bq/d	Bq/m3	Bq/m3	Bq/m3	Bq/m3	Bq/d	
Am241	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00	0.00E+00	0.00E+00	0.0000	
Ba137m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00	0.00E+00	0.00E+00	0.0000	
Co60	1.30E+01	1.34E+08	1.34E+08	1.38E+07	0.0000	1.34E+08	7.87E+07	1.87E+08	0.00E+00	0.0000	
Ca137	1.27E+13	1.27E+06	1.27E+13	1.14E+13	0.0000	1.27E+13	1.21E+13	2.83E+13	0.00E+00	0.0000	
Eu154/155	4.12E+09	4.12E+09	4.12E+09	4.12E+09	0.0000	4.12E+09	4.12E+09	8.98E+09	-9.27E-07	0.0000	
NI63/59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00	0.00E+00	0.00E+00	0.0000	
Pu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00	0.00E+00	0.00E+00	0.0000	
Sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00	0.00E+00	0.00E+00	0.0000	
Sr90	1.30E+11	1.30E+11	1.30E+11	1.30E+11	0.0000	1.3E+11	1.30E+11	2.84E+11	2.87E-06	0.0000	
To99	2.11E+10	2.11E+10	2.11E+10	2.11E+10	0.0000	2.11E+10	2.11E+10	4.57E+10	0.00E+00	0.0000	
TRU	1.42E+09	1.42E+09	1.42E+09	1.42E+09	0.0000	1.42E+09	1.42E+09	3.08E+09	0.00E+00	0.0000	
Y-90	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00	0.00E+00	0.00E+00	0.0000	
Solid	5.22E+11	5.22E+05	5.22E+11	4.88E+11	0.0000	5.22E+11	4.98E+11	1.08E+12	0.00E+00	0.0000	

Evaporation Unit

③ Stream 8+10
Both as Input

② Input stream 12.

$$\text{Total Flow from \#8 + \#10} \\ = 67.6281 + 76.01603 \\ = 143.6441 \text{ Mt/d}$$

$$\text{Total Flow in str \#12} \\ 143.6441 \text{ Mt/d} \\ \text{O.k.}$$

k from #8 + #10.

$$1.8935 \times \frac{10^{-6}}{10^{-3}} \times 58 + \\ 1.893483 \times \frac{10^{-6}}{10^{-3}} \times 64 \\ = 0.231007 \text{ Mt/d}$$

k in str #12

$$1.8935 \times \frac{10^{-6}}{10^{-3}} \times 122.00 \\ = 0.231007 \text{ Mt/d} \\ \text{O.k.}$$

⑥ Mass Balance in Unit.

Omitted, should same as in case ① and ②

Note: Preceding Units all set to "preceding unit strm only"

Plants Units	Input=	Preced Strm only			Unit Bal	
	in	IN	out	OUT	out-in	
Filtration						
Stream Name	Auxiliar	Feeds to Filtra	Precep. Agent	LAW PermeatSr/TRU	& Entrained sol	
Stream No:	18	20	22	24	26	
Tot Mass (M)	0	38.6546	9.4114	44.5367	3.5293	0.0000
Tot Vol (m3)	0	29.0265	9.4114	36.0851	2.3529	0.0000
Density (Mv/r)	0	1.3317	1.0000	1.2342	1.5000	
Tot Act. (Bq)	0	6.992E+14	0.000E+00	6.433E+14	5.586E+13	0.3516E+15
Temperat. (o)		20.0000	20.0000	20.0000	20.0000	
Feed Type:	A	A	A	A	A	
	0	0.0000	0.0000	0.0000	0.0000	
Ionic Comp	g/L	g/L	g/L	g/L	g/L	kg/d
Al	0	21.4761	0.0000	2.7294	223.0846	0.0000
B	0	0.0000	0.0000	0.0000	0.0000	0.0000
Ba	0	0.0000	0.0000	0.0000	0.0000	0.0000
CN	0	0.0413	0.0000	0.0332	0.0000	0.0000
C as CO3	0	0.0207	0.0000	0.0015	0.2326	0.0000
Ca	0	0.0000	0.0000	0.0000	0.0000	0.0000
Cd	0	0.0000	0.0000	0.0000	0.0000	0.0000
Cl	0	5.7857	0.0000	2.8639	27.4541	0.0000
Cr	0	0.3534	0.0000	0.1773	1.6395	0.0000
F	0	0.0000	0.0000	0.0000	0.0000	0.0000
Fe	0	0.5296	0.0000	0.0829	5.2614	0.0000
H2O	0	946.3116	1000.0000	989.4150	500.0000	0.0000
Hg	0	0.0000	0.0000	0.0000	0.0000	0.0000
K	0	3.7835	0.0000	1.6712	21.0457	0.0000
La	0	0.0000	0.0000	0.0000	0.0000	0.0000
Li	0	0.0000	0.0000	0.0000	0.0000	0.0000
Mg	0	0.0000	0.0000	0.0000	0.0000	0.0000
Mn	0	0.0000	0.0000	0.0000	0.0000	0.0000
Na	0	161.0000	0.0000	125.3902	63.1372	0.0000
NI	0	0.0000	0.0000	0.0000	0.0000	0.0000
NO2	0	46.7746	0.0000	24.1424	206.7798	0.0000
NO3	0	101.7500	0.0000	70.9975	166.3923	0.0000
OH	0	17.9868	0.0000	0.0599	220.9801	0.0000
Pb	0	0.0000	0.0000	0.0000	0.0000	0.0000
P as PO4	0	1.4765	0.0000	1.1877	0.0000	0.0000
Pu (total)	0	0.0000	0.0000	0.0000	0.0000	0.0000
SI	0	0.0000	0.0000	0.0000	0.0000	0.0000
S as SO4	0	3.4680	0.0000	1.4322	20.8196	0.0000
Sr	0	0.0000	0.0000	0.0000	0.0000	0.0000
U (total)	0	0.0000	0.0000	0.0000	0.0000	0.0000
Zn	0	0.0000	0.0000	0.0000	0.0000	0.0000
Zr	0	0.0000	0.0000	0.0000	0.0000	0.0000
Mo	0	0.0000	0.0000	0.0000	0.0000	0.0000
Others	0	0.0000	0.0000	0.0000	0.0000	0.0000
Precep. Solids	0	0.1761	0.0000	0.0001	2.2079	0.0000
	0	38.7515	0.0000	0.0100	998.5830	1278.0000
TIC	0	14.9874	0.0000	10.8835	21.0457	0.0000
TOC	0	2.9858	0.0000	1.0228	21.1509	0.0000
	0					#VALUE!
	0					#VALUE!
Gases	g/L	g/L	g/L	g/L	g/L	g/L
CH4	0	0.0000	0.0000	0.0000	0.0000	0.0000
H2	0	0.0000	0.0000	0.0000	0.0000	0.0000
N2	0	0.0000	0.0000	0.0000	0.0000	0.0000
NH3	0	0.0000	0.0000	0.0000	0.0000	0.0000
NO	0	0.0000	0.0000	0.0000	0.0000	0.0000
NO2(g)	0	0.0000	0.0000	0.0000	0.0000	0.0000
	0					
Fissile	g/L	g/L	g/L	g/L	g/L	g/L
Pu239/241	0	0.0000	0.0000	0.0000	0.0000	0.0000
U-235	0	0.0000	0.0000	0.0000	0.0000	0.0000
Activity	Bq/m3	Bq/m3	Bq/m3	Bq/m3	Bq/m3	Bq/d
Am241	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000
Ba137m	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000
Co60	0	2.77E+07	0.00E+00	2.15E+07	1.08E+07	0.0000
Ce137	0	2.28E+13	0.00E+00	1.78E+13	8.90E+12	0.0000
Eu154/155	0	8.23E+09	0.00E+00	6.41E+09	3.23E+09	0.0000
Ni63/59	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000
Pu	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000
Sm151	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000
Sr90	0	2.61E+11	0.00E+00	2.10E+08	3.21E+12	0.0000
To99	0	4.21E+10	0.00E+00	3.28E+10	1.65E+10	0.0000
TRU	0	2.84E+09	0.00E+00	2.29E+06	3.51E+10	0.0000
Y-90	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000
Solid	0	9.34E+11	0.00E+00	7.52E+08	1.15E+13	0.0000

Plants	Input=	Preced Strm only	Unit Balance	Input=	Both Preced and Aux. Strm	Unit Bal
Units	in	out	out-in	in	IN	OUT
				in	in	out
					out	out
					out	out-in
Evaporation						
Stream Name	Feeds to LAW	LAW	Concent	Evaporator		
Stream No:	12	14	16	18	20	22
Tot Mass (Mt)	67.6281	38.6546	28.9735	0.0000	76.01604	114.6706
Tot Vol (m3)	58.0000	29.0265	28.9735	0.0000	84	93.0265
Density (Mt/m)	1.1660	1.3317	1.0000	1.187751	1.2327	1.0000
Tot Act. (Bq)	6.992E+14	6.992E+14	0.000E+00	0.0000	8.59E+14	1.559E+15
Temperat. (o)	20.0000	20.0000	20.0000	0.0000	20.0000	20.0000
Feed Type:	A	A	A	A	A	A
Filtration						
Stream Name	Feeds to Filtration	Preced. Agent	LAW	Permeat	Sr/TRU	Entrained solid
Stream No:	20	22	24	26		
Tot Mass (Mt)	76.01604	76.0160	9.3906	81.8852	3.5215	0.0000
Tot Vol (m3)	64	64.0000	9.3906	71.0430	2.3477	0.0000
Density (Mt/m)	1.187751	1.1878	1.0000	1.1526	1.5000	0.0000
Tot Act. (Bq)	8.59E+14	8.594E+14	0.000E+00	7.898E+14	6.960E+13	0.2188
Temperat. (o)	20.0000	20.0000	20.0000	20.0000	20.0000	0.0000
Feed Type:	A	A	A	A	A	A
Ionics						
Comp	g/L	g/L	g/L	kg/d	g/L	kg/d
Al	10.7586	21.4761	0.0215	0.0000	0.01	6.7079
B	0.0000	0.0000	0.0000	0.0000	0.1	0.0688
Ba	0.0000	0.0000	0.0000	0.0000	0.1	0.0688
CN	0.0207	0.0413	0.0000	0.0000	2.3	1.5952
C as CO3	0.0103	0.0207	0.0000	0.0000	0.11	0.0821
Ca	0.0000	0.0000	0.0000	0.0000	0	0.0000
Cd	0.0000	0.0000	0.0000	0.0000	0	0.0000
Cl	2.8955	5.7857	0.0000	0.0000	2.5	3.5252
Cr	0.1768	0.3534	0.0000	0.0000	0.12	0.1928
F	0.0000	0.0000	0.0000	0.0000	0	0.0000
Fe	0.2650	0.5296	0.0000	0.0000	0.002853	0.1673
H2O	973.1312	946.3116	1000.0000	0.0000	981.5894	970.5681
Hg	0.0000	0.0000	0.0000	0.0000	0	0.0000
K	1.8935	3.7835	0.0000	0.0000	1.893483	2.4832
La	0.0000	0.0000	0.0000	0.0000	0.01	0.0069
Li	0.0000	0.0000	0.0000	0.0000	0	0.0000
Mg	0.0000	0.0000	0.0000	0.0000	0	0.0000
Mn	0.0000	0.0000	0.0000	0.0000	0	0.0000
Na	80.5737	161.0000	0.0000	0.0000	88.21205	97.1641
NI	0.0000	0.0000	0.0000	0.0000	0	0.0000
NO2	23.4087	46.7746	0.0000	0.0000	23.4087	30.6994
NO3	50.9215	101.7500	0.0000	0.0000	50.92153	66.7812
OH	9.0016	17.9868	0.0000	0.0000	43.88231	35.6647
Pb	0.0000	0.0000	0.0000	0.0000	0	0.0000
P as PO4	0.7389	1.4765	0.0000	0.0000	0.738932	0.9691
Pu (total)	0.0000	0.0000	0.0000	0.0000	0	0.0000
Si	0.0000	0.0000	0.0000	0.0000	0	0.0000
S as SO4	1.7356	3.4680	0.0000	0.0000	1.737412	2.2774
Sr	0.0000	0.0000	0.0000	0.0000	0	0.0000
U (total)	0.0000	0.0000	0.0000	0.0000	0	0.0000
Zn	0.0000	0.0000	0.0000	0.0000	0	0.0000
Zr	0.0000	0.0000	0.0000	0.0000	0	0.0000
Mo	0.0000	0.0000	0.0000	0.0000	0	0.0000
Others	0.0000	0.0000	0.0000	0.0000	0	0.0000
Precep.	0.0897	0.1791	0.0000	0.0000	0	0.0559
Solids	18.3828	36.7615	0.0000	0.0000	18.39255	24.1210
TIC	7.5005	14.9874	0.0000	0.0000	7.5053	9.8399
TOC	2.9885	2.9858	2.9912	0.0000	4	3.6835
Gases	g/L	g/L	g/L	g/L	g/L	g/L
CH4	0.0000	0.0000	0.0000	0.0000	0	0.0000
H2	0.0000	0.0000	0.0000	0.0000	0	0.0000
N2	0.0000	0.0000	0.0000	0.0000	0	0.0000
NH3	0.0000	0.0000	0.0000	0.0000	0	0.0000
NO	0.0000	0.0000	0.0000	0.0000	0	0.0000
NO2(g)	0.0000	0.0000	0.0000	0.0000	0	0.0000
Fissile	g/L	g/L	g/L	g/L	g/L	g/L
Pu239/241	0.0000	0.0000	0.0000	0.0000	0.1	0.0888
U-235	0.0000	0.0000	0.0000	0.0000	0	0.0000
Activity	Bq/m3	Bq/m3	Bq/m3	Bq/d	Bq/m3	Bq/m3
Am241	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00
Ba137m	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00
Co60	1.38E+07	2.77E+07	0.00E+00	0.0000	1.34E+08	1.01E+08
Cs137	1.14E+13	2.28E+13	0.00E+00	0.0000	1.27E+13	1.59E+13
Eu154/155	4.12E+09	8.23E+09	0.00E+00	0.0000	4.12E+09	5.40E+09
NI63/59	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00
Pu	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00
Sm151	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00
Sr90	1.30E+11	2.61E+11	0.00E+00	0.0000	1.3E+11	1.71E+11
To99	2.11E+10	4.21E+10	0.00E+00	0.0000	2.11E+10	2.78E+10
TRU	1.42E+09	2.84E+09	0.00E+00	0.0000	1.42E+09	1.87E+09
Y-90	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00
Solid	4.88E+11	9.34E+11	0.00E+00	0.0000	5.22E+11	6.50E+11
Sum						

Filtration Unit
Case ③ Mar. 28/00

Stream 14 + 18

as input

② Input stream 20

Total Flow #14 + 18
= 37.6546 + 76.0160
= 114.6706

Total Flow in #20
114.6706
o.k.

⑥ mass balance in Unit.

Omitted.

No Formula change

Compared with Case ①

① out-in = 0, except ①

④ Solid generated

is 100.4 kg this
time compared with
1778 kg/d in

Case ①.

This is because
the assay used in

Calculation is
different, see
sheet "Solid Assay"

Filtration Unit

Mar 28/00

Case ②, Strm #18 only as input

② Input strm #20

All the same as that in
strm. 18. o.k.

⑥ mass balance in Unit.
Omitted.

No Formula change. Compared
with case ①

① out-in = 0 except ①

④ Solid of 1173.59 kg/d
is produced in the Unit.
see Page 63.

Continued From Page 63:

Solids components such as
Fe(OH)₃, BaSO₄, Al(OH)₃
as balanced. Solids are not
balanced because they
changes if pH changes.

Plants	Input=	Aux. Strm only	Unit Bal
Units	in	IN	OUT
		in	out
			out-in
Filtration			
Stream Name	Auxiliary	Feeds to Filtration	Agent LAW Permeat Sr/TRU & Entrained solid
Stream No:	18	20	22
Tot Mass (Mt)	76.01604	76.0160	9.3906
Tot Vol (m3)	64	64.0000	9.3906
Density (Mt/m)	1.187751	1.1878	1.0000
Tot Act. (Bq)	8.59E+14	8.594E+14	0.000E+00
Temperat. (o)	20.0000	20.0000	20.0000
Feed Type:	A	A	A
Ionics			
Comp	g/L	g/L	g/L
Al	0.01	0.0100	0.0000
B	0.1	0.1000	0.0000
Ba	0.1	0.1000	0.0000
CN	2.3	2.3000	0.0000
C as CO3	0.11	0.1100	0.0000
Ca	0	0.0000	0.0000
Cd	0	0.0000	0.0000
Cl	2.5	2.5000	0.0000
Cr	0.12	0.1200	0.0000
F	0	0.0000	0.0000
Fe	0.002853	0.0030	0.0000
H2O	981.5894	981.5694	1000.0000
Hg	0	0.0000	0.0000
K	1.893483	1.8935	0.0000
La	0.01	0.0100	0.0000
Li	0	0.0000	0.0000
Mg	0	0.0000	0.0000
Mn	0	0.0000	0.0000
Na	88.21205	68.2120	0.0000
NI	0	0.0000	0.0000
NO2	23.4087	23.4087	0.0000
NO3	50.92153	50.9215	0.0000
OH	43.88231	43.6823	0.0000
Pb	0	0.0000	0.0000
P as PO4	0.738932	0.7389	0.0000
Pu (total)	0	0.0000	0.0000
Si	0	0.0000	0.0000
S as SO4	1.737412	1.7374	0.0000
Sr	0	0.0000	0.0000
U (total)	0	0.0000	0.0000
Zn	0	0.0000	0.0000
Zr	0	0.0000	0.0000
Mo	0	0.0000	0.0000
Others	0	0.0000	0.0000
Precep.	0	0.0000	0.0000
Solids	18.39255	18.3828	0.0000
TIC	7.5053	7.5053	0.0000
TOC	4	4.0000	0.0000
Gases	g/L	g/L	g/L
CH4	0	0.0000	0.0000
H2	0	0.0000	0.0000
N2	0	0.0000	0.0000
NH3	0	0.0000	0.0000
NO	0	0.0000	0.0000
NO2(g)	0	0.0000	0.0000
Fissile	g/L	g/L	g/L
Pu239/241	0.1	0.1000	0.0000
U-235	0	0.0000	0.0000
Activity	Bq/m3	Bq/m3	Bq/m3
Am241	0	0.00E+00	0.00E+00
Ba137m	0	0.00E+00	0.00E+00
Co60	1.34E+08	1.34E+08	0.00E+00
Cs137	1.27E+13	1.27E+13	0.00E+00
Eu154/155	4.12E+09	4.12E+09	0.00E+00
NI63/59	0	0.00E+00	0.00E+00
Pu	0	0.00E+00	0.00E+00
Sm151	0	0.00E+00	0.00E+00
Sr90	1.3E+11	1.30E+11	0.00E+00
To99	2.11E+10	2.11E+10	0.00E+00
TRU	1.42E+09	1.42E+09	0.00E+00
Y-90	0	0.00E+00	0.00E+00
Solid	5.22E+11	5.22E+11	0.00E+00

* All previous units use "preceding Strm only".

Cs - column

Plants Units Input= Preced Strm only Unit Bal

Stream Name	Aug F	Feeds to Cs C Rinse Soln	Elution Agent Rinse Recycle Cs soln	Cs Removed LAW	
Stream No:	28	40	41	42	43
Tot Mass (M)	0	44.5367	0.4000	0.2750	0.4001
Tot Vol (m3)	0	36.0851	0.4000	0.2750	0.4000
Density (Mtr)	0	1.2342	1.0000	1.0000	1.0002
Tot Act. (Bq)	0	6.433E+14	0.000E+00	0.000E+00	6.413E+14
Temperat. (o)	0	20.0000	20.0000	20.0000	20.0000
Feed Type:	#####	A	0.0000	0.0000	0.0000
Ionio Comp	g/L	g/L	Mt/d	Mt/d	Mt/d
Al	0	2.7294	0.0000	0.0000	0.0001
B	0	0.0000	0.0000	0.0000	0.0000
Ba	0	0.0000	0.0000	0.0000	0.0000
CN	0	0.0332	0.0000	0.0000	0.0044
C as CO3	0	0.0015	0.0000	0.0000	0.0002
Ca	0	0.0000	0.0000	0.0000	0.0000
Cd	0	0.0000	0.0000	0.0000	0.0000
Cl	0	2.8639	0.0000	0.0000	0.3758
Cr	0	0.1773	0.0000	0.0000	0.0233
F	0	0.0000	0.0000	0.0000	0.0000
Fe	0	0.0829	0.0000	0.0000	0.0109
H2O	0	989.4150	0.3960	0.2687	977.0909
Hg	0	0.0000	0.0000	0.0000	0.0000
K	0	1.6712	0.0000	0.0000	0.2193
La	0	0.0000	0.0000	0.0000	0.0000
Li	0	0.0000	0.0000	0.0000	0.0000
Mg	0	0.0000	0.0000	0.0000	0.0000
Mn	0	0.0000	0.0000	0.0000	0.0000
Na	0	125.3902	0.0023	0.0000	0.0023
Ni	0	0.0000	0.0000	0.0000	0.0000
NO2	0	24.1424	0.0000	0.0000	3.1679
NO3	0	70.9975	0.0000	0.0062	31.8616
OH	0	0.0599	0.0017	0.0000	0.0017
Pb	0	0.0000	0.0000	0.0000	0.0000
P as PO4	0	1.1877	0.0000	0.0000	0.1558
Pu (total)	0	0.0000	0.0000	0.0000	0.0000
Si	0	0.0000	0.0000	0.0000	0.0000
S as SO4	0	1.4322	0.0000	0.0000	0.1879
Sr	0	0.0000	0.0000	0.0000	0.0000
U (total)	0	0.0000	0.0000	0.0000	0.0000
Zn	0	0.0000	0.0000	0.0000	0.0000
Zr	0	0.0000	0.0000	0.0000	0.0000
Mo	0	0.0000	0.0000	0.0000	0.0000
Others	0	0.0000	0.0001	0.0000	0.0000
Prealp.	0	0.0001	0.0000	0.0000	0.0095
Solids	0	0.0100	0.0000	0.0000	0.0551
TIC	0	10.8835	0.0000	0.0000	1.4019
TOC	0	1.0228	0.0000	0.0000	0.1342
Gases	g/L	g/L	Mt/d	Mt/d	Mt/d
CH4	0	0.0000	0.0000	0.0000	0.0000
H2	0	0.0000	0.0000	0.0000	0.0000
N2	0	0.0000	0.0000	0.0000	0.0000
NH3	0	0.0000	0.0000	0.0000	0.0000
NO	0	0.0000	0.0000	0.0000	0.0000
NO2(g)	0	0.0000	0.0000	0.0000	0.0000
Fissile	g/L	g/L	Mt/d	Mt/d	Mt/d
Pu239/241	0	0.0000	0.0000	0.0000	0.0000
U-235	0	0.0000	0.0000	0.0000	0.0000
Activity	Bq/m3	Bq/m3	Bq/d	Bq/d	Bq/d
Am241	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ba137m	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co60	0	2.15E+07	0.00E+00	0.00E+00	2.83E+07
Ca137	0	1.78E+13	0.00E+00	0.00E+00	2.33E+15
Eu154/155	0	6.41E+09	0.00E+00	0.00E+00	8.42E+09
Ni63/59	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm151	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sr90	0	2.10E+08	0.00E+00	0.00E+00	2.75E+08
To99	0	3.28E+10	0.00E+00	0.00E+00	4.30E+10
TRU	0	2.26E+08	0.00E+00	0.00E+00	3.00E+08
Y-90	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Solid	0	7.52E+08	0.00E+00	0.00E+00	8.88E+10

Case ① "Stream 24 only" as input

Ⓐ Input stream 40

All properties in Strm #40 are the same as in Strm #24 (see page 63)

O.k.

Ⓑ Mass Balance in unit

Total Flow in: $44.5367 + 0.400 + 0.2750 = 45.2117 \text{ Mt/d}$

Total Flow out: $0.4001 + 0.2791 + 44.8448$

O.k. = 45.1273 Mt/d

Flow in: $[989.415 \times 36.0851 + 0.396 \times 0.2687 \times 10^{-6}] \times \frac{10^{-6}}{10^{-3}}$
 $= 36.36784 \text{ Mt/day}$

Flow out: $[0.346 \times 0.400 \times 0.275 + 977.0909 \times 0.275 + 989.415 \times 36.0851] \times \frac{10^{-6}}{10^{-3}}$
 $= 36.3678 \text{ Mt/d}$

O.k.

Ⓒ out - in = 0 (close) for all. O.k.

Cs - Column Unit

Case ③

March 23/00

Stream # 24 + #28

as input

Ⓐ Input stream 40

Total from #24 and #28

$44.5367 + 76.016$

$= 120.5527 \text{ Mt/d}$

Same as in Strm #40

O.k.

Cl from #24 and #28

$[2.8639 \times 36.0851 + 2.5 \times 64] \times \frac{10^{-6}}{10^{-3}}$

$= 0.26334 \text{ Mt/d}$

Cl in Strm #40

1.5486×100.0251

$\times \frac{10^{-6}}{10^{-3}} \times \frac{0.0746}{10^{-3}}$

$= 0.159996$

Not O.k. Problem

Ⓑ Mass balance in unit omitted.

Ⓒ Mar. 29/00.

A bug Found in the formula for stream 40 components.

Fixed. See Page 64

Plants Units		Input=		Preced Strm only		Unit Balance		Input=		Both Preced and Aux. Strm		Unit Balance	
		in		in out		out out-in		in		in in out		out out out out-in	
Stream Name		Filtration										Cs_Col	
Stream No:		20		22		24		26		28		48	
Tot Mass (M)		38.6546		9.4114		44.5367		3.5293		0.0000		76.016	
Tot Vol (m3)		29.0265		9.4114		36.0851		2.3529		0.0000		84	
Density (Mv)		1.3317		1.0000		1.2342		1.5000		1.18775		1.2045	
Tot Act. (Bq)		6.992E+14		0.000E+00		6.433E+14		5.586E+13		0.3516		8.6E+14	
Temperat. (o)		20.0000		20.0000		20.0000		20.0000		20.0000		20.0000	
Feed Type:		A		A		A		A		#####		0	
Ionio Comp		g/L		g/L		g/L		g/L		kg/d		g/L	
Al		21.4761		0.0000		2.7294		223.0846		0.0000		0.01	
B		0.0000		0.0000		0.0000		0.0000		0.0000		0.1	
Ba		0.0000		0.0000		0.0000		0.0000		0.0000		0.1	
CN		0.0413		0.0000		0.0332		0.0000		0.0000		2.3	
C as CO3		0.0207		0.0000		0.0015		0.2326		0.0000		0.11	
Ca		0.0000		0.0000		0.0000		0.0000		0.0000		0	
Cd		0.0000		0.0000		0.0000		0.0000		0.0000		0	
Cl		5.7857		0.0000		2.8639		27.4541		0.0000		2.5	
Cr		0.3534		0.0000		0.1773		1.6395		0.0000		0.12	
F		0.0000		0.0000		0.0000		0.0000		0.0000		0	
Fe		0.5296		0.0000		0.0829		5.2614		0.0000		0.00295	
H2O		946.3116		1000.0000		989.4150		500.0000		0.0000		981.589	
Hg		0.0000		0.0000		0.0000		0.0000		0.0000		0	
K		3.7835		0.0000		1.6712		21.0457		0.0000		1.89348	
La		0.0000		0.0000		0.0000		0.0000		0.0000		0.01	
Li		0.0000		0.0000		0.0000		0.0000		0.0000		0	
Mg		0.0000		0.0000		0.0000		0.0000		0.0000		0	
Mn		0.0000		0.0000		0.0000		0.0000		0.0000		0	
Na		161.0000		0.0000		125.3902		63.1372		0.0000		88.212	
Ni		0.0000		0.0000		0.0000		0.0000		0.0000		0	
NO2		46.7746		0.0000		24.1424		206.7798		0.0000		23.4087	
NO3		101.7500		0.0000		70.9975		166.3923		0.0000		50.9215	
OH		17.9868		0.0000		0.0599		220.9801		0.0000		43.8823	
Pb		0.0000		0.0000		0.0000		0.0000		0.0000		0	
P as PO4		1.4765		0.0000		1.1877		0.0000		0.0000		0.73883	
Pu (total)		0.0000		0.0000		0.0000		0.0000		0.0000		0	
Si		0.0000		0.0000		0.0000		0.0000		0.0000		0	
S as SO4		3.4680		0.0000		1.4322		20.8196		0.0000		1.73741	
Sr		0.0000		0.0000		0.0000		0.0000		0.0000		0	
U (total)		0.0000		0.0000		0.0000		0.0000		0.0000		0	
Zn		0.0000		0.0000		0.0000		0.0000		0.0000		0	
Zr		0.0000		0.0000		0.0000		0.0000		0.0000		0	
Mo		0.0000		0.0000		0.0000		0.0000		0.0000		0	
Others		0.0000		0.0000		0.0000		0.0000		0.0000		0	
Precip.		0.1791		0.0000		0.0001		2.2079		0.0000		0	
Solids		38.7515		0.0000		0.0100		996.5830		1279.4080		18.3929	
TIC		14.9874		0.0000		10.8835		21.0457		0.0000		7.50523	
TOC		2.9858		0.0000		1.0226		21.1509		0.0000		4	
								#VALUE!				0	
								#VALUE!				0	
Gases		g/L		g/L		g/L		g/L		g/L		g/L	
CH4		0.0000		0.0000		0.0000		0.0000		0.0000		0	
H2		0.0000		0.0000		0.0000		0.0000		0.0000		0	
N2		0.0000		0.0000		0.0000		0.0000		0.0000		0	
NH3		0.0000		0.0000		0.0000		0.0000		0.0000		0	
NO		0.0000		0.0000		0.0000		0.0000		0.0000		0	
NO2(g)		0.0000		0.0000		0.0000		0.0000		0.0000		0	
Fissile		g/L		g/L		g/L		g/L		g/L		#VALUE!	
Pu239/241		0.0000		0.0000		0.0000		0.0000		0.0000		0.1	
U-235		0.0000		0.0000		0.0000		0.0000		0.0000		0	
Activity		Bq/m3		Bq/m3		Bq/m3		Bq/m3		Bq/d		Bq/m3	
Am241		0.00E+00		0.00E+00		0.00E+00		0.00E+00		0.0000		0	
Ba137m		0.00E+00		0.00E+00		0.00E+00		0.00E+00		0.0000		0	
Co60		2.77E+07		0.00E+00		2.15E+07		1.08E+07		0.0000		1.3E+08	
Ce137		2.28E+13		0.00E+00		1.78E+13		8.99E+12		0.0391		1.3E+13	
Eu154/155		8.23E+09		0.00E+00		6.41E+09		3.23E+09		0.0000		4.1E+09	
Ni63/59		0.00E+00		0.00E+00		0.00E+00		0.00E+00		0.0000		0	
Pu		0.00E+00		0.00E+00		0.00E+00		0.00E+00		0.0000		0	
Sm151		0.00E+00		0.00E+00		0.00E+00		0.00E+00		0.0000		0	
Sr90		2.81E+11		0.00E+00		2.10E+08		3.21E+12		0.0000		1.3E+11	
To99		4.21E+10		0.00E+00		3.28E+10		1.65E+10		0.0000		2.1E+10	
TRU		2.84E+09		0.00E+00		2.29E+08		3.51E+10		0.0000		1.4E+09	
Y-90		0.00E+00		0.00E+00		0.00E+00		0.00E+00		0.0000		0	
Solid		9.34E+11		0.00E+00		7.52E+08		1.15E+13		0.0000		5.2E+11	
Feeds to Cs C Rinse Soln		40		41		42		43		44		48	
Elution Agent Rinse Recycle Cs soln		120.5528		0.4000		0.2750		0.4000		0.2931		94.8206	
Cs Removed LAW		100.0851		0.4000		0.2750		0.4000		0.2750		100.0841	
		1.2045		1.0000		1.0000		1.0000		1.0660		0.9474	
		8.594E+14		0.000E+00		0.000E+00		0.000E+00		8.453E+14		1.411E+13	
		20.0000		20.0000		20.0000		20.0000		20.0000		20.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
		0.0000		0.0000		0.0000		0.0000		0.0000			

Plants Units Input= Aux. Strm only Unit Bal: in in in out out out out-in

Cs_Col									
Stream Name	Aug. F	Feeds to Cs C Rinse Soln	Elution Agent Rinse Recycle Cs soln	Cs Removed LAW					
Stream No: 28	40	41	42	43	44	48			
Tot Mass (M)	76.016	76.0160	0.4000	0.2750	0.4000	0.2837	76.0072	-0.0000	
Tot Vol (m3)	64	64.0000	0.4000	0.2750	0.4000	0.2750	63.9994	-0.0006	
Density (Mg)	1.18775	1.1878	1.0000	1.0000	1.0000	1.0317	1.1876		
Tot Act. (Bq)	8.8E+14	8.594E+14	0.000E+00	0.000E+00	0.000E+00	8.453E+14	1.411E+13	0.0000	
Temperat. (o)	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000		
Feed Type:	#####	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
Ionlo Comp	g/L	g/L	Mt/d	Mt/d	Mt/d	g/L	g/L	kg/d	
Al	0.01	0.0100	0.0000	0.0000	0.0000	0.0023	0.0100	0.0006	
B	0.1	0.1000	0.0000	0.0000	0.0000	0.0233	0.0999	0.0000	
Ba	0.1	0.1000	0.0000	0.0000	0.0000	0.0233	0.0999	0.0000	
CN	2.3	2.3000	0.0000	0.0000	0.0000	0.5353	2.2977	0.0000	
C as CO3	0.11	0.1100	0.0000	0.0000	0.0000	0.0256	0.1099	0.0000	
Ca	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Cd	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Cl	2.5	2.5000	0.0000	0.0000	0.0000	0.5818	2.4975	0.0000	
Cr	0.12	0.1200	0.0000	0.0000	0.0000	0.0279	0.1199	0.0000	
F	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Fe	0.00295	0.0030	0.0000	0.0000	0.0000	0.0007	0.0029	0.0000	
H2O	981.589	981.5694	0.3960	0.2687	0.3960	977.0909	981.5793	0.0000	
Hg	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
K	1.89348	1.8935	0.0000	0.0000	0.0000	0.4407	1.8916	0.0000	
La	0.01	0.0100	0.0000	0.0000	0.0000	0.0023	0.0100	0.0000	
Li	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Mg	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Mn	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Na	88.212	88.2120	0.0023	0.0000	0.0023	0.0000	88.2127	0.0000	
Ni	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
NO2	23.4087	23.4087	0.0000	0.0000	0.0000	5.4478	23.3855	0.0000	
NO3	50.9215	50.9215	0.0000	0.0062	0.0000	34.3963	50.8711	0.0000	
OH	43.8823	43.8823	0.0017	0.0000	0.0017	10.1661	43.6391	0.0000	
Pb	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
P as PO4	0.73893	0.7389	0.0000	0.0000	0.0000	0.1720	0.7382	0.0000	
Pu (total)	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Si	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
S as SO4	1.73741	1.7374	0.0000	0.0000	0.0000	0.4043	1.7357	0.0000	
Sr	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
U (total)	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Zn	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Zr	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Mo	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Others	0	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	
Precip. Solids	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
TIC	7.50523	7.5052	0.0000	0.0000	0.0000	1.7487	7.4978	0.0000	
TOC	4	4.0000	0.0000	0.0000	0.0000	0.9309	3.9960	0.0000	
Gases	g/L	g/L	Mt/d	Mt/d	Mt/d	g/L	g/L	g/L	
CH4	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
H2	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
N2	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
NH3	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
NO	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
NO2(g)	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Fissile	g/L	g/L	Mt/d	Mt/d	Mt/d	g/L	g/L	#VALUE!	
Pu239/241	0.1	0.1000	0.0000	0.0000	0.0000	0.2327	0.0990	0.0000	
U-235	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Activity	Bq/m3	Bq/m3	Bq/d	Bq/d	Bq/d	Bq/m3	Bq/m3	Bq/d	
Am241	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	
Ba137m	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	
Co60	1.3E+08	1.34E+08	0.00E+00	0.00E+00	0.00E+00	3.11E+08	1.32E+08	0.0000	
Cs137	1.3E+13	1.27E+13	0.00E+00	0.00E+00	0.00E+00	2.98E+15	1.27E+10	0.0680	
Eu154/155	4.1E+09	4.12E+09	0.00E+00	0.00E+00	0.00E+00	9.59E+09	4.08E+09	0.0000	
Ni63/59	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	
Pu	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	
Sm151	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	
Sr90	1.3E+11	1.30E+11	0.00E+00	0.00E+00	0.00E+00	3.04E+11	1.29E+11	0.0000	
To99	2.1E+10	2.11E+10	0.00E+00	0.00E+00	0.00E+00	4.90E+10	2.08E+10	0.0000	
TRU	1.4E+09	1.42E+09	0.00E+00	0.00E+00	0.00E+00	3.31E+09	1.41E+09	0.0000	
Y-90	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	
Solid	5.2E+11	5.22E+11	0.00E+00	0.00E+00	0.00E+00	1.09E+14	5.22E+10	-0.0005	

Input stream 40

Examine properties in #40.

The all agree with that in #28

Mass balance in unit

OH in : $[43.6323 \times 64 + 0.0017 \times 10^{-6}] \times 10^{-6}$
 $= 2.79736 \text{ Mt/d}$
 $\approx 2.795673 \text{ Mt/d}$
J. 04/21/00

OH out : $[0.0017 \times 0.1 + 10.1661 \times 0.2357 + 43.6391 \times 63.9994] \times 10^{-6}$
 $= 2.79737 \text{ Mt/d}$
 $\approx 2.795673 \text{ Mt/d}$
J. 04/21/00

Out-in = 0 for all

Input=		Preceed Strm only				Unit Balance		Input=		Both Preceed and Aux. Strm						Unit Bal							
Plants		IN		OUT						in		in		in		out		out		out		out-in	
Units		in	out	in	out	out-in			in	in	in	out	out	out	out	out	out	out	out	out	out	out-in	
Filtration																							
Stream Name	Feeds to Filtra	Precip. Agent	LAW	Permet	Sr/TRU & Entrained solid	Aug. F	Feeds to Cs	Cx Rinse Soln	Elution Agent	Rinse	Recycle	Cs soln	Cs Removed	LAW									
Stream No:	20	22	24	26		28	40	41	42	43	44	48											
Tot Mass (M)	38.6546	9.4114	44.5367	3.5293	0.0000	76.016	120.5528	0.4000	0.2750	0.4001	0.2880	120.4553	-0.0844										
Tot Vol (m3)	29.0265	9.4114	36.0851	2.3529	0.0000	64	100.0851	0.4000	0.2750	0.4000	0.2750	100.0841	-0.0010										
Density (M/v)	1.3317	1.0000	1.2342	1.5000		1.18775	1.2045	1.0000	1.0000	1.0002	1.0471	1.2035											
Tot Act. (Bq)	6.992E+14	0.000E+00	6.433E+14	5.586E+13	0.3516	8.8E+14	1.503E+15	0.000E+00	0.000E+00	0.000E+00	1.487E+15	1.617E+13	-0.1660										
Temperat. (o)	20.0000	20.0000	20.0000	20.0000			20.0000	20.0000	20.0000	20.0000	20.0000	20.0000											
Feed Type:	A	A	A	A		#####	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000											
	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000											
Ionlo Comp	g/L	g/L	g/L	g/L	kg/d	g/L	g/L	Mt/d	Mt/d	Mt/d	g/L	g/L	kg/d										
Al	21.4761	0.0000	2.7294	223.0846	0.0000	0.01	0.9905	0.0000	0.0000	0.0001	0.3605	0.9895	0.0991										
B	0.0000	0.0000	0.0000	0.0000	0.0000	0.1	0.0639	0.0000	0.0000	0.0000	0.0233	0.0639	0.0000										
Ba	0.0000	0.0000	0.0000	0.0000	0.0000	0.1	0.0639	0.0000	0.0000	0.0000	0.0233	0.0639	0.0000										
CN	0.0413	0.0000	0.0332	0.0000	0.0000	2.3	1.4827	0.0000	0.0000	0.0000	0.5396	1.4813	0.0000										
C as CO3	0.0207	0.0000	0.0015	0.2326	0.0000	0.11	0.0709	0.0000	0.0000	0.0000	0.0258	0.0708	0.0000										
Ca	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
Cd	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
Cl	5.7857	0.0000	2.8639	27.4541	0.0000	2.5	2.6312	0.0000	0.0000	0.0000	0.9576	2.6286	0.0000										
Cr	0.3534	0.0000	0.1773	1.6395	0.0000	0.12	0.1407	0.0000	0.0000	0.0000	0.0512	0.1405	0.0000										
F	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
Fe	0.5296	0.0000	0.0829	5.2614	0.0000	0.00295	0.0318	0.0000	0.0000	0.0000	0.0116	0.0318	0.0000										
H2O	946.3116	1000.0000	989.4150	500.0000	0.0000	981.589	984.3981	0.3960	0.2687	0.3960	977.0909	984.4080	0.0000										
Hg	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
K	3.7835	0.0000	1.6712	21.0457	0.0000	1.89348	1.8133	0.0000	0.0000	0.0000	0.6600	1.8115	0.0000										
La	0.0000	0.0000	0.0000	0.0000	0.0000	0.01	0.0064	0.0000	0.0000	0.0000	0.0023	0.0064	0.0000										
Li	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
Mg	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
Mn	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
Na	161.0000	0.0000	125.3902	63.1372	0.0000	88.212	88.8273	0.0023	0.0000	0.0023	0.0000	88.8282	0.0000										
Ni	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
NO2	46.7746	0.0000	24.1424	206.7798	0.0000	23.4087	23.6732	0.0000	0.0000	0.0000	8.6158	23.6498	0.0000										
NO3	101.7500	0.0000	70.9975	166.3923	0.0000	50.9215	58.1598	0.0000	0.0062	0.0000	43.7125	58.1022	0.0000										
OH	17.9868	0.0000	0.0599	220.9801	0.0000	43.8823	27.9545	0.0017	0.0000	0.0017	10.1739	27.9268	0.0000										
Pb	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
P as PO4	1.4765	0.0000	1.1877	0.0000	0.0000	0.73893	0.9007	0.0000	0.0000	0.0000	0.3278	0.8998	0.0000										
Pu (total)	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
Si	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
S as SO4	3.4680	0.0000	1.4322	20.8196	0.0000	1.73741	1.6274	0.0000	0.0000	0.0000	0.5923	1.6257	0.0000										
Sr	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
U (total)	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
Zn	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
Zr	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
Mo	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
Others	0.0000	0.0000	0.0000	0.0000		0	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000											
					0.0000																		
Precip.	0.1791	0.0000	0.0001	2.2079	0.0000	0	0.0001	0.0000	0.0000	0.0000	0.0085	0.0000	0.0000										
Solids	38.7515	0.0000	0.0100	998.5930	1278.4086	18.3928	11.7848	0.0000	0.0000	0.0000	2140.8803	5.8825	0.0000										
TIC	14.9874	0.0000	10.6835	21.0457	0.0000	7.50523	8.6511	0.0000	0.0000	0.0000	3.1485	8.8428	0.0000										
TOC	2.9858	0.0000	1.0226	21.1509	0.0000	4	2.9285	0.0000	0.0000	0.0000	1.0851	2.9238	0.0000										
				#VALUE!		0																	
				#VALUE!		0																	
Gases																							
	g/L	g/L	g/L	g/L		g/L	g/L	Mt/d	Mt/d	Mt/d	g/L	g/L											
CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
H2	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
N2	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
NH3	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
NO	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
NO2(g)	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
						0																	
Fissile																							
	g/L	g/L	g/L	g/L		g/L	g/L	Mt/d	Mt/d	Mt/d	g/L	g/L	#VALUE!										
Pu-239/241	0.0000	0.0000	0.0000	0.0000	0.0000	0.1	0.0839	0.0000	0.0000	0.0000	0.2327	0.0833	0.0000										
U-235	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000										
Activity																							
	Bq/m3	Bq/m3	Bq/m3	Bq/m3	Bq/d	Bq/m3	Bq/m3	Bq/d	Bq/d	Bq/d	Bq/m3	Bq/m3	Bq/d										
Am241	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000										
Ba137m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000										
Co60	2.77E+07	0.00E+00	2.15E+07	1.08E+07	0.0000	1.3E+08	9.33E+07	0.00E+00	0.00E+00	0.00E+00	3.40E+08	9.24E+07	0.0000										
Ce137	2.28E+13	0.00E+00	1.78E+13	8.96E+12	0.0391	1.3E+13	1.49E+13	0.00E+00	0.00E+00	0.00E+00	5.30E+15	1.49E+10	0.0010										
Eu154/155	8.23E+09	0.00E+00	6.41E+09	3.23E+09	0.0000	4.1E+09	4.95E+09	0.00E+00	0.00E+00	0.00E+00	1.80E+10	4.90E+09	0.0001										
Ni63/69	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000										
Pu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000										
Sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000										
Sr90	2.61E+11	0.00E+00	2.10E+08	3.21E+12	0.0000	1.3E+11	8.35E+10	0.00E+00	0.00E+00	0.00E+00	3.04E+11	8.27E+10	0.0000										
To99	4.21E+10	0.00E+00	3.28E+10	1.85E+10	0.0000	2.1E+10	2.53E+10	0.00E+00	0.00E+00	0.00E+00	9.20E+10	2.50E+10	0.0000										
TRU	2.84E+09	0.00E+00	2.29E+08	3.51E+10	0.0000	1.4E+09	9.11E+08	0.00E+00	0.00E+00	0.00E+00	3.32E+09	9.02E+08	0.0000										
Y-90	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000										
Solid	9.34E+11	0.00E+00	7.82E+08	1.15E+13	0.0000	5.2E+11	3.34E+11	0.00E+00	0.00E+00	0.00E+00	1.09E+14	3.34E+10	-0.0000										

There is only one case

for this unit, no Auxiliary stream was set up for this unit.

(a) Input stream # 48

Examine values in #48 this page and the values in #48 on page 66

There is no difference, o.k.

(b) mass balance in unit

Total in: $44.4438 + 0.20 + 2.20 = 46.8438 \text{ mt/d}$

Total out: $0.2001 + 2.2032 + 44.4438 = 46.847 \text{ mt/d}$

O.k.

Flow in: $(0.844249 \times 36.0847 + 0.146 \times 10^3 + 2.1370 \times 10^3) \times \frac{10^{-6}}{10^{-3}} = 38.036 \text{ mt/d}$

Flow out: $(0.146 \times 10^3 + 971.3636 \times 2.2 + 989.4348 \times 36.0844) \times \frac{10^{-6}}{10^{-3}} = 38.036 \text{ mt/d}$

(c) out - in = 0

Plants Units	in	in	in	out	out	out	out-in
Tc Col							
Stream Name	Cs Removed	1 Rinse Soln	Elution Agent	Rinse Recycle	Tc soln	Cs+Tc Remov	
Stream No:	48	51	52	53	54	58	
Tot Mass (Mt)	44.4481	0.2000	2.2000	0.2001	2.2032	44.4438	-0.0009
Tot Vol (m3)	36.0847	0.2000	2.2000	0.2000	2.2000	36.0844	-0.0004
Density (Mv)	1.2318	1.0000	1.0000	1.0005	1.0015	1.2317	
Tot Act (Bq)	2.052E+12	0.000E+00	0.000E+00	0.000E+00	1.123E+12	9.294E+11	-0.0004
Temperat. (c)	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	
Feed Type: A	0.0000	0.0000	0.0000	0.0000	A	A	
Ionio Comp	g/L	Mt/d	Mt/d	Mt/d	g/L	g/L	
Al	2.7267	0.0000	0.0000	0.0001	0.0447	2.7240	0.0984
B	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ba	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CN	0.0332	0.0000	0.0000	0.0000	0.0005	0.0332	0.0000
C as CO3	0.0015	0.0000	0.0000	0.0000	0.0000	0.0015	0.0000
Ca	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cd	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cl	2.8611	0.0000	0.0000	0.0000	0.0469	2.8582	0.0000
Cr	0.1772	0.0000	0.0000	0.0000	0.0029	0.1770	0.0000
F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Fe	0.0828	0.0000	0.0000	0.0000	0.0014	0.0828	0.0000
H2O	989.4249	0.1960	2.1370	0.1960	971.3636	989.4348	0.0000
Hg	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
K	1.6695	0.0000	0.0000	0.0000	0.0274	1.6679	0.0000
La	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Li	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mg	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mn	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Na	125.3915	0.0023	0.0000	0.0023	0.0000	125.3928	0.0000
Ni	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NO2	24.1185	0.0000	0.0000	0.0000	0.3956	24.0946	0.0000
NO3	70.9272	0.0000	0.0620	0.0000	29.3452	70.8570	0.0000
OH	0.0598	0.0017	0.0000	0.0017	0.0010	0.0597	0.0000
Pb	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
P as PO4	1.1865	0.0000	0.0000	0.0000	0.0195	1.1853	0.0000
Pu (total)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Si	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
S as SO4	1.4307	0.0000	0.0000	0.0000	0.0235	1.4293	0.0000
Sr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
U (total)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Zn	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Zr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mo	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Others	0.0000	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000
Precip.	0.0001	0.0000	0.0000	0.0000	0.0006	0.0000	0.0000
Solids	0.0050	0.0000	0.0000	0.0000	0.0410	0.0025	0.0000
TIC	10.8729	0.0000	0.0000	0.0000	0.1751	10.8823	0.0000
TOC	1.0216	0.0000	0.0000	0.0000	0.0168	1.0205	0.0000
Gases	g/L	Mt/d	Mt/d	Mt/d	g/L	g/L	
CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NH3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NO	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NO2(g)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Fluoride	g/L	Mt/d	Mt/d	Mt/d	g/L	g/L	
Pu239/241	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
U-235	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Activity	Bq/m3	Bq/d	Bq/d	Bq/d	Bq/m3	Bq/m3	Bq/d
Am241	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ba137m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co60	2.13E+07	0.00E+00	0.00E+00	0.00E+00	3.50E+08	2.11E+07	0.00E+00
Ca137	1.78E+10	0.00E+00	0.00E+00	0.00E+00	2.92E+09	1.76E+10	0.00E+00
Eu154/155	6.35E+09	0.00E+00	0.00E+00	0.00E+00	1.04E+09	6.28E+09	0.00E+00
Ni63/59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sr90	2.08E+08	0.00E+00	0.00E+00	0.00E+00	3.41E+07	2.08E+08	0.00E+00
To99	3.24E+10	0.00E+00	0.00E+00	0.00E+00	5.05E+11	1.62E+09	-8.1E-05
TRU	2.27E+08	0.00E+00	0.00E+00	0.00E+00	3.72E+05	2.24E+08	0.00E+00
Y-90	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Solid	7.52E+07	0.00E+00	0.00E+00	0.00E+00	1.11E+09	7.52E+08	2.98E-07

Plants Units	in	out	out	out-in	
M. Evaporator					
Stream Name	Aug. Fe	Feeds to LAW	LAW Concent	Evaporator Overhead	
Stream No:	70	72	74	76	
Tot Mass (Mt)	0	44.4438	29.0490	15.3948	0.0000
Tot Vol (m3)	0	36.0844	20.7081	15.3763	0.0000
Density (Mv)	0	1.2317	1.4028	1.0012	
Tot Act. (Bq)	0	9.294E+11	9.294E+11	9.294E+05	0.0000
Temperat. (o)	0	20.0000	20.0000	20.0000	
Feed Type:	#####	A	A	A	
	A	0.0000	0.0000	0.0000	
Ionic Comp	g/L	g/L	g/L	g/L	
Al	0	2.7240	4.7419	0.0064	0.0000
B	0	0.0000	0.0000	0.0000	0.0000
Ba	0	0.0000	0.0000	0.0000	0.0000
CN	0	0.0332	0.0577	0.0001	0.0000
C as CO3	0	0.0015	0.0025	0.0000	0.0000
Ca	0	0.0000	0.0000	0.0000	0.0000
Cd	0	0.0000	0.0000	0.0000	0.0000
Cl	0	2.8582	4.9806	0.0000	0.0000
Cr	0	0.1770	0.3084	0.0000	0.0000
F	0	0.0000	0.0000	0.0000	0.0000
Fe	0	0.0828	0.1442	0.0000	0.0000
H2O	0	989.4348	981.5898	1000.0000	0.0000
Hg	0	0.0000	0.0000	0.0000	0.0000
K	0	1.6679	2.9063	0.0000	0.0000
La	0	0.0000	0.0000	0.0000	0.0000
Li	0	0.0000	0.0000	0.0000	0.0000
Mg	0	0.0000	0.0000	0.0000	0.0000
Mn	0	0.0000	0.0000	0.0000	0.0000
Na	0	125.3928	218.5000	0.0000	0.0000
Ni	0	0.0000	0.0000	0.0000	0.0000
NO2	0	24.0946	41.9855	0.0000	0.0000
NO3	0	70.8570	123.4701	0.0000	0.0000
OH	0	0.0597	0.1041	0.0000	0.0000
Pb	0	0.0000	0.0000	0.0000	0.0000
P as PO4	0	1.1853	2.0655	0.0000	0.0000
Pu (total)	0	0.0000	0.0000	0.0000	0.0000
Si	0	0.0000	0.0000	0.0000	0.0000
S as SO4	0	1.4293	2.4906	0.0000	0.0000
Sr	0	0.0000	0.0000	0.0000	0.0000
U (total)	0	0.0000	0.0000	0.0000	0.0000
Zn	0	0.0000	0.0000	0.0000	0.0000
Zr	0	0.0000	0.0000	0.0000	0.0000
Mo	0	0.0000	0.0000	0.0000	#####
Others	0	0.0000	0.0000	0.0000	0.0000
	0				0.0000
Precip.	0	0.0000	0.0001	0.0000	0.0000
Solids	0	0.0025	0.0044	0.0000	0.0000
	0				#####
TIC	0	10.6623	18.5704	0.0000	0.0000
TOC	0	1.0208	0.8892	1.1975	0.0000
	0				#####
	0				#####
	0				#####
Gases	g/L	g/L	g/L	g/L	#####
CH4	0	0.0000	0.0000	0.0000	0.0000
H2	0	0.0000	0.0000	0.0000	0.0000
N2	0	0.0000	0.0000	0.0000	0.0000
NH3	0	0.0000	0.0000	0.0000	0.0000
NO	0	0.0000	0.0000	0.0000	0.0000
NO2(g)	0	0.0000	0.0000	0.0000	0.0000
	0				#####
Fluoride	g/L	g/L	g/L	g/L	#####
Pu239/241	0	0.0000	0.0000	0.0000	0.0000
U-235	0	0.0000	0.0000	0.0000	0.0000
					#####
Activity	Bq/m3	Bq/m3	Bq/m3	Bq/m3	Bq/d
Am241	0	0.00E+00	0.00E+00	0.00E+00	0.0000
Ba137m	0	0.00E+00	0.00E+00	0.00E+00	0.0000
Co60	0	2.11E+07	3.88E+07	4.95E+01	0.0000
Ca137	0	1.76E+10	3.07E+10	4.13E+04	0.0000
Eu154/155	0	6.29E+09	1.10E+10	1.48E+04	0.0000
Ni63/59	0	0.00E+00	0.00E+00	0.00E+00	0.0000
Pu	0	0.00E+00	0.00E+00	0.00E+00	0.0000
Sm151	0	0.00E+00	0.00E+00	0.00E+00	0.0000
Sr90	0	2.08E+08	3.58E+08	4.82E+02	0.0000
To99	0	1.62E+09	2.83E+09	3.81E+03	0.0000
TRU	0	2.24E+08	3.91E+08	5.28E+00	0.0000
Y-90	0	0.00E+00	0.00E+00	0.00E+00	0.0000
Solid	0	7.52E+08	1.31E+07	1.76E+01	0.0000

Case ①, Strm # 58 as input only

(a) Input strm # 72

Examine the values in #72, All are the same as that in #58, page 70

Good

(b) Mass Balance in unit

Total Flow in: 44.4438 mt/d
Total Flow out: $29.049 + 15.3948 = 44.4438 \text{ mt/d}$
O.k.

TOC in: $1.0206 \times 36.0844 \times \frac{10^{-6}}{10^{-3}} = 36.82774 \text{ mt/d}$
TOC out: $(0.8892 \times 20.7081 + 1.1975 \times 15.3763) \times \frac{10^{-6}}{10^{-3}} = 36.82676 \text{ mt/d}$
O.k.

(c) out - in = 0 for all component.

Melter Evaporator Unit

Case 2 Strm # 70 as input only

(a) Input strm # 72

Examine values in #72. They all are the same as that in #70.

O.k.

(b) Mass balance in unit.

omitted, as no formula change from case 1

(c) Out - in = 0 for all

Difference in Total Activity = 0.1426 which is extremely small compared with 3.544×10^4 .

Plants Units	ance		Input=		Aux. Strm only		Unit Bal	
			in	out	out		out-in	
M. Evaporator								
Stream Name	Aug. Fe	Feeds to LAW LAW Concent Evaporator Overhead						
Stream No:	70	72	74	76				
Tot Mass (Mt)	76.01603	76.0160	31.8677	44.1484	0.0000			
Tot Vol (m3)	84	64.0000	19.9797	44.0203	0.0000			
Density (Mtn)	1.187751	1.1878	1.5950	1.0029				
Tot Act. (Bq)	8.59E+14	8.594E+14	8.594E+14	8.594E+08	0.1426			
Temperat. (C)		20.0000	20.0000	20.0000				
Feed Type:	#####	0.0000	0.0000	0.0000				
	0	0.0000	0.0000	0.0000				
Ionlc Comp								
Al	0.01	0.0100	0.0320	0.0000	0.0000			
B	0.1	0.1000	0.3203	0.0000	0.0000			
Ba	0.1	0.1000	0.3203	0.0000	0.0000			
CN	2.3	2.3000	7.3601	0.0033	0.0000			
C as CO3	0.11	0.1100	0.3524	0.0000	0.0000			
Ca	0	0.0000	0.0000	0.0000	0.0000			
Cd	0	0.0000	0.0000	0.0000	0.0000			
Cl	2.5	2.5000	8.0081	0.0000	0.0000			
Cr	0.12	0.1200	0.3844	0.0000	0.0000			
F	0	0.0000	0.0000	0.0000	0.0000			
Fe	0.002953	0.0030	0.0095	0.0000	0.0000			
H2O	981.5694	981.5694	940.9624	1000.0000	0.0000			
Hg	0	0.0000	0.0000	0.0000	0.0000			
K	1.893483	1.8935	6.0653	0.0000	0.0000			
La	0.01	0.0100	0.0320	0.0000	0.0000			
Li	0	0.0000	0.0000	0.0000	0.0000			
Mg	0	0.0000	0.0000	0.0000	0.0000			
Mn	0	0.0000	0.0000	0.0000	0.0000			
Na	68.21205	68.2120	218.5000	0.0000	0.0000			
NI	0	0.0000	0.0000	0.0000	0.0000			
NO2	23.4087	23.4087	74.9838	0.0000	0.0000			
NO3	50.92153	50.9215	163.1142	0.0000	0.0000			
OH	43.68231	43.6823	139.9252	0.0000	0.0000			
Pb	0	0.0000	0.0000	0.0000	0.0000			
P as PO4	0.738932	0.7389	2.3670	0.0000	0.0000			
Pu (total)	0	0.0000	0.0000	0.0000	0.0000			
SI	0	0.0000	0.0000	0.0000	0.0000			
S as SO4	1.737412	1.7374	5.5654	0.0000	0.0000			
Sr	0	0.0000	0.0000	0.0000	0.0000			
U (total)	0	0.0000	0.0000	0.0000	0.0000			
Zn	0	0.0000	0.0000	0.0000	0.0000			
Zr	0	0.0000	0.0000	0.0000	0.0000			
Mo	0	0.0000	0.0000	0.0000	#####			
Others	0	0.0000	0.0000	0.0000	0.0000			
Precip. Solids								
18.39255	18.3926	58.9159	0.0000	0.0000	0.0000			
	0	#####						
TIC	7.505225	7.5052	24.0411	0.0000	0.0000			
TOC	4	4.0000	8.4085	2.9078	0.0000			
	0	#####						
		#####						
Gases								
CH4	0	0.0000	0.0000	0.0000	0.0000			
H2	0	0.0000	0.0000	0.0000	0.0000			
N2	0	0.0000	0.0000	0.0000	0.0000			
NH3	0	0.0000	0.0000	0.0000	0.0000			
NO	0	0.0000	0.0000	0.0000	0.0000			
NO2(g)	0	0.0000	0.0000	0.0000	0.0000			
	0	#####						
Fissile								
Pu239/241	0.1	0.1000	0.3203	0.0000	0.0000			
U-235	0	0.0000	0.0000	0.0000	0.0000			
		#####						
Activity								
Am241	0	0.00E+00	0.00E+00	0.00E+00	0.0000			
Ba137m	0	0.00E+00	0.00E+00	0.00E+00	0.0000			
Co60	1.34E+08	1.34E+08	4.28E+08	1.94E+02	0.0000			
Ce137	1.27E+13	1.27E+13	4.08E+13	1.85E+07	0.0000			
Eu154/155	4.12E+09	4.12E+09	1.32E+10	5.99E+03	0.0000			
NI63/59	0	0.00E+00	0.00E+00	0.00E+00	0.0000			
Pu	0	0.00E+00	0.00E+00	0.00E+00	0.0000			
Sm151	0	0.00E+00	0.00E+00	0.00E+00	0.0000			
Sr90	1.3E+11	1.30E+11	4.18E+11	1.90E+05	0.0000			
Tc99	2.11E+10	2.11E+10	8.74E+10	3.08E+04	0.0000			
TRU	1.42E+09	1.42E+09	4.58E+09	2.07E+03	0.0000			
Y-90	0	0.00E+00	0.00E+00	0.00E+00	0.0000			
Solid	5.22E+11	5.22E+11	1.67E+12	7.58E+05	0.0000			

Melter Evaporator Unit

April 4/2

Case 3

Strm # 58 and

70 Both as

input

(a) Input stream # 72.

Total: from stream # 58 + # 70

$44.4438 + 76.01603$

$= 120.46 \text{ mt/d}$

which is the same as in strm # 72.

O.k.

~~0.0332~~ 0.0332

EN:

from stream # 58 + # 70

$(0.0332 \times 36.0844 + 2.3 \times 64) \times 10^{-6} / 10^3$

$= 0.1484 \text{ mt/d}$

in strm # 72

$1.4827 \times 100.0844 \times 10^{-6} / 10^3$

$= 0.1484 \text{ mt/d}$

O.k.

(b) Mass Bal in unit

omitted

(c) Out - in = 0

for all.
O.k.

ance		Unit Balance						Input=		Both Proceed and Aux. Str Unit Bal			
Plants													
Units	in	in	in	out	out	out	out-in		in	out	out	out-in	
Tc Col								M. Evaporator					
Stream Name	Cs Removed	I Rinse Soln	Elution Agent	Rinse Recycle	Tc soln	Cs+Tc Remov		Aug. Fe	Feeds to LAW	LAW Concent	Evaporator Overhead		
Stream No:	48	51	52	53	54	58		70	72	74	76		
Tot Mass (Mt)	44.4481	0.2000	2.2000	0.2001	2.2032	44.4438	-0.0009	76.01903	120.4599	60.9167	59.5431	0.0000	0.0000
Tot Vol (m3)	36.0847	0.2000	2.2000	0.2000	2.2000	36.0844	-0.0004	84	100.0844	40.6878	59.3965	0.0000	0.0000
Density (Mtn)	1.2318	1.0000	1.0000	1.0005	1.0015	1.2317		1.187751	1.2036	1.4972	1.0025		
Tot Act. (Bq)	2.052E+12	0.000E+00	0.000E+00	0.000E+00	1.123E+12	9.294E+11	-0.0004	8.59E+14	8.603E+14	8.603E+14	8.603E+08	0.076E+08	0.076E+08
Temperat. (C)	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000			40.0000	20.0000	20.0000		
Feed Type:	A				A			#####	0.0000	0.0000	0.0000		
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0	0.0000	0.0000	0.0000		
Ionlc Comp	g/L	Mt/d	Mt/d	Mt/d	g/L	g/L		g/L	g/L	g/L	g/L		
Al	2.7267	0.0000	0.0000	0.0001	0.0447	2.7240	0.0984	0.01	0.9885	2.4291	0.0017	0.0000	0.0000
B	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1	0.0639	0.1573	0.0000	0.0000	0.0000
Ba	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1	0.0639	0.1573	0.0000	0.0000	0.0000
CN	0.0332	0.0000	0.0000	0.0000	0.0005	0.0332	0.0000	2.3	1.4827	3.6435	0.0025	0.0000	0.0000
C as CO3	0.0015	0.0000	0.0000	0.0000	0.0000	0.0015	0.0000	0.11	0.0709	0.1743	0.0000	0.0000	0.0000
Ca	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
Cd	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
Cl	2.8611	0.0000	0.0000	0.0000	0.0469	2.8582	0.0000	2.5	2.6292	6.4672	0.0000	0.0000	0.0000
Cr	0.1772	0.0000	0.0000	0.0000	0.0029	0.1770	0.0000	0.12	0.1405	0.3457	0.0000	0.0000	0.0000
F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
Fe	0.0828	0.0000	0.0000	0.0000	0.0014	0.0828	0.0000	0.002953	0.0317	0.0780	0.0000	0.0000	0.0000
H2O	989.4249	0.1960	2.1370	0.1960	971.3636	989.4348	0.0000	981.5694	984.4052	961.6398	1000.0000	0.0000	0.0000
Hg	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
K	1.6695	0.0000	0.0000	0.0000	0.0274	1.6679	0.0000	1.893483	1.8121	4.4575	0.0000	0.0000	0.0000
La	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.01	0.0064	0.0157	0.0000	0.0000	0.0000
Li	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
Mg	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
Mn	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
Na	125.3915	0.0023	0.0000	0.0023	0.0000	125.3928	0.0000	68.21205	88.8280	218.5000	0.0000	0.0000	0.0000
NI	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
NO2	24.1185	0.0000	0.0000	0.0000	0.3956	24.0946	0.0000	23.4087	23.5660	58.1893	0.0000	0.0000	0.0000
NO3	70.9272	0.0000	0.0620	0.0000	29.3452	70.8570	0.0000	50.92153	58.1091	142.9373	0.0000	0.0000	0.0000
OH	0.0598	0.0017	0.0000	0.0017	0.0010	0.0597	0.0000	43.68231	27.9546	68.7632	0.0000	0.0000	0.0000
Pb	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
P as PO4	1.1865	0.0000	0.0000	0.0000	0.0195	1.1853	0.0000	0.738932	0.8999	2.2135	0.0000	0.0000	0.0000
Pu (total)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
SI	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
S as SO4	1.4307	0.0000	0.0000	0.0000	0.0235	1.4293	0.0000	1.737412	1.6263	4.0005	0.0000	0.0000	0.0000
Sr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
U (total)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
Zn	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
Zr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
Mo	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	#VALUE!	0	0.0000	0.0000	0.0000	#VALUE!	0.0000
Others	0.0000	0.0010	0.0000	0.0000	0.0000	0.0000	#VALUE!	0	0.0000	0.0000	0.0000	0.0000	0.0000
								0.0000					
Precip.	0.0001	0.0000	0.0000	0.0000	0.0006	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
Solids	0.0050	0.0000	0.0000	0.0000	0.0410	0.0025	0.0000	18.39255	11.7822	28.9328	0.0000	0.0000	0.0000
								#VALUE!					#VALUE!
TIC	10.6729	0.0000	0.0000	0.0000	0.1751	10.6623	0.0000	7.505225	8.6435	21.2613	0.0000	0.0000	0.0000
TOC	1.0218	0.0000	0.0000	0.0000	0.0188	1.0208	0.0000	4	2.9258	3.5985	2.4850	0.0000	0.0000
								#VALUE!					#VALUE!
								#VALUE!					#VALUE!
								#VALUE!					#VALUE!
								#VALUE!					#VALUE!
Gases	g/L	Mt/d	Mt/d	Mt/d	g/L	g/L	#VALUE!	g/L	g/L	g/L	g/L	#VALUE!	
CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
H2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
N2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
NH3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
NO	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
NO2(g)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
								0					#VALUE!
Fleasle	g/L	Mt/d	Mt/d	Mt/d	g/L	g/L	#VALUE!	g/L	g/L	g/L	g/L	#VALUE!	
Pu239/241	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1	0.0639	0.1573	0.0000	0.0000	0.0000
U-235	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000
								#VALUE!					#VALUE!
Activity	Bq/m3	Bq/d	Bq/d	Bq/d	Bq/m3	Bq/m3	Bq/d	Bq/m3	Bq/m3	Bq/m3	Bq/m3	Bq/d	
Am241	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00	0.0000	0.0000
Ba137m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00	0.0000	0.0000
Co60	2.13E+07	0.00E+00	0.00E+00	0.00E+00	3.50E+06	2.11E+07	0	1.34E+08	9.31E+07	2.29E+08	1.57E+02	0.0000	0.0000
Ca137	1.78E+10	0.00E+00	0.00E+00	0.00E+00	2.92E+09	1.78E+10	0	1.27E+13	8.16E+12	2.01E+13	1.37E+07	0.0000	0.0000
Eu154/155	6.35E+09	0.00E+00	0.00E+00	0.00E+00	1.04E+09	6.29E+09	0	4.12E+09	4.90E+09	1.21E+10	8.28E+03	0.0000	0.0000
Ni63/59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00	0.0000	0.0000
Pu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00	0.0000	0.0000
Sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00	0.0000	0.0000
Sr90	2.08E+08	0.00E+00	0.00E+00	0.00E+00	3.41E+07	2.08E+08	0	1.3E+11	8.35E+10	2.05E+11	1.41E+05	0.0000	0.0000
Tc99	3.24E+10	0.00E+00	0.00E+00	0.00E+00	5.05E+11	1.82E+09	-6.1E-05	2.11E+10	1.40E+10	3.46E+10	2.37E+04	0.0000	0.0000
TRU	2.27E+06	0.00E+00	0.00E+00	0.00E+00	3.72E+05	2.24E+06	0	1.42E+09	9.11E+08	2.24E+09	1.54E+03	0.0000	0.0000
Y-90	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00	0.0000	0.0000
Solid	7.82E+07	0.00E+00	0.00E+00	0.00E+00	1.11E+09	7.82E+05	2.98E-07	5.22E+11	3.34E+11	8.20E+11	5.82E+05	0.0000	0.0000

Note All preceding Unit
Set Aux. Strm = 0

Melter Unit

Plants Input= Preced Strm only Unit Bal
Units in in out out out-in

Melter					
Stream Name	Feeds to Melter	Glass Formers	LAW Glass	Melter Off Gas	
Stream No:	82	84	86	88	
Tot Mass (M)	29.0490	11.3491	29.5284	24.3814	13.5116
Tot Vol (m3)	20.7081	4.5397	9.8428	?	
Density (M/d)	1.4028	2.5000	3.0000	?	
Tot Act. (Bq)	9.294E+11	0.000E+00	9.0147E+11	2.7881E+10	0.0000
Temperat. (C)	20.0000	20.0000	20.0000	20.0000	
Feed Type:	A	A	A	A	
Ionlc Comp	g/L	M/d	M/d	M/d	
Al	4.7419	1.7838	1.8791	0.0029	0.0000
B	0.0000	0.4590	0.4590	0.0000	0.0000
Ba	0.0000	0.0000	0.0000	0.0000	0.0000
CN	0.0577	0.0000	0.0000	0.0012	0.0000
C as CO3	0.0025	0.0000	0.0000	0.0001	0.0000
Ca	0.0000	0.8451	0.8451	0.0000	0.0000
Cd	0.0000	0.0000	0.0000	0.0000	0.0000
Cl	4.9806	0.0829	0.1035	0.0825	0.0000
Cr	0.3084	0.0019	0.0081	0.0002	0.0000
F	0.0000	0.0858	0.0858	0.0000	0.0000
Fe	0.1442	-0.0023	0.0008	0.0001	0.0000
H2O	981.5898	0.0000	0.0000	20.3269	0.0000
Hg	0.0000	0.0000	0.0000	0.0000	0.0000
K	2.9083	0.3001	0.3585	0.0018	0.0000
La	0.0000	0.0000	0.0000	0.0000	0.0000
Li	0.0000	0.0000	0.0000	0.0000	0.0000
Mg	0.0000	0.0000	0.0000	0.0000	0.0000
Mn	0.0000	0.0005	0.0005	0.0000	0.0000
Na	218.5000	0.0000	4.3890	0.1357	0.0000
Ni	0.0000	0.0000	0.0000	0.0000	0.0000
NO2	41.9855	0.0000	0.0000	0.8694	0.0000
NO3	123.4701	0.0000	0.0000	2.5568	0.0000
OH	0.1041	0.0000	0.0000	0.0022	0.0000
Pb	0.0000	0.0000	0.0000	0.0000	0.0000
P as PO4	2.0655	-0.0170	0.0245	0.0013	0.0000
Pu (total)	0.0000	0.0000	0.0000	0.0000	0.0000
Si	0.0000	7.7319	7.7319	0.0000	0.0000
S as SO4	2.4908	-0.0485	0.0035	0.0015	0.0000
Sr	0.0000	0.0000	0.0000	0.0000	0.0000
U (total)	0.0000	0.0000	0.0000	0.0000	0.0000
Zn	0.0000	0.0000	0.0000	0.0000	0.0000
Zr	0.0000	0.0000	0.0000	0.0000	0.0000
Mo	0.0000	0.0298	0.0298	0.0000	0.0000
Others		0.0943	0.0943	0.0000	#VALUE!
Precip.	0.0001	0.0000	0.0000	0.0000	0.0000
Solids	0.0044	0.0000	0.0001	0.0000	0.0000
TIC	18.5794	0.0000	0.0038	0.3809	0.0000
TOC	0.8892	0.0000	0.0000	0.0184	0.0000
Gases	g/L	M/d	M/d	M/d	
CH4	0.0000	0.0000	0.0000	0.0000	0.0000
H2	0.0000	0.0000	0.0000	0.0000	0.0000
N2	0.0000	0.0000	0.0000	0.0000	0.0000
NH3	0.0000	0.0000	0.0000	0.0000	0.0000
NO	0.0000	0.0000	0.0000	0.0000	0.0000
NO2(g)	0.0000	0.0000	0.0000	0.0000	0.0000
Fissile	g/L	M/d	M/d	M/d	#VALUE!
Pu239/241	0.0000	0.0000	0.0000	0.0000	0.0000
U-235	0.0000	0.0000	0.0000	0.0000	0.0000
Activity	Bq/m3	Bq/d	Bq/d	Bq/d	Bq/d
Am241	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000
Ba137m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000
Co60	3.68E+07	0.00E+00	7.39E+08	2.28E+07	0.0000
Ce137	3.07E+10	0.00E+00	6.16E+11	1.91E+10	0.0000
Eu154/155	1.10E+10	0.00E+00	2.20E+11	6.80E+09	0.0000
Ni63/59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000
Pu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000
Sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000
Sr90	3.58E+08	0.00E+00	7.19E+09	2.23E+08	0.0000
Tc99	2.83E+09	0.00E+00	5.68E+10	1.78E+09	0.0000
TRU	3.91E+06	0.00E+00	7.85E+07	2.43E+06	0.0000
Y-90	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000
Solid	1.31E+07	0.00E+00	2.63E+08	8.14E+06	0.0000
Sum	1402.8202	11.3491	16.0169	24.3820	13.5116

Case ① Strm # 74 as input only.

① Stream # 82

Examine the values in #82.
They are all the same as in #74
(See page 71)

O.k.

② Mass balance in Unit.

Total Flow in

$$29.0490 + 11.3491 = 40.3981 \text{ Mt}$$

Total Flow out

$$29.5284 + 24.3814 = 53.9098 \text{ Mt/d}$$

$$(out - in)_{total} = 13.5117 \text{ Mt/d}$$

This is the additional O from the air due to oxide glass formation.
The additional O is not shown in the balance sheet.

$SO_{4in} : (2.4906 - 0.0465) \times \frac{10^{-6}}{10^{-3}} = 0.05076 \text{ Mt/d}$

$SO_{out} : 0.00515 + 0.00155 = 0.0067 \text{ Mt/d}$

D.K.

Note: minus -0.0465 means SO_4 has to be taken out to meet the glass Assay requirement (specified in Assumption Page by user)

③ out - in = 0 except for O (not shown)

Melter Unit

April 21/00

Case ② Strm 80 as input only.

① Input # 82

Examine data in #82, they are all the same as #80
O.k.

② Mass Balance in Unit.

Total Flow in:

$$76.0160 + 9.7135 = 85.7295 \text{ Mt/d}$$

Total Flow out

$$27.3139 + 71.4521 = 98.766 \text{ Mt/d}$$

$$\text{Difference: } 98.766 - 85.7295 = 13.0365 \text{ Mt/d}$$

due to O from Air which is not shown in the balance sheet.

$$k_{in} : 1.8435 \times 64 \times \frac{10^{-6}}{10^{-3}} + 0.2287 = 0.3495 \text{ Mt/d}$$

$$k_{out} : 0.3494 + 0.0036 = 0.3495 \text{ Mt/d}$$

O.k.

③ out - in = 0.

except for oxygen and total flow.

ice Input= Aux. Strm only Unit Bal
Plants in in out out out-in
Units

Melter					
Stream Name	Aug. Fe	Feeds to Melter	Glass Formers	LAW Glass	Melter Off Gas
Stream No:	80	82	84	86	88
Tot Mass (M)	76.01603	76.0160	9.7135	27.3139	71.4521
Tot Vol (m3)	64	64.0000	3.8854	9.1048	?
Density (M/d)	1.187751	1.1878	2.5000	3.0000	?
Tot Act. (Bq)	8.59E+14	8.594E+14	0.000E+00	8.3362E+14	2.5782E+13
Temperat. (C)	0.0000	20.0000	20.0000	20.0000	20.0000
Feed Type:	#####	0.0000	0.0000	0.0000	0.0000
Ionlc Comp	g/L	g/L	M/d	M/d	M/d
Al	0.01	0.0100	1.8124	1.8130	0.0000
B	0.1	0.1000	0.4388	0.4428	0.0002
Ba	0.1	0.1000	-0.0082	0.0000	0.0002
CN	2.3	2.3000	0.0000	0.0000	0.1472
C as CO3	0.11	0.1100	0.0000	0.0000	0.0070
Ca	0	0.0000	0.8154	0.8154	0.0000
Cd	0	0.0000	0.0000	0.0000	0.0000
Cl	2.5	2.5000	0.0879	0.0899	0.1280
Cr	0.12	0.1200	0.0004	0.0078	0.0002
F	0	0.0000	0.0828	0.0828	0.0000
Fe	0.002053	0.0030	0.0004	0.0008	0.0000
H2O	981.5694	981.5694	0.0000	0.0000	20.3204
Hg	1.893483	1.8935	0.2283	0.3459	0.0036
La	0.01	0.0100	-0.0008	0.0000	0.0000
Li	0	0.0000	0.0000	0.0000	0.0000
Mg	0	0.0000	0.0000	0.0000	0.0000
Mn	0	0.0000	0.0004	0.0004	0.0000
Na	68.21205	68.2120	0.0000	4.2346	0.1310
Ni	0	0.0000	0.0000	0.0000	0.0000
NO2	23.4087	23.4087	0.0000	0.0000	1.4982
NO3	50.92153	50.9215	0.0000	0.0000	3.2590
OH	43.68231	43.6823	0.0000	0.0000	2.7957
Pb	0	0.0000	0.0000	0.0000	0.0000
P as PO4	0.738632	0.7389	-0.0222	0.0237	0.0014
Pu (total)	0	0.0000	0.0000	0.0000	0.0000
Si	0	0.0000	7.4800	7.4800	0.0000
S as SO4	1.737412	1.7374	-0.1044	0.0034	0.0033
Sr	0	0.0000	0.0000	0.0000	0.0000
U (total)	0	0.0000	0.0000	0.0000	0.0000
Zn	0	0.0000	0.0000	0.0000	0.0000
Zr	0	0.0000	0.0000	0.0000	0.0000
Mo	0	0.0000	0.0285	0.0285	0.0000
Others	0	-1.0880	-1.0880	0.0000	#VALUE!
Precip.	0	0.0000	0.0000	0.0000	0.0000
Solids	18.39255	18.3926	0.0000	1.1771	0.0000
TIC	7.505225	7.5052	0.0000	0.0048	0.4755
TOC	4	4.0000	0.0000	0.0000	0.2560
Gases	g/L	g/L	M/d	M/d	M/d
CH4	0	0.0000	0.0000	0.0000	0.0000
H2	0	0.0000	0.0000	0.0000	0.0000
N2	0	0.0000	0.0000	0.0000	0.0000
NH3	0	0.0000	0.0000	0.0000	0.0000
NO	0	0.0000	0.0000	0.0000	0.0000
NO2(g)	0	0.0000	0.0000	0.0000	0.0000
Fissile	g/L	g/L	M/d	M/d	M/d
Pu239/241	0	0.1000	0.0000	0.0082	0.0002
U-235	0	0.0000	0.0000	0.0000	0.0000
Activity	Bq/m3	Bq/m3	Bq/d	Bq/d	Bq/d
Am241	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ba137m	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co60	1.34E+08	1.34E+08	0.00E+00	8.30E+09	2.57E+08
Ce137	1.27E+13	1.27E+13	0.00E+00	7.91E+14	2.45E+13
Eu154/155	4.12E+09	4.12E+09	0.00E+00	2.58E+11	7.91E+09
Ni63/59	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm151	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sr90	1.3E+11	1.30E+11	0.00E+00	8.10E+12	2.51E+11
Tc99	2.11E+10	2.11E+10	0.00E+00	1.31E+12	4.04E+10
TRU	1.42E+09	1.42E+09	0.00E+00	8.84E+10	2.73E+09
Y-90	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Solid	5.22E+11	5.22E+11	0.00E+00	3.24E+13	1.00E+12
Sum	1207.4146	9.7135	15.4808	71.5272	13.0364

Plants Units	Input= Proceed Strm only				Unit Balance		Input= Both Proceed and Aux. Strm				Unit Bal	
	in		out		out-in		in		out		out-in	
Stream Name	M. Evaporator					Aug. Fe	Melter					
	Feeds to LAW LAW Concent Evaporator Overhead				Feeds to Melte Glass Formers LAW Glass				Melter Off Gas			
Stream No:	72	74	76		80	82	84	86	88			
Tot Mass (M)	44.4438	29.0490	15.3948	0.0000	76.01803	105.0851	21.0827	58.8423	95.8334	26.5479		
Tot Vol (m3)	36.0844	20.7081	15.3763	0.0000	64	84.7081	8.4251	18.9474	?			
Density (Mv)	1.2317	1.4028	1.0012		1.187751	1.2403	2.5000	3.0000	?			
Tot Act. (Bq)	9.294E+11	9.294E+11	9.294E+05	0.0000	8.59E+14	8.803E+14	0.000E+00	8.3452E+14	2.581E+13	0.0000		
Temperat. (o)	20.0000	20.0000	20.0000			20.0000	20.0000	20.0000	20.0000			
Feed Type:	A	A	A		#####	0.0000	0.0000	0.0000	0.0000			
	0.0000	0.0000	0.0000		0	0.0000	0.0000	0.0000	0.0000			
Ionio Comp	g/L	g/L	g/L		g/L	g/L	Mv/d	Mv/d	Mv/d			
Al	2.7240	4.7419	0.0064	0.0000	0.01	1.1688	3.5982	3.6920	0.0030	0.0000		
B	0.0000	0.0000	0.0000	0.0000	0.1	0.0758	0.8958	0.9018	0.0002	0.0000		
Ba	0.0000	0.0000	0.0000	0.0000	0.1	0.0758	-0.0082	0.0000	0.0002	0.0000		
CN	0.0332	0.0577	0.0001	0.0000	2.3	1.7518	0.0000	0.0000	0.1484	0.0000		
Ca as CO3	0.0015	0.0025	0.0000	0.0000	0.11	0.0837	0.0000	0.0000	0.0071	0.0000		
Ca	0.0000	0.0000	0.0000	0.0000	0	0.0000	1.6804	1.6804	0.0000	0.0000		
Cd	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
Cl	2.8582	4.9806	0.0000	0.0000	2.5	3.1064	0.1508	0.2034	0.2105	0.0000		
Cr	0.1770	0.3084	0.0000	0.0000	0.12	0.1681	0.0023	0.0159	0.0004	0.0000		
F	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.1685	0.1685	0.0000	0.0000		
Fe	0.0828	0.1442	0.0000	0.0000	0.002953	0.0375	-0.0019	0.0012	0.0001	0.0000		
H2O	989.4348	981.5898	1000.0000	0.0000	981.5694	981.5744	0.0000	0.0000	83.1473	0.0000		
Hg	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
K	1.6679	2.9063	0.0000	0.0000	1.893483	2.1411	0.5284	0.7044	0.0054	0.0000		
La	0.0000	0.0000	0.0000	0.0000	0.01	0.0078	-0.0008	0.0000	0.0000	0.0000		
Li	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
Mg	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
Mn	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0009	0.0009	0.0000	0.0000		
Na	125.3928	218.5000	0.0000	0.0000	68.21205	104.9521	0.0000	8.8238	0.2887	0.0000		
Ni	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
NO2	24.0946	41.9855	0.0000	0.0000	23.4087	27.9501	0.0000	0.0000	2.3878	0.0000		
NO3	70.8570	123.4701	0.0000	0.0000	50.92153	68.8570	0.0000	0.0000	5.8158	0.0000		
OH	0.0597	0.1041	0.0000	0.0000	43.68231	33.0290	0.0000	0.0000	2.7978	0.0000		
Pb	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
P as PO4	1.1853	2.0655	0.0000	0.0000	0.738832	1.0832	-0.0382	0.0482	0.0027	0.0000		
Pu (total)	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
Si	0.0000	0.0000	0.0000	0.0000	0	0.0000	15.1919	15.1919	0.0000	0.0000		
S as SO4	1.4293	2.4906	0.0000	0.0000	1.737412	1.9218	-0.1509	0.0070	0.0049	0.0000		
Sr	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
U (total)	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
Zn	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
Zr	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
Mo	0.0000	0.0000	0.0000	#####	0	0.0000	0.0581	0.0581	0.0000	0.0000		
Others	0.0000	0.0000	0.0000	0.0000	0		-0.9817	-0.9817	0.0000	#VALUE!		
				0.0000						0.0000		
Precip.	0.0000	0.0001	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
Solids	0.0025	0.0044	0.0000	0.0000	18.39255	13.8973	0.0000	1.1772	0.0000	0.0000		
				#####	0					#VALUE!		
TIC	10.8823	18.5794	0.0000	0.0000	7.505225	10.2125	0.0000	0.0087	0.8584	0.0000		
TOC	1.0206	0.8892	1.1975	0.0000	4	3.2395	0.0000	0.0000	0.2744	0.0000		
				#####	0							
				#####	0							
				#####	0							
Gases	g/L	g/L	g/L	#####	g/L	g/L	Mv/d	Mv/d	Mv/d			
CH4	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
H2	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
N2	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
NH3	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
NO	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
NO2(g)	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
				#####	0					#VALUE!		
Fleasle	g/L	g/L	g/L	#####	g/L	g/L	Mv/d	Mv/d	Mv/d	#VALUE!		
Pu239/241	0.0000	0.0000	0.0000	0.0000	0	0.0758	0.0000	0.0082	0.0002	0.0000		
U-235	0.0000	0.0000	0.0000	0.0000	0	0.0000	0.0000	0.0000	0.0000	0.0000		
				#####								
Activity	Bq/m3	Bq/m3	Bq/m3	Bq/d	Bq/m3	Bq/m3	Bq/d	Bq/d	Bq/d	Bq/d		
Am241	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000		
Ba137m	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000		
Co60	2.11E+07	3.68E+07	4.95E+01	0.0000	1.34E+08	1.10E+08	0.00E+00	9.04E+09	2.80E+08	0.0000		
Cs137	1.78E+10	3.07E+10	4.13E+04	0.0000	1.27E+13	9.84E+12	0.00E+00	7.92E+14	2.45E+13	0.0000		
Eu154/155	6.29E+09	1.10E+10	1.48E+04	0.0000	4.12E+09	5.79E+09	0.00E+00	4.78E+11	1.47E+10	0.0000		
N63/59	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000		
Pu	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000		
Sm151	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000		
Sr90	2.06E+08	3.58E+08	4.82E+02	0.0000	1.3E+11	9.87E+10	0.00E+00	8.11E+12	2.51E+11	0.0000		
Ta99	1.82E+09	2.83E+09	3.81E+03	0.0000	2.11E+10	1.66E+10	0.00E+00	1.36E+12	4.22E+10	0.0000		
TRU	2.24E+08	3.91E+08	5.29E+00	0.0000	1.42E+09	1.08E+09	0.00E+00	8.84E+10	2.74E+09	0.0000		
Y-90	0.00E+00	0.00E+00	0.00E+00	0.0000	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000		
Solid	7.52E+06	1.31E+07	1.78E+01	0.0000	5.22E+11	3.94E+11	0.00E+00	3.24E+13	1.00E+12	0.0000		
Sum	1231.6835	1402.8202	1001.2040			1255.1843	21.0827	31.4777	95.9092	26.5479		

Table: 4-12 - Effluent limits.

extra: CO, NO_x, SO₂, O₃, NH₃

We do not have these except NO_2

Table 4-103

4-14, Same report.

We do not have CO_2 , P_2O_5 , SO_3

Handford Tank Waste

Familiarization Report. CNWRA-97-001

Page A-3. Hanford site inventories.

This table gives the significance of Radionuclides in Tandy (also in total).

I should include:

DBP Butanol

Ra-100 and Cd-113 m, Sb-125, their total ≈ 5000

Page. A-4.

I should include:

Cs-134,

8 7h-22h, 232. both low!

U-238, 233, 234, and small

Page A-6

We need to add individual organisms.

New Configuration for tables

Feed Code 1:		1	
Feed Code 2:		1	
Feed from Preceding Unit Only			
Stream No			
Stream Name			
Stream Temp			
Feed A (%)			
Feed B (%)			
Feed C (%)			
Feed D (%)			
Mass Flow, g/d			
Volume Flow, L/d			
Density, g/L			
Activity Flow, Bq/d			
Component*	Property code*	Mass, g/L	Activity, Bq/L
INORGANICS			
Ag	XXXXXX	0.0000	0
Al	XXXXXX	0.0000	0
Am/Am241,242	XXXXXX	0.0000	0
As	XXXXXX	0.0000	0
B	XXXXXX	0.0000	0
Ba/Ba137	XXXXXX	0.0000	0
Be	XXXXXX	0.0000	0
Bi	XXXXXX	0.0000	0
C (as CO3)	XXXXXX	0.0004	0
Ca	XXXXXX	0.0006	0
Cd	XXXXXX	0.0000	0
Ce	XXXXXX	0.0000	0
Cl	XXXXXX	2.8111	0
CN	XXXXXX	0.0188	0
Co/Co60	XXXXXX	0.0000	2.813E+04
Cr	XXXXXX	0.1771	0
Co/Ce137,134	XXXXXX	0.0000	1.181E+19
Cu	XXXXXX	0.0000	0
Bu/Bu154,155	XXXXXX	0.0000	4.190E+06
F	XXXXXX	0.0000	0
Fe	XXXXXX	0.0408	0
H2(Molecular)	XXXXXX	0.0000	0
H2O/H3	XXXXXX	973.9223	0
Hg	XXXXXX	0.0000	0
U129	XXXXXX	0.0000	0
K	XXXXXX	1.8823	0
La	XXXXXX	0.0000	0
Li	XXXXXX	0.0000	0
Mg	XXXXXX	0.0000	0
Mn	XXXXXX	0.0000	0
Mo	XXXXXX	0.0000	0
H2(Molecular)	XXXXXX	0.0000	0
Na	XXXXXX	78.1148	0
Nd	XXXXXX	0.0000	0
NH3(Molecular)	XXXXXX	0.0000	0
NH4NO3,56	XXXXXX	0.0000	0
NO2(molecular)	XXXXXX	0.0000	0
NO2	XXXXXX	23.4087	0
NO3	XXXXXX	50.9218	0
O2(Molecular)	XXXXXX	0.0000	0
OH	XXXXXX	12.3338	0
P (as PO4)	XXXXXX	0.7380	0
Pb	XXXXXX	0.0000	0
Pu/Pu238-241	XXXXXX	0.0000	0
S (as SO4)	XXXXXX	1.7358	0
Sb	XXXXXX	0.0000	0
Se	XXXXXX	0.0000	0
Si	XXXXXX	0.0000	0
Sm/Sm151	XXXXXX	0.0000	0
Sn/Sn96	XXXXXX	0.0000	1.300E+08
Ta/Ta98	XXXXXX	0.0000	2.110E+07
Th/Th232,229	XXXXXX	0.0000	0
Ti	XXXXXX	0.0000	0
U/235-238	XXXXXX	0.0000	0
V/V96	XXXXXX	0.0000	0
Zn	XXXXXX	0.0000	0
Zr	XXXXXX	0.0000	0
Others Inorg.	XXXXXX	0.0000	0
ORGANICS			
Acetate	XXXXXX	0.0000	0
Butanediol	XXXXXX	0.0000	0
Citric Acid	XXXXXX	0.0000	0
Formic Acid	XXXXXX	0.0000	0
DBP	XXXXXX	0.0000	0
ED3A	XXXXXX	0.0000	0
ED7A	XXXXXX	0.0000	0
Glycolate	XXXXXX	0.0000	0
HEDTA	XXXXXX	0.0000	0
NPH	XXXXXX	0.0000	0
NIDA	XXXXXX	0.0000	0
NTA	XXXXXX	0.0000	0
Oxalate	XXXXXX	0.0000	0
TBP	XXXXXX	0.0000	0
Other Organic	XXXXXX	0.0000	0
SUM		1147.8435	1.160E+18
Total TRU		0	1.402E+08
TiC		7.3609	0
TOC		2.9637	0
Total solids		18.3928	4.731E+08
Pu239/241 in solids		0.0000	0.000E+00
U238 in solids		0.0000	0.000E+00

* If not otherwise specified, components are in ionic form in solution.

* 1st character R-Radiation of Hazard, X-Non-radioactive Hazard

2nd character E=Explosion Hazard, X=Non-explosion Hazard

3rd character F=Feasible, X=Non-Feasible

4th character D=Dangerous constituent under WAC 173-303, X=Non-dangerous

April 27/00

Minor error noticed for

① Filtration - Calc. Sheet, cell T62

should not Assay amount * Filtration efficiency.

Should: just Assay amount.

because it has nothing to do with efficiency.
(this may cause imbalance).

③ Filtration - Calc. Sheet, cell T69.

Equal amount of water, should be total slurry
volume. should be using T67 + T68Not T67 + T68
(this should not cause imbalance.)

J. Yang / 03/16/00

changes.

- ① Not to use 60 g Na / dry solid
to calculate Na distribution, (Comp. factor).
use Assay to do the comp. factor.

rn Solid Assay:

0.10 (2.4. 04/27/00)

If feed contain $C\%$ ~~7.60~~, Then
consider the feed "C" envelope, use
precipitation. This number is arbitrary.

Sheet: Filtration

 $\sum C_i * F_i / F$ produces some error.if $\sum \frac{F_i}{F} * C_i$ should be better.

Density = 1.3088 E3 v.s. 1.3085 E3
1.2041 E3 v.s. 1.20397 E3
= 1.2040 E3

June 22.

PRETREAT

Spreadsheet part is in good shape.

J. Yang / 08/16/00

July 5/00

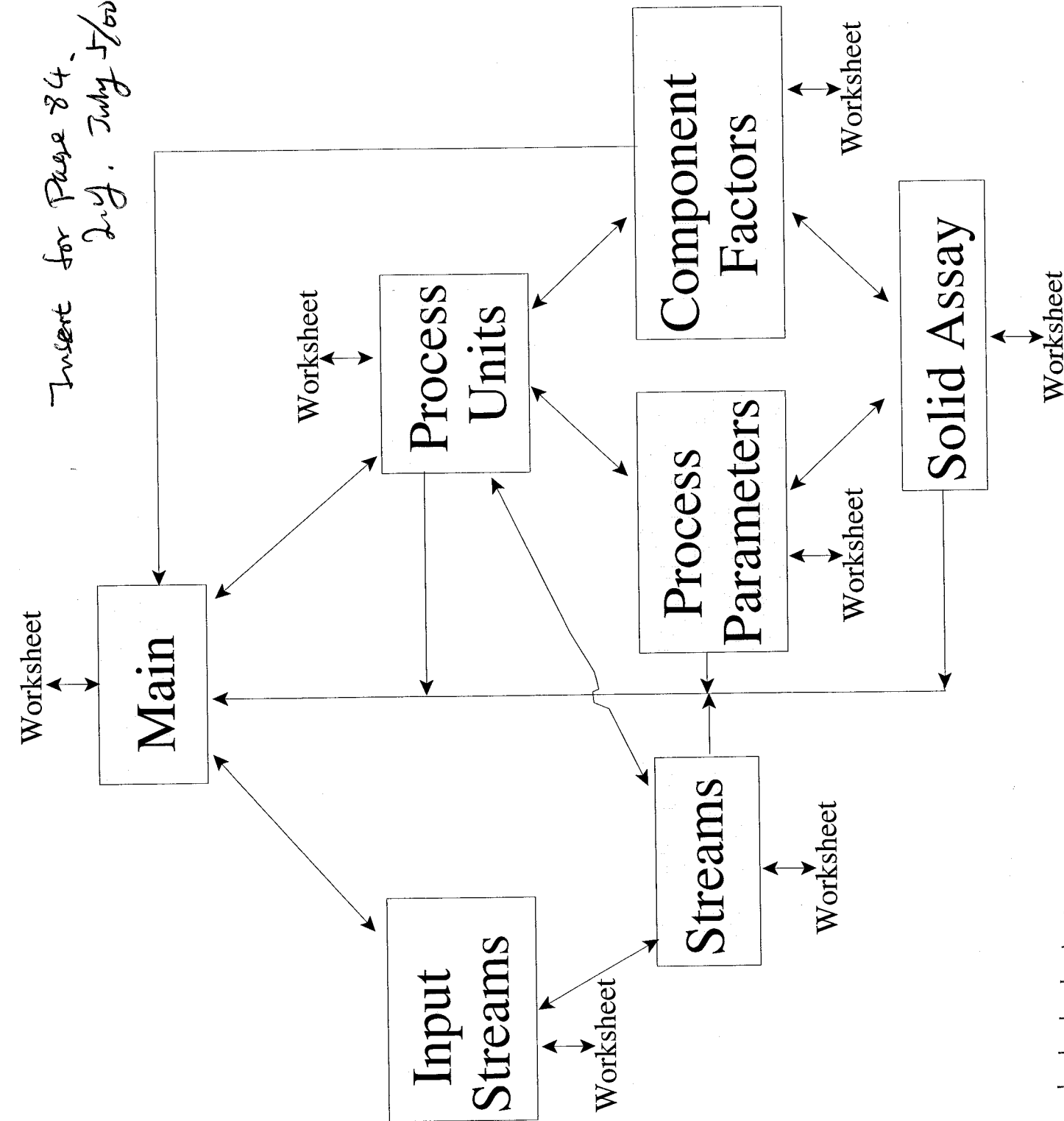
Started to work on the interface so that it is applicable to the new sheet modifications.

- ① Add a form - frmAssay for Solid Assay sheet
- ② Separated Component factor form from "STREAMS" so less conflict would be experienced.
Call it frmCompFactor
- ③ Change "frmAssumption" to "frmPreParameters" just rename the form and make the changes wherever referenced "frmAssumption".

To This stage, there are 6 independent forms as shown in Page ~~83~~ 84. (J.Y.) July 5/00

The transverse directions are also shown in Page ~~83~~ 84 (or Navigation direction).
(J.Y.) July 5/00

Insert for Page 84.
July. July 5/00



July 06/00

Rules:

"Back" Button in every form should always go back to the Parent Form the user last worked on. For example, in Streams Form, the Back button should go to either "Input Streams" or "Process Units", ^{from} which ever "STREAMS" were initiated.

We need a variable in such forms to track which is the latest parent.

Create a Variable

also: `Public Parent_Form as String for such forms`
`Public Parent-sheet : : for sheet tracking`

"Back to User Form" Button on Spreadsheet should always go to the form where "GoTo"

Button Was pressed. To keep track, use `frm\prev-form.Text`. which always indicate the previous form the user has worked on,

it may be a parent, may be a daughter form.

also:

`Prev-sheet` is for sheet tracking.

For QA purpose, Pages up to
Page 85 were copied and given
to QA for records.

J. Young July 13/00

July 13/00

Interface was finished.

Should have a Save Dialog Button on
Main Form. However, VBA does not support
this. "Not Licensed" when tried to use it.

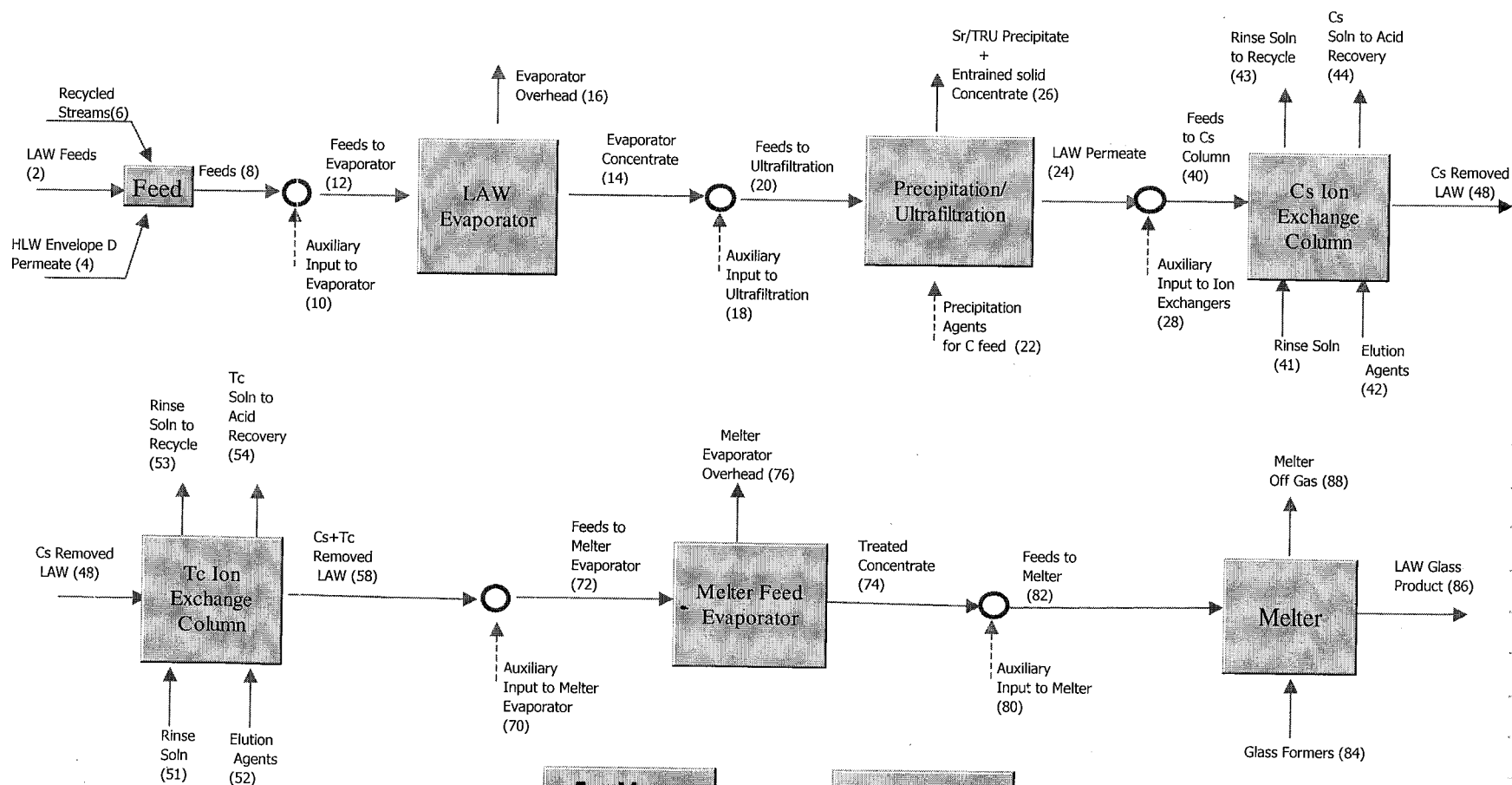
J. Young 08/16/00

07/13/00

Validation of the Spreadsheet calculation
for the modified version of PRETREAT

Flow sheet with Stream numbers.

July 13/00



Unit Mass Summaries and Mass Balances									
Mass Summaries					Mass Balances				
					Unit				
2	4	6	8	Out - In	Out - In	In	Out	2+4+6	8
Stream No	20	20	20	20	0.0000	0.0000E+00	0.0000E+00		
Stream Name	0	0	0	0	0.0000	1.7008E+10	1.7008E+10		
Stream Temp	95	100	0	95	0.0000	8.9517E+08	8.9517E+08		
Feed A (%)	5	0	0	5	0.0000	0.0000E+00	0.0000E+00		
Feed B (%)	0	0	100	0	0.0000	1.7903E+08	1.7903E+08		
Feed C (%)	1.7903E+08	0.0000E+00	0.0000E+00	1.7903E+08	0.0000E+00	1.7903E+08	1.7903E+08		
Feed D (%)	1.5000E+05	0.0000E+00	0.0000E+00	1.5000E+05	0.0000E+00	1.5000E+05	1.5000E+05		
Mass Flow, g/d	1.1936E+03	NA	NA	1.1936E+03	1.2816E+16	0.0000E+00	1.2816E+16	1.9223E+21	1.9223E+21
Volume Flow, L/d	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Density, g/L	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Activity Flow, Bq/d	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Component*	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/d	Mass, g/d	Mass, g/d		
INORGANICS	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		
Ag	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Al	7.7760E+00	0.0000E+00	0.0000E+00	7.7760E+00	0.0000E+00	1.1664E+06	1.1664E+06		
Am/Am241,242	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		
As	0.0000E+00	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
B	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Ba/Ba137	5.5195E-05	0.0000E+00	0.0000E+00	5.5195E-05	0.0000E+00	8.2792E+00	8.2792E+00		
Be	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		
Bi	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		
C (as CO3)	1.0000E-05	1.0000E-01	0.0000E+00	1.0000E-05	0.0000E+00	1.5000E+00	1.5000E+00		
Ca	1.9860E-03	0.0000E+00	0.0000E+00	1.9860E-03	0.0000E+00	2.9940E+02	2.9940E+02		
Cd	2.3997E-03	0.0000E+00	0.0000E+00	2.3997E-03	0.0000E+00	3.5996E+02	3.5996E+02		
Ce	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		
Cl	1.4857E-01	1.9900E+00	1.9951E+00	1.4857E-01	0.0000E+00	2.2285E+04	2.2285E+04		
CN	0	2.0000E-01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Co/Co60	0	1.0000E-10	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Cr	1.1752E+00	1.5000E-01	1.7994E-01	1.1752E+00	0.0000E+00	1.7628E+05	1.7628E+05		
Ca/Ca137,134	0.0000E+00	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Cu	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		
Eu/Eu154,155	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		
F	1.9855E+00	0.0000E+00	0.0000E+00	1.9855E+00	0.0000E+00	2.9783E+05	2.9783E+05		
Fe	1.2834E-04	2.9527E-03	2.9527E-03	1.2834E-04	0.0000E+00	1.9251E+01	1.9251E+01		
H2(Molecule)	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		
H2O/H3	8.9000E+02	9.0000E+02	9.8157E+02	8.9000E+02	0.0000E+00	1.3350E+08	1.3350E+08		
Hg	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
U129	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		
K	3.3431E+00	1.8935E+00	1.8935E+00	3.3431E+00	0.0000E+00	5.0146E+05	5.0146E+05		
La	5.8894E-04	0.0000E+00	0.0000E+00	5.8894E-04	0.0000E+00	8.8340E+01	8.8340E+01		
Li	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Mg	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Mn	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Mo	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		
N2(Molecule)	1.1510E-02	6.8212E+01	6.8212E+01	1.1510E-02	0.0000E+00	1.7265E+07	1.7265E+07		
Na	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		
Np /Np-237	0.0000E+00	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
NH3(Molecule)	6.0157E-04	0.0000E+00	0.0000E+00	6.0157E-04	0.0000E+00	9.0236E+01	9.0236E+01		
Ni/Ni63,59	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		
NO2(molecule)	6.5550E+01	2.3409E+01	2.3409E+01	6.5550E+01	0.0000E+00	9.8325E+06	9.8325E+06		
NO2	7.1300E+01	5.0922E+01	5.0922E+01	7.1300E+01	0.0000E+00	1.0695E+07	1.0695E+07		
NO3	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		
O(In others, Note 9)	1.0710E+01	4.0000E+00	1.4000E+01	1.0710E+01	0.0000E+00	1.6065E+06	1.6065E+06		
OH	1.0925E+00	7.3893E-01	7.3893E-01	1.0925E+00	0.0000E+00	1.6388E+05	1.6388E+05		
P (as PO4)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Pb	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Pu/Pu238-241	2.4336E+01	1.7200E+00	1.7374E+00	2.4336E+01	0.0000E+00	3.8504E+06	3.8504E+06		
S (as SO4)	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		
Sb	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		
Se	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Si	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		
Sm/Sm151	3.3157E-05	0.0000E+00	0.0000E+00	3.3157E-05	0.0000E+00	4.9735E+00	4.9735E+00		
Sr/Sr90	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Tc/Tc99	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Th/Th232,229	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Ti	1.0424E+00	0.0000E+00	0.0000E+00	1.0424E+00	0.0000E+00	1.5637E+05	1.5637E+05		
U/U233-238	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
V/V90	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Zn	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Zr	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Others Inorg.	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
ORGANICS	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		
Acetate	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Butanol	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Citric Acid	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Formic Acid	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
DBP	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
EDSA	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
EDTA	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Glycolate	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
HEDTA	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
NPH	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
NIDA	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
NTA	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Oxalate	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
TBP	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Other Organics	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
SUM	1.1936E+03	1.0533E+03	1.1447E+03	1.1936E+03	0.0000E+00	1.7903E+08	1.7903E+08		
Total TRU	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		
TIC	8.7000E+00	7.5000E+00	7.5100E+00	8.7000E+00	0.0000E+00	1.3050E+06	1.3050E+06		
TOC	1.9580E+00	2.9641E+00	2.9600E+00	1.9580E+00	0.0000E+00	2.9340E+05	2.9340E+05		
Total solids	0	1.8393E+01	1.8393E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
Pu238/241 in solids	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		
U235 in solids	1.0424E+00	0.0000E+00	0.0000E+00	1.0424E+00	0.0000E+00	1.5637E+05	1.5637E+05		
END	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00		

Note 9: In Oxygen containing spec

Feed unit

Sample calculation for

Na:

$$\text{input} = \#2 + \#4 + \#6$$

$$= 1.1510E2 \times 1.5E5 +$$

$$6.8212E1 \times 0 +$$

$$6.8212E1 \times 0$$

$$= 1.7265E7 \text{ g/day}$$

$$\text{output} = \#8$$

$$= 1.1510E2 \times 1.500E5$$

$$= 1.7265E7 \text{ g/day}$$

$$\text{output} = \text{input}$$

O.k.

Evaporation

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Evaporation unit

Case 2

Feed from Preceding Unit Only

Unit Mass Summaries and Mass Balances

Mass Summaries					Mass Balances					
					Unit			Feed		
					Out-In	In	Out	Out-In	In	Out
8	10	12	14	16		12	14+16		8+10	12
20	20	20	20	20	0.0000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
95	0	0	0	0	0.0000	1.7008E+10	1.7008E+10	0.0000E+00	1.7008E+10	1.7008E+10
5	0	95	95	95	0.0000	8.9517E+08	8.9517E+08	0.0000E+00	8.9517E+08	8.9517E+08
0	0	5	5	5	0.0000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0	0	0	0	0.0000	1.7903E+08	1.7903E+08	0.0000E+00	1.7903E+08	1.7903E+08
1.7903E+08	0.0000E+00	1.7903E+08	1.3624E+08	4.2792E+07	0.0000E+00	1.7903E+08	1.7903E+08	0.0000E+00	1.7903E+08	1.7903E+08
1.5000E+05	0.0000E+00	1.5000E+05	1.0724E+05	4.2764E+04	0.0000E+00	1.5000E+05	1.5000E+05	0.0000E+00	1.5000E+05	1.5000E+05
1.1936E+03	0.0000E+00	1.1936E+03	1.2705E+03	1.0007E+03	0.0000E+00	1.1936E+03	1.1936E+03	0.0000E+00	1.1936E+03	1.1936E+03
1.2816E+16	0.0000E+00	1.2816E+16	1.2802E+16	1.2816E+16	0.0000E+00	1.2816E+16	1.2816E+16	0.0000E+00	1.2816E+16	1.2816E+16
Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/L
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
7.7700E-04	0.0000E+00	7.7700E-04	1.0866E+01	2.7275E-02	0.0000E+00	1.1664E+06	1.1664E+06	0.0000E+00	1.1664E+06	1.1664E+06
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
5.5195E-05	0.0000E+00	5.5195E-05	7.7128E-05	1.9360E-07	0.0000E+00	8.2792E+00	8.2792E+00	0.0000E+00	8.2792E+00	8.2792E+00
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
1.0000E-05	0.0000E+00	1.0000E-05	1.3974E-05	3.5075E-08	0.0000E+00	1.5000E+00	1.5000E+00	0.0000E+00	1.5000E+00	1.5000E+00
1.9960E-03	0.0000E+00	1.9960E-03	2.7893E-03	7.0012E-06	0.0000E+00	2.9940E+02	2.9940E+02	0.0000E+00	2.9940E+02	2.9940E+02
2.3997E-03	0.0000E+00	2.3997E-03	3.3534E-03	8.4174E-06	0.0000E+00	3.5996E+02	3.5996E+02	0.0000E+00	3.5996E+02	3.5996E+02
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
1.4857E-01	0.0000E+00	1.4857E-01	2.0761E-01	5.2112E-04	0.0000E+00	2.2285E+04	2.2285E+04	0.0000E+00	2.2285E+04	2.2285E+04
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
1.1752E+00	0.0000E+00	1.1752E+00	1.8422E+00	4.1222E-03	0.0000E+00	1.7628E+05	1.7628E+05	0.0000E+00	1.7628E+05	1.7628E+05
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
1.9855E+00	0.0000E+00	1.9855E+00	2.7745E+00	6.9844E-03	0.0000E+00	2.9783E+05	2.9783E+05	0.0000E+00	2.9783E+05	2.9783E+05
1.2834E-04	0.0000E+00	1.2834E-04	1.7394E-04	4.5017E-07	0.0000E+00	1.9251E-01	1.9251E-01	0.0000E+00	1.9251E-01	1.9251E-01
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
8.9000E+02	0.0000E+00	8.9000E+02	8.4613E+02	1.0000E+03	0.0000E+00	1.3350E+08	1.3350E+08	0.0000E+00	1.3350E+08	1.3350E+08
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
3.3431E-04	0.0000E+00	3.3431E-04	4.6715E+00	1.1726E-02	0.0000E+00	5.0146E+05	5.0146E+05	0.0000E+00	5.0146E+05	5.0146E+05
5.8894E-04	0.0000E+00	5.8894E-04	8.2297E-04	2.0656E-06	0.0000E+00	8.8340E+01	8.8340E+01	0.0000E+00	8.8340E+01	8.8340E+01
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
1.1510E+02	0.0000E+00	1.1510E+02	1.6100E+02	8.7113E-14	0.0000E+00	1.7265E+07	1.7265E+07	0.0000E+00	1.7265E+07	1.7265E+07
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
6.0157E-04	0.0000E+00	6.0157E-04	8.4063E-04	2.1101E-06	0.0000E+00	9.0236E-01	9.0236E-01	0.0000E+00	9.0236E-01	9.0236E-01
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
6.5550E+01	0.0000E+00	6.5550E+01	9.1599E+01	2.2992E-01	0.0000E+00	9.8325E+06	9.8325E+06	0.0000E+00	9.8325E+06	9.8325E+06
7.1300E+01	0.0000E+00	7.1300E+01	9.9634E+01	2.5009E-01	0.0000E+00	1.0695E+07	1.0695E+07	0.0000E+00	1.0695E+07	1.0695E+07
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
1.0710E+01	0.0000E+00	1.0710E+01	1.4968E+01	3.7567E-02	0.0000E+00	1.6065E+06	1.6065E+06	0.0000E+00	1.6065E+06	1.6065E+06
1.0925E+00	0.0000E+00	1.0925E+00	1.5266E+00	3.8321E-03	0.0000E+00	1.6386E+05	1.6386E+05	0.0000E+00	1.6386E+05	1.6386E+05
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
2.4336E+01	0.0000E+00	2.4336E+01	3.4007E+01	8.5362E-02	0.0000E+00	3.6504E+06	3.6504E+06	0.0000E+00	3.6504E+06	3.6504E+06
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
3.3157E-05	0.0000E+00	3.3157E-05	4.6333E-05	1.1630E-07	0.0000E+00	4.9735E+00	4.9735E+00	0.0000E+00	4.9735E+00	4.9735E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
1.0424E+00	0.0000E+00	1.0424E+00	1.4567E+00	3.8565E-03	0.0000E+00	1.5637E+05	1.5637E+05	0.0000E+00	1.5637E+05	1.5637E+05
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00								

Evaporation Unit.

Case 1:

Stream 8 as Teed
alone.

Sample calc.
for Al

① Unit: $\frac{\text{J.g.}}{\text{kg}}$ 07/13

Input = # 12

$$= 7.776 \times 1.50 \text{ E5}$$
$$= 1.1664 \text{ E6}$$

output = # 14 + # 16

$$= 1.0866 \text{ E1} \times 1.0724 \text{ E5}$$
$$+ 2.7275 \text{ E-2} \times 4.2764 \text{ E4}$$
$$= 1.1652698 \text{ E6}$$
$$+ 0.11664 \text{ E4}$$
$$= 1.16644 \text{ E6}$$

So Input = Output

② Feed.

Input = #8 + #10

$$\begin{aligned} &= 7.776 \times 10^5 \\ &\quad + 0 \\ &= 1.16644 \times 10^6 \\ \text{outpwt} &= 12 \\ &= 7.776 \times 10^5 \\ &= 1.16644 \times 10^6 \end{aligned}$$

So:
Input = output
O.K.

[illegible]

In this case, stream #10 only. Stream #8 set to zero

① Unit balance

$$\begin{aligned} \text{Input} &= \#12 \\ &= 1.000E-2 \times 6.4E4 \\ &= 6.4E2 \\ \text{output} &= \#14 + \#16 \\ &= 1.9615E-2 \times 3.2596E4 + \\ &\quad 2.038E-2 \times 3.140E4 \\ &= 6.40E2 \end{aligned}$$

Input = output

② Feed entrance

$$\#8 = 0$$

④ input = #0

Output = #12

Visual examination
this is true.

O.K.

93

July 13/02

In this case

i) Unit Balance.

Input = #20 + #22

$$= 5.8844 \times 3.2596 E 4$$

+ 0

$$= 1.918125$$

output = #24 + #26

$$= 3,0378 \times 4.0059 \text{ E } 4$$

+7.0118E4

$$= 1.9181 \text{ E } 5$$

Input = output

O.k

② Feed Entrance

use Cl:

Input = #14

$$= 5.8844 \times 3.259654$$

output = #20

$$= 5.8844 \times 3.2596 \text{e} 4$$

Input = output.

O.k

③ Stream 22

has only water
since the feed
does not have
envelope

[illegible]

① Unit balance.

Input, and out

put
has been verified in
case 1 and case 2

② Feed Entrance

For All:

Input = #8 + #10

$$= 7.776 \times 10^4 + 1.00 \times 10^{-2} \times 6.4 \times 10^4$$
$$= 1.16704 \text{E}6$$

out|out = #12

$$= 5.4535 \text{E}0 \times 2.14 \text{E}5$$
$$= 1.16704 \text{E} 6$$

So: $\text{Input} = \text{Output}$

O.k.

③

Flow

Q

H₂O

July 16/60

Case 3

In this case:

Stream 14 $\neq 0$
Stream 18 $\neq 0$
None C Feed

① Unit Balance

Calculation same as
in cases 1 and 2.

② Feed Entrance:

② Feed Entrance:

$$\begin{aligned} \text{Input} &= \#14 + \#18 \\ &= 5.8844 \times 10^4 \\ &\quad + 3.0 \times 10^4 \\ &= 8.8844 \times 10^4 \end{aligned}$$
$$\begin{aligned} \text{output} &= \$20 \\ &= 3.4733 \times 9.6596E4 \\ &= 3.3381E5 \end{aligned}$$

Input = Output
O.k.

③ Same as +n
Cases 1 and 2.

[illegible]

Sum=	1.3667E+05	0.0000E+00
------	------------	------------

1.3667E+05 -This is the total solids generated in the unit which is the sum of * and ** (see below)

* 0.0000E+00 -Total solids produced from added agent (agent was added as solution, no solids)

** 1.3667E+05 -Total solid produced from feed in the unit (due to chemistry change, excluding water)

- This case!

Stream 24 #0

Stream 28 20

Unit Balance

Na:

Input: #40 + #41 + #42

$$= 1.5214 \times 10^2 \times 1.2641 \times 10^5$$
 $+ 2.30 \text{ E}3$
$$= 1.9238 \text{ E}7 + 2300$$
$$= 1.92406 \times 10^7 \text{ g/d}$$

output = # 43¹⁶ + 44 + #48

$$= 2.30 \text{ E}3 + 69.636 \times 276.26$$
$$+ 1.5204 \text{E} 2 * 1.2641 \text{E} 5$$

$= 2300 + 14237.64$

1.42195 / E /

192407E1 8/d

② Feed Entrance

Input = #24

output = # 40

The table shows
the two streams
are the same

O.K.

initially) 2 4
those from added agent).

Feed from Preceding Unit Only															
Unit Mass Summaries and Mass Balances										Mass Balances					
Mass Summaries										Unit			Feed		
										Out - In	In	Out	Out - In	In	Out
Stream No	24	28	40	41	42	43	44	48		40+41+42	43+44+48		24+28	40	
Stream Name	20	20	20	20	20	20	20	20							
Stream Temp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Feed A (%)	95.0	0.0	95.0	0.0	0.0	0.0	0.0	95.0	0.0000	0.0000E+00	0.0000E+00	0.0000E+00	1.5158E+10	1.5158E+10	
Feed B (%)	5.0	0.0	5.0	0.0	0.0	0.0	0.0	5.0	0.0000	0.0000E+00	0.0000E+00	0.0000E+00	7.9787E+08	7.9787E+08	
Feed C (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Feed D (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0000E+00	1.6021E+08	1.6021E+08	0.0000E+00	1.5953E+09	1.5953E+09	
Mass Flow, g/d	1.5953E+08	0.0000E+00	1.5953E+08	4.0000E+05	2.7500E+05	4.0000E+05	3.2600E+05	1.5948E+08	0.0000E+00	1.2708E+05	1.2708E+05	0.0000E+00	1.2641E+05	1.2641E+05	
Volume Flow, L	1.2641E+05	0.0000E+00	1.2641E+05	4.0000E+02	2.7500E+02	4.0000E+02	2.7626E+02	1.2641E+05	0.0000E+00						
Density, g/L	1.2621E+03	0.0000E+00	1.2621E+03	1.0000E+03	1.0000E+03	1.0000E+03	1.1800E+03	1.2617E+03	0.0000E+00	4.2482E+15	4.2482E+15	0.0000E+00	4.2482E+15	4.2482E+15	
Activity Flow, Bq	4.2482E+15	0.0000E+00	4.2482E+15	0.0000E+00	0.0000E+00	0.0000E+00	3.6275E+15	6.2074E+14	0.0000E+00						
Component	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/d	Mass, g/d	Mass, g/d	Mass, g/L	Mass, g/L	g/d	g/d	g/d	g/d	g/d	g/d	
INORGANICS															
Ag	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Al	9.2181E+00	0.0000E+00	9.2181E+00	0	0	0	4.2178E+00	9.2090E+00	0.0000E+00	1.1652E+06	1.1652E+06	0.0000E+00	1.1652E+06	1.1652E+06	
Am/Am241,242	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
As	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
B	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Ba/Ba137	6.5431E-06	0.0000E+00	6.5431E-06	0	0	0	2.9938E-06	6.5366E-06	0.0000E+00	8.2709E-01	8.2709E-01	0.0000E+00	8.2709E-01	8.2709E-01	
Be	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Bi	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
C (as CO3)	1.1855E-05	0.0000E+00	1.1855E-05	0	0	0	5.4242E-06	1.1843E-05	0.0000E+00	1.4985E+00	1.4985E+00	0.0000E+00	1.4985E+00	1.4985E+00	
Ca	2.3662E-03	0.0000E+00	2.3662E-03	0	0	0	1.0827E-03	2.3638E-03	0.0000E+00	2.9910E+02	2.9910E+02	0.0000E+00	2.9910E+02	2.9910E+02	
Cd	2.8448E-03	0.0000E+00	2.8448E-03	0	0	0	1.3017E-03	2.8420E-03	0.0000E+00	3.5960E+02	3.5960E+02	0.0000E+00	3.5960E+02	3.5960E+02	
Co	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Cl	-8.537E-02	0.0000E+00	-8.537E-02	0	0	0	-4.0511E-02	-8.449E-02	0.0000E+00	-1.1192E+04	-1.1192E+04	0.0000E+00	-1.1192E+04	-1.1192E+04	
CN	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Co/Co60	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Cr	1.3434E+00	0.0000E+00	1.3434E+00	0	0	0	6.1486E-01	1.3421E+00	0.0000E+00	1.6981E+05	1.6981E+05	0.0000E+00	1.6981E+05	1.6981E+05	
Ca/Ca137,134	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Cu	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Eu/Eu154,155	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
F	2.3537E+00	0.0000E+00	2.3537E+00	0	0	0	1.0770E+00	2.3514E+00	0.0000E+00	2.9753E+05	2.9753E+05	0.0000E+00	2.9753E+05	2.9753E+05	
Fe	3.6386E-03	0.0000E+00	3.6386E-03	0	0	0	1.6649E-03	3.6350E-03	0.0000E+00	4.5995E+02	4.5995E+02	0.0000E+00	4.5995E+02	4.5995E+02	
H2(Molecule)	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
H2O/H3	8.5862E+02	0.0000E+00	8.5862E+02	3.9600E+05	2.6870E+05	3.9600E+05	9.7262E+02	8.5863E+02	0.0000E+00	1.0920E+08	1.0920E+08	0.0000E+00	1.0854E+08	1.0854E+08	
Hg	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
U129	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
K	3.7794E+00	0.0000E+00	3.7794E+00	0	0	0	1.7289E+00	3.7756E+00	0.0000E+00	4.7774E+05	4.7774E+05	0.0000E+00	4.7774E+05	4.7774E+05	
La	6.9816E-04	0.0000E+00	6.9816E-04	0	0	0	3.1945E-04	6.9747E-04	0.0000E+00	8.8252E+01	8.8252E+01	0.0000E+00	8.8252E+01	8.8252E+01	
Li	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Mg	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Mn	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Mo	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
N2(Molecule)	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Na	1.5219E+02	0.0000E+00	1.5219E+02	2.3000E+03	0	2.3000E+03	6.9636E+01	1.5204E+02	0.0000E+00	1.9240E+07	1.9240E+07	0.0000E+00	1.9238E+07	1.9238E+07	
Np/Np-237	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
NH3(Molecule)	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Ni/Ni63,59	7.1314E-06	0.0000E+00	7.1314E-06	0	0	0	3.2630E-06	7.1243E-06	0.0000E+00	9.0146E-01	9.0146E-01	0.0000E+00	9.0146E-01	9.0146E-01	
NO2(molecule)	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
NO2	7.5803E+01	0.0000E+00	7.5803E+01	0	0	0	3.4684E+01	7.5728E+01	0.0000E+00	9.5821E+06	9.5821E+06	0.0000E+00	9.5821E+06	9.5821E+06	
NO3	1.0372E+02	0.0000E+00	1.0372E+02	0	6.2000E+03	0	6.9901E+01	1.0362E+02	0.0000E+00	1.3117E+07	1.3117E+07	0.0000E+00	1.3117E+07	1.3117E+07	
O(If others, Not OH)	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
OH	2.4579E+01	0.0000E+00	2.4579E+01	1.7000E+03	0	1.7000E+03	1.1246E+01	2.4554E+01	0.0000E+00	3.1068E+06	3.1068E+06	0.0000E+00	3.1068E+06	3.1068E+06	
P (as PO4)	1.2951E+00	0.0000E+00	1.2951E+00	0	0	0	5.9259E-01	1.2938E+00	0.0000E+00	1.6371E+05	1.6371E+05	0.0000E+00	1.6371E+05	1.6371E+05	
Pb	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Pu/Pu238-241	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
S (as SO4)	2.8666E+01	0.0000E+00	2.8666E+01	0	0	0	1.3116E+01	2.8637E+01	0.0000E+00	3.6235E+06	3.6235E+06	0.0000E+00	3.6235E+06	3.6235E+06	
Sb	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Se	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Si	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Sm/Sm151	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Sr/Sr90	5.6216E-01	0.0000E+00	5.6216E-01	0	0	0	2.5722E-01	5.6166E-01	0.0000E+00	7.1061E+04	7.1061E+04	0.0000E+00	7.1061E+04	7.1061E+04	
Te/Te99	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Th/Th232,229	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Ti	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
U/U233-238	1.2358E-02	0.0000E+00	1.2358E-02	0	0	0	6.5544E-03	1.2345E-02	0.0000E+00	1.5621E+03	1.5621E+03	0.0000E+00	1.5621E+03	1.5621E+03	
Y/Y90	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Zn	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Zr	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
Others Inorg.	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
ORGANICS															
Acetate	0	0.0000E+00	0	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00			

This Case:

Stream 24 $\phi = 0$

Stream 28 $\neq 0$

Unit Balance

should be the same as in case i, although the values are different. (The formula are the same)

Omitted

Tool Expenses

Input = #28

output = # 40

Table shows this is true.

O.k.

Case 3

Cs - Column Unit

July 16/00

This case:

Stream 24 $\neq 0$

Stream 28 $\neq 0$

① Unit Balance :

skipped

② Feed Entrance
Blance:

Input = #24 + #28

$$= 1.5219 \text{ e } 2 \times 1.2641 \text{ e } 5$$
$$+ 8.2 \text{ E1} * 6.4 \text{ E4}$$
$$= \cancel{19758657} \text{ (11)}$$

07/16/00

- 244.87 t/s

Output = #40

$$1.2860 \pm 2 \times 1.4041 \text{ e5}$$
$$= 2.4487 \text{E}7$$

o.k

Unit Mass Summaries and Mass Balances														
Mass Summaries								Mass Balances						
								Unit			Feed			
								Out - In	In	Out	Out - In	In	Out	
Stream No	24	28	40	41	42	43	44	48						
Stream Name	20	20	20	20	20	20	20	20		40+41+42	43+44+48		24+28	40
Feed A (%)	0.0	100.0	100.0	0.0	0.0	0.0	0.0	100.0	0.0000			0.0000E+00	7.3648E+06	7.3648E+06
Feed B (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0000			0.0000E+00	0.0000E+00	0.0000E+00
Feed C (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0000			0.0000E+00	0.0000E+00	0.0000E+00
Feed D (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0000			0.0000E+00	0.0000E+00	0.0000E+00
Mass Flow, g/d	0.0000E+00	7.3648E+07	7.3648E+07	4.0000E+05	2.7500E+05	4.0000E+05	2.8583E+05	7.3637E+07	0.0000E+00	7.4323E+07	7.4329E+07	0.0000E+00	7.3648E+07	7.3648E+07
Volume Flow, L	0.0000E+00	6.4000E+04	6.4000E+04	4.0000E+02	2.7500E+02	4.0000E+02	2.7586E+02	6.3999E+04	0.0000E+00	6.4675E+04	6.4675E+04	0.0000E+00	6.4000E+04	6.4000E+04
Density, g/L	0.0000E+00	1.1570E+03	1.1507E+03	1.0000E+03	1.0000E+03	1.0000E+03	1.0370E+03	1.1505E+03	0.0000E+00			0.0000E+00	1.1570E+03	1.1507E+03
Activity Flow, kg	0.0000E+00	8.2273E+14	8.2273E+14	0.0000E+00	0.0000E+00	0.0000E+00	8.1200E+14	1.0737E+15	0.0000E+00	8.2273E+14	8.2273E+14	0.0000E+00	8.2273E+14	8.2273E+14
Component*	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/d	Mass, g/d	Mass, g/d	Mass, g/L	Mass, g/L	g/d	g/d	g/d	g/d	g/d	g/d
INORGANICS														
Ag	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Al	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Am/Am241,242	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
As	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
B	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Ba/Ba137	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Be	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Bi	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C (as CO3)	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Cd	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Ce	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Cl	0.0000E+00	3.0000E+00	3.0000E+00	0	0	0	6.9656E-01	2.9970E+00	0.0000E+00	1.9200E+05	1.9200E+05	0.0000E+00	1.9200E+05	1.9200E+05
CN	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Co/Co60	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Cr	0.0000E+00	1.7994E-01	1.7994E-01	0	0	0	4.1779E-02	1.7976E-01	0.0000E+00	1.1516E+04	1.1516E+04	0.0000E+00	1.1516E+04	1.1516E+04
Ca/Ca137,134	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Cu	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Eu/Eu154,155	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
F	0.0000E+00	2.0000E+00	2.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Fe	0.0000E+00	2.9527E-01	2.9527E-01	0	0	0	6.8558E-02	2.9498E-01	0.0000E+00	1.8937E+04	1.8937E+04	0.0000E+00	1.8937E+04	1.8937E+04
H2(Molecule)	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
H2O/H3	0.0000E+00	9.8157E+02	9.8157E+02	3.9600E+05	2.6870E+05	3.9600E+05	9.7482E+02	9.8158E+02	0.0000E+00	6.3485E+07	6.3485E+07	0.0000E+00	6.3485E+07	6.3485E+07
Hg	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
I/I129	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
K	0.0000E+00	1.8935E+00	1.8935E+00	0	0	0	4.3965E-01	1.8916E+00	0.0000E+00	1.2118E+05	1.2118E+05	0.0000E+00	1.2118E+05	1.2118E+05
L	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Li	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Mg	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Mn	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Mo	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
N2(Molecule)	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Np	0.0000E+00	8.2000E+01	8.2000E+01	2.3000E+03	0	2.3000E+03	1.9039E+01	8.1919E+01	0.0000E+00	5.2503E+06	5.2503E+06	0.0000E+00	5.2408E+06	5.2408E+06
Np/Np-237	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
NH3(Molecule)	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
NI/Ni63,59	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
NO2(molecule)	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
NO2	0.0000E+00	2.3409E+01	2.3409E+01	0	0	0	5.4352E+02	2.3386E+01	0.0000E+00	1.4982E+06	1.4982E+06	0.0000E+00	1.4982E+06	1.4982E+06
NO3	0.0000E+00	5.0922E+01	5.0922E+01	0	6.2000E+03	0	3.4316E+01	5.0871E+01	0.0000E+00	3.2652E+06	3.2652E+06	0.0000E+00	3.2590E+06	3.2590E+06
O (in others, Not O2)	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
P	0.0000E+00	5.0000E+00	5.0000E+00	1.7000E+03	0	1.7000E+03	1.1609E+00	4.9950E+00	0.0000E+00	3.2170E+05	3.2170E+05	0.0000E+00	3.2000E+05	3.2000E+05
Pb (as PO4)	0.0000E+00	7.3893E-01	7.3893E-01	0	0	0	1.7157E-01	7.3820E-01	0.0000E+00	4.7292E+04	4.7292E+04	0.0000E+00	4.7292E+04	4.7292E+04
Pb	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Pu/Pu238-241	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
S (as SO4)	0.0000E+00	1.7374E+00	1.7374E+00	0	0	0	4.0304E-01	1.7357E+00	0.0000E+00	1.1119E+05	1.1119E+05	0.0000E+00	1.1119E+05	1.1119E+05
Se	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Sb	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Si	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Sm/Sm151	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Sn/Sn90	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
To/To99	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Th/Th232,229	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Ti	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
U/U233-238	0.0000E+00	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Unit Mass Summaries and Mass Balances													
Mass Summaries								Mass Balances					
								Unit			Feed		
24	28	40	41	42	43	44	46	Out - In	In	Out	Out - In	In	Out
20	20	20	20	20	20	20	20		40+41+42	43+44+46		24+28	40
0.0	100.0	31.6	0.0	0.0	0.0	0.0	0.0	0.0000			0.0000E+00	7.3648E+09	7.3648E+09
95.0	0.0	65.0	0.0	0.0	0.0	0.0	65.0	0.0000			0.0000E+00	1.5158E+10	1.5158E+10
0.0	0.0	3.4	0.0	0.0	0.0	0.0	3.4	0.0000			0.0000E+00	7.9767E+08	7.9767E+08
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0000			0.0000E+00	0.0000E+00	0.0000E+00
1.5595E+08	7.3648E+07	2.3318E+08	4.0000E+05	2.7500E+05	4.0000E+05	3.9893E+05	2.3318E+08	0.0000E+00	2.3386E+08	2.3386E+08	0.0000E+00	2.3318E+08	2.3318E+08
1.2841E+05	6.4000E+04	1.9041E+05	4.0000E+02	2.7500E+02	4.0000E+02	2.7690E+02	1.9041E+05	0.0000E+00	1.9108E+05	1.9108E+05	0.0000E+00	1.9041E+05	1.9041E+05
1.2821E+03	1.1507E+03	1.2246E+03	1.0000E+03	1.0000E+03	1.0000E+03	1.2164E+03	1.2246E+03	0.0000E+00			0.0000E+00		
4.2482E+15	8.2273E+14	5.0710E+15	0.0000E+00	0.0000E+00	0.0000E+00	4.4395E+15	6.3148E+14	0.0000E+00	5.0710E+15	5.0710E+15	0.0000E+00	5.0710E+15	5.0710E+15
Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/d	Mass, g/d	Mass, g/d	Mass, g/L	Mass, g/L	g/d	g/d	g/d	g/d	g/d	g/d
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.2181E+00	0.0000E+00	0.1197E+00	0	0	0	4.2081E+00	6.1139E+00	0.0000E+00	1.1652E+06	1.1652E+06	0.0000E+00	1.1652E+06	1.1652E+06
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
6.5431E-06	0.0000E+00	4.3438E-06	0	0	0	2.9869E-06	4.3395E-06	0.0000E+00	8.2709E-01	8.2709E-01	0.0000E+00	8.2709E-01	8.2709E-01
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
1.1855E-05	0.0000E+00	7.8700E-06	0	0	0	5.4118E-06	7.8622E-06	0.0000E+00	1.4985E+00	1.4985E+00	0.0000E+00	1.4985E+00	1.4985E+00
2.3682E-03	0.0000E+00	1.5708E-03	0	0	0	1.0802E-03	1.5693E-03	0.0000E+00	2.9910E+02	2.9910E+02	0.0000E+00	2.9910E+02	2.9910E+02
2.8448E-03	0.0000E+00	1.8886E-03	0	0	0	1.2888E-03	1.8887E-03	0.0000E+00	3.5960E+02	3.5960E+02	0.0000E+00	3.5960E+02	3.5960E+02
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
-8.8537E-02	3.0000E+00	8.4959E-01	0	0	0	8.5296E-01	9.4858E-01	0.0000E+00	1.8081E+05	1.8081E+05	0.0000E+00	1.8081E+05	1.8081E+05
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
1.3434E+00	1.7944E-01	5.5233E-01	0	0	0	6.5485E-01	9.5139E-01	0.0000E+00	1.8133E+05	1.8133E+05	0.0000E+00	1.8133E+05	1.8133E+05
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
2.3537E+00	0.0000E+00	1.5628E+00	0	0	0	1.0745E+00	1.5610E+00	0.0000E+00	2.9753E+05	2.9753E+05	0.0000E+00	2.9753E+05	2.9753E+05
3.6386E-03	2.9527E-01	1.0166E-01	0	0	0	6.9908E-02	1.0150E-01	0.0000E+00	1.9357E+04	1.9357E+04	0.0000E+00	1.9357E+04	1.9357E+04
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
8.5862E+02	9.8167E+02	8.9956E+02	3.9800E+05	2.6870E+05	3.960E+05	9.7037E+02	8.9996E+02	0.0000E+00	1.7202E+08	1.7202E+08	0.0000E+00	1.7136E+08	1.7136E+08
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
3.7794E+00	1.8935E+00	3.1455E+00	0	0	0	1.2629E+00	3.1424E+00	0.0000E+00	5.9892E+05	5.9892E+05	0.0000E+00	5.9892E+05	5.9892E+05
6.9816E-04	0.0000E+00	4.6349E-04	0	0	0	3.1671E-04	4.6303E-04	0.0000E+00	8.8252E-01	8.8252E-01	0.0000E+00	8.8252E-01	8.8252E-01
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
1.5219E+02	8.2000E+01	1.2860E+02	2.3000E+03	0	2.3000E+03	8.8428E+01	1.2847E+02	0.0000E+00	2.4488E+07	2.4488E+07	0.0000E+00	2.4488E+07	2.4488E+07
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
7.1314E-06	0.0000E+00	4.7344E-06	0	0	0	3.2555E-06	4.7297E-06	0.0000E+00	9.0146E-01	9.0146E-01	0.0000E+00	9.0146E-01	9.0146E-01
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
7.5803E+01	2.3409E+01	5.8192E+01	0	0	0	4.0015E+01	5.8135E+01	0.0000E+00	1.1080E+07	1.1080E+07	0.0000E+00	1.1080E+07	1.1080E+07
1.0372E+02	5.0922E+01	8.5974E+01	0	6.2000E+03	0	8.1609E+01	8.5889E+01	0.0000E+00	1.6376E+07	1.6376E+07	0.0000E+00	1.6376E+07	1.6376E+07
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
2.4579E+01	5.0000E+00	1.7998E+01	1.7000E+03	0	1.7000E+03	1.2376E+01	1.7980E+01	0.0000E+00	3.4286E+06	3.4286E+06	0.0000E+00	3.4286E+06	3.4286E+06
1.2951E+00	7.3893E-01	1.1082E+00	0	0	0	7.6201E-01	1.1071E+00	0.0000E+00	2.1100E+05	2.1100E+05	0.0000E+00	2.1100E+05	2.1100E+05
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
2.8666E+01	1.7374E+01	1.9814E+01	0	0	0	1.3487E+01	1.9595E+01	0.0000E+00	3.7347E+06	3.7347E+06	0.0000E+00	3.7347E+06	3.7347E+06
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
5.6216E-01	0.0000E+00	3.7320E-01	0	0	0	2.5683E-01	3.7283E-01	0.0000E+00	7.1061E+04	7.1061E+04	0.0000E+00	7.1061E+04	7.1061E+04
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
1.2358E-02	0.0000E+00	8.2040E-03	0	0	0	5.6413E-03	8.1959E-03	0.0000E+00	1.5621E+03	1.5621E+03	0.0000E+00	1.5621E+03	1.5621E+03
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0	0.0000E+00	0.0000E+00	0	0									

Tc ~ column Cas 1 (There is No case 2 or 3)

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July. 07/17/00

Feed from Preceding Unit Only														
Unit Mass Summaries and Mass Balances														
Mass Balances														
Mass Summaries								Unit						
								In		Out		Feed		
								Out - In	In	Out	Out - In	In	Out	
Stream No	(Pre+Aux)	Feed (Fd)	48	51	52	53	54	58		48+51+52	53+54+58			
Stream Name			20	20	20	20	20	20						
Stream Temp			0.0	0.0	0.0	0.0	0.0	0.0	0.0000			0.0000E+00		
Feed A (%)			95.0	0.0	0.0	0.0	0.0	95.0	0.0000			0.0000E+00		
Feed B (%)			5.0	0.0	0.0	0.0	0.0	5.0	0.0000			0.0000E+00		
Feed C (%)			0.0	0.0	0.0	0.0	0.0	0.0	0.0000			0.0000E+00		
Feed D (%)			0.0000E+00	0.0000E+00	1.5948E+08	3.0000E+05	2.2000E+06	3.0000E+05	2.2509E+06	1.5943E+09	0.0000E+00	1.6198E+08	1.6198E+08	0.0000E+00
Mass Flow, g/s	0.0000E+00	0.0000E+00	1.2841E+05	3.0000E+02	2.2000E+03	3.0000E+02	2.2126E+03	1.2639E+05	0.0000E+00	1.2891E+05	1.2891E+05	0.0000E+00	0.0000E+00	0.0000E+00
Volume Flow, L/s	0.0000E+00	0.0000E+00	1.2617E+03	1.0000E+03	1.0000E+03	1.0000E+03	1.0173E+03	1.2614E+03	0.0000E+00	6.2074E+14	6.2074E+14	0.0000E+00	0.0000E+00	0.0000E+00
Density, g/L	0.0000E+00	0.0000E+00	6.2074E+14	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.4191E+11	6.2010E+14	0.0000E+00	6.2074E+14	6.2074E+14	0.0000E+00	0.0000E+00
Activity Flow, B														
Component		Mass, g/L	Mass, g/d	Mass, g/d	Mass, g/d	Mass, g/L	Mass, g/L	g/d	g/d	g/d	g/d	g/d	g/d	g/d
INORGANICS		0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Ag		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Al		0.0000E+00	0.0000E+00	9.2090E+00	0	0	0	5.2610E-01	9.2007E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Am/Am241,242		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
As		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
B		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Ba/Ba137		0.0000E+00	0.0000E+00	6.5366E-06	0	0	0	3.7343E-07	6.5307E-06	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Be		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Bi		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
C (as CO3)		0.0000E+00	0.0000E+00	1.1843E-05	0	0	0	6.7657E-07	1.1832E-05	0.0000E+00	1.4970E+00	1.4970E+00	0.0000E+00	0.0000E+00
Ca		0.0000E+00	0.0000E+00	2.3638E-03	0	0	0	1.3504E-04	2.3617E-03	0.0000E+00	2.9880E+02	2.9880E+02	0.0000E+00	0.0000E+00
Cd		0.0000E+00	0.0000E+00	2.8420E-03	0	0	0	1.6238E-04	2.8394E-03	0.0000E+00	3.5924E+02	3.5924E+02	0.0000E+00	0.0000E+00
Ce		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Cl		0.0000E+00	0.0000E+00	-8.8449E-02	0	0	0	-5.0530E-03	-8.8370E-02	0.0000E+00	-1.1180E+04	-1.1180E+04	0.0000E+00	0.0000E+00
CN		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Co/Co60		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Cr		0.0000E+00	0.0000E+00	1.3421E+00	0	0	0	7.6671E-02	1.3409E+00	0.0000E+00	1.6964E+05	1.6964E+05	0.0000E+00	0.0000E+00
Ca/Ca137,134		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Cu		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Eu/Eu154,155		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
F		0.0000E+00	0.0000E+00	2.3514E+00	0	0	0	1.3433E-01	2.3493E+00	0.0000E+00	2.9723E+05	2.9723E+05	0.0000E+00	0.0000E+00
Fe		0.0000E+00	0.0000E+00	3.6350E-03	0	0	0	2.0768E-04	3.6317E-03	0.0000E+00	4.5949E+02	4.5949E+02	0.0000E+00	0.0000E+00
H2(Molecule)		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
H2O/H3		0.0000E+00	0.0000E+00	8.5863E+02	2.9600E+05	2.1370E+06	2.9600E+05	9.6581E+02	8.5872E+02	0.0000E+00	1.1097E+08	1.1097E+08	0.0000E+00	0.0000E+00
Hg		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
U129		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
K		0.0000E+00	0.0000E+00	3.7756E+00	0	0	0	2.1570E-01	3.7722E+00	0.0000E+00	4.7726E+05	4.7726E+05	0.0000E+00	0.0000E+00
La		0.0000E+00	0.0000E+00	6.9747E-04	0	0	0	3.9846E-05	6.9684E-04	0.0000E+00	8.8164E+01	8.8164E+01	0.0000E+00	0.0000E+00
Li		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Mg		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Mn		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Mo		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
N2(Molecule)		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Na		0.0000E+00	0.0000E+00	1.5204E+02	2.3000E+03	0	2.3000E+03	8.6859E+01	1.5190E+02	0.0000E+00	1.9221E+07	1.9221E+07	0.0000E+00	0.0000E+00
Np/Np-237		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
NH3(Molecule)		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
NI/US-59		0.0000E+00	0.0000E+00	7.1243E-06	0	0	0	4.0700E-07	7.1178E-06	0.0000E+00	9.0055E-01	9.0055E-01	0.0000E+00	0.0000E+00
NO2(Molecule)		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
NO2		0.0000E+00	0.0000E+00	7.5728E+01	0	0	0	4.3263E+00	7.5690E+01	0.0000E+00	9.5725E+06	9.5725E+06	0.0000E+00	0.0000E+00
NO3		0.0000E+00	0.0000E+00	1.0362E+02	0	6.2000E+04	0	3.3940E+01	1.0353E+02	0.0000E+00	1.3160E+07	1.3160E+07	0.0000E+00	0.0000E+00
O1n others, Nc		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
OH		0.0000E+00	0.0000E+00	2.4554E+01	1.7000E+03	0	1.7000E+03	1.4028E+00	2.4532E+01	0.0000E+00	3.1055E+06	3.1055E+06	0.0000E+00	0.0000E+00
P (as PO4)		0.0000E+00	0.0000E+00	1.2938E+00	0	0	0	7.3915E-02	1.2927E+00	0.0000E+00	1.6355E+05	1.6355E+05	0.0000E+00	0.0000E+00
Pb		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Pu/Pu238-241		0.0000E+00	0.0000E+00	0	0	0	0	1.6360E+00	2.8611E+01	0.0000E+00	3.6199E+06	3.6199E+06	0.0000E+00	0.0000E+00
S (as SO4)		0.0000E+00	0.0000E+00	2.8637E+01	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Sb		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Se		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Si		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Sm/Sm151		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Sr/Sr90		0.0000E+00	0.0000E+00	5.6160E-01	0	0	0	3.2084E-02	5.6108E-01	0.0000E+00	7.0889E+04	7.0889E+04	0.0000E+00	0.0000E+00
To/Te99		0.0000E+00	0.0000E+00	0	0	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Ti/Th232,229		0.0000E+00	0.0000E+00	0	0									

Melter Feed Evaporator Case 1

July 17/00

Feed from Preceding Unit Only

Unit Mass Summaries and Mass Balances											
Mass Summaries					Mass Balances						
					Unit			Feed			
					Out - In	In	Out	Out - In	In	Out	
58	70	72	74	76	Output-Inp	72	74+76	d-(Pre&Aux)	58+70	72	
20	20		20	20							
0	0	0	0	0	0.0000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
95	0	95	95	95	0.0000	1.5146E+10	1.5146E+10	0.0000E+00	1.5146E+10	1.5146E+10	
5	0	5	5	5	0.0000	7.8716E+08	7.8716E+08	0.0000E+00	7.8716E+08	7.8716E+08	
0	0	0	0	0	0.0000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
1.5943E+08	0.0000E+00	1.5943E+08	1.1987E+08	3.9560E+07	0.0000E+00	1.5943E+08	1.5943E+08	0.0000E+00	1.5943E+08	1.5943E+08	
1.2639E+05	0.0000E+00	1.2639E+05	8.8664E+04	3.9529E+04	0.0000E+00	1.2639E+05	1.2639E+05	0.0000E+00	1.2639E+05	1.2639E+05	
1.2614E+03	0.0000E+00	1.2614E+03	1.3000E+03	1.0008E+03	0.0000E+00	1.2614E+03	1.2614E+03	0.0000E+00	1.2614E+03	1.2614E+03	
6.2010E+14	0.0000E+00	6.2010E+14	6.1948E+14	6.2010E+11	0.0000E+00	6.2010E+14	6.2010E+14	0.0000E+00	6.2010E+14	6.2010E+14	
Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/d	Mass, g/d	Mass, g/d	Mass, g/d	Mass, g/d	Mass, g/d	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
9.2007E+00	0.0000E+00	9.2007E+00	1.3374E+01	2.9419E-02	0.0000E+00	1.1629E-06	1.1629E-06	0.0000E+00	1.1629E-06	1.1629E-06	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
6.5307E-06	0.0000E+00	6.5307E-06	9.4931E-06	2.0882E-08	0.0000E+00	8.2544E-01	8.2544E-01	0.0000E+00	8.2544E-01	8.2544E-01	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
1.1832E-05	0.0000E+00	1.1832E-05	1.7199E-05	3.7833E-08	0.0000E+00	1.4955E-00	1.4955E-00	0.0000E+00	1.4955E-00	1.4955E-00	
2.3617E-03	0.0000E+00	2.3617E-03	3.4330E-03	7.5515E-06	0.0000E+00	2.9850E-02	2.9850E-02	0.0000E+00	2.9850E-02	2.9850E-02	
2.8394E-03	0.0000E+00	2.8394E-03	4.1274E-03	9.0790E-06	0.0000E+00	3.5888E-02	3.5888E-02	0.0000E+00	3.5888E-02	3.5888E-02	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
-8.8370E-02	0.0000E+00	-8.8370E-02	-1.2845E-01	-2.8256E-04	0.0000E+00	-1.1189E-04	-1.1189E-04	0.0000E+00	-1.1189E-04	-1.1189E-04	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
1.3409E+00	0.0000E+00	1.3409E+00	1.9491E+00	4.2874E-03	0.0000E+00	1.6948E+05	1.6948E+05	0.0000E+00	1.6948E+05	1.6948E+05	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
2.3493E+00	0.0000E+00	2.3493E+00	3.4149E+00	7.5118E-03	0.0000E+00	2.9693E+02	2.9693E+02	0.0000E+00	2.9693E+02	2.9693E+02	
3.6317E-03	0.0000E+00	3.6317E-03	5.2791E-03	1.1612E-05	0.0000E+00	4.5903E-02	4.5903E-02	0.0000E+00	4.5903E-02	4.5903E-02	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
8.5872E-02	0.0000E+00	8.5872E-02	7.9442E-02	1.0000E+03	0.0000E+00	1.0854E+08	1.0854E+08	0.0000E+00	1.0854E+08	1.0854E+08	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
3.7722E+00	0.0000E+00	3.7722E+00	5.4833E+00	1.2062E-02	0.0000E+00	4.7678E+05	4.7678E+05	0.0000E+00	4.7678E+05	4.7678E+05	
6.9884E-04	0.0000E+00	6.9884E-04	1.0129E-03	2.2281E-06	0.0000E+00	8.8076E-01	8.8076E-01	0.0000E+00	8.8076E-01	8.8076E-01	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
1.5190E+02	0.0000E+00	1.5190E+02	2.2103E+02	0.0000E+00	0.0000E+00	1.9200E+07	1.9200E+07	0.0000E+00	1.9200E+07	1.9200E+07	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
7.1179E-06	0.0000E+00	7.1179E-06	1.0347E-05	2.2759E-08	0.0000E+00	8.9965E-01	8.9965E-01	0.0000E+00	8.9965E-01	8.9965E-01	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
7.5660E+01	0.0000E+00	7.5660E+01	1.0998E+02	2.4192E-01	0.0000E+00	9.5629E+06	9.5629E+06	0.0000E+00	9.5629E+06	9.5629E+06	
1.0335E-02	0.0000E+00	1.0335E-02	1.5049E-02	3.1022E-01	0.0000E+00	1.3085E-07	1.3085E-07	0.0000E+00	1.3085E-07	1.3085E-07	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
2.4532E+01	0.0000E+00	2.4532E+01	3.5660E+01	7.8441E-02	0.0000E+00	3.1007E+06	3.1007E+06	0.0000E+00	3.1007E+06	3.1007E+06	
1.2927E+00	0.0000E+00	1.2927E+00	1.8790E+00	4.1333E-03	0.0000E+00	1.6338E+05	1.6338E+05	0.0000E+00	1.6338E+05	1.6338E+05	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
2.8611E+01	0.0000E+00	2.8611E+01	4.1590E+01	9.1485E-02	0.0000E+00	3.6163E+06	3.6163E+06	0.0000E+00	3.6163E+06	3.6163E+06	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
5.6109E-01	0.0000E+00	5.6109E-01	8.1561E-01	1.7941E-03	0.0000E+00	7.0918E+04	7.0918E+04	0.0000E+00	7.0918E+04	7.0918E+04	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0	0	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	

Melter Feed Evaporator Case 3

Unit Mass Summaries and Mass Balances												
Mass Summaries						Mass Balances						
						Unit			Feed			
						Out - In	In	Out	Out - In	In	Out	
						Output-In	72	74+76	d-(Pre&A	58+70	72	
58	70	72	74	76	78							
mp	20	20	20	20	20							
(D)	0	100	0	0	0	0.0000	7.1346E+06	7.1346E+06	0.0000E+00	7.1346E+06	7.1346E+06	
(D)	95	0	95	95	95	0.0000	1.5148E+10	1.5148E+10	0.0000E+00	1.5148E+10	1.5148E+10	
(D)	5	0	5	5	5	0.0000	7.9716E+08	7.9716E+08	0.0000E+00	7.9716E+08	7.9716E+08	
(D)	0	0	0	0	0	0.0000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
g	1.5943E+08	7.1346E+04	1.5950E+08	1.1990E+08	3.9599E+07	0.0000E+00	1.5950E+08	1.5950E+08	0.0000E+00	1.5950E+08	1.5950E+08	
W, L	1.2639E+05	8.2000E+01	1.2646E+05	8.6887E+04	3.9568E+04	0.0000E+00	1.2646E+05	1.2646E+05	0.0000E+00	1.2646E+05	1.2646E+05	
W, L	1.2614E+03	1.1507E+03	1.2613E+03	1.3800E+03	1.0000E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
W, L	6.2010E+14	7.9702E+11	6.2090E+14	6.2028E+14	6.2090E+14	0.0000E+00	6.2090E+14	6.2090E+14	0.0000E+00	6.2090E+14	6.2090E+14	
W, L	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/d	Mass, g/d	Mass, g/d	Mass, g/d	Mass, g/d	Mass, g/d	
CS	0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
24	9.2007E+06	0.0000E+00	9.1962E+06	1.3371E+01	2.9390E-02	0.0000E+00	1.1629E+06	1.1629E+06	0.0000E+00	1.1629E+06	1.1629E+06	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
6.5307E-06	0.0000E+00	6.5275E-06	9.4906E-06	2.0861E-08	0.0000E+00	8.2544E-01	8.2544E-01	0.0000E+00	8.2544E-01	8.2544E-01	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
1.1832E-05	0.0000E+00	1.1826E-05	1.7195E-05	3.7796E-08	0.0000E+00	1.4955E+00	1.4955E+00	0.0000E+00	1.4955E+00	1.4955E+00	0.0000E+00	
2.3617E-03	0.0000E+00	2.3605E-03	3.4321E-03	7.5441E-06	0.0000E+00	2.9850E+02	2.9850E+02	0.0000E+00	2.9850E+02	2.9850E+02	0.0000E+00	
2.8394E-03	0.0000E+00	2.8380E-03	4.1263E-03	9.0701E-06	0.0000E+00	3.5888E+02	3.5888E+02	0.0000E+00	3.5888E+02	3.5888E+02	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
-8.370E-02	3.0000E+00	-8.6856E-02	-1.2628E-01	-2.7758E-04	0.0000E+00	-1.0983E+04	-1.0983E+04	0.0000E+00	-1.0983E+04	-1.0983E+04	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
1.3409E+06	1.7994E-01	1.3403E+06	1.9487E+00	4.2834E-03	0.0000E+00	1.6949E+05	1.6949E+05	0.0000E+00	1.6949E+05	1.6949E+05	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
2.3493E+00	0.0000E+00	2.3481E+00	3.4140E+00	7.5044E-03	0.0000E+00	2.9693E+05	2.9693E+05	0.0000E+00	2.9693E+05	2.9693E+05	0.0000E+00	
3.6317E-03	2.9527E-01	3.7747E-03	5.4862E-03	1.2064E-05	0.0000E+00	4.7733E+02	4.7733E+02	0.0000E+00	4.7733E+02	4.7733E+02	0.0000E+00	
8.5872E-02	9.8157E+02	8.5878E-02	7.9446E+02	1.0000E+03	0.0000E+00	1.0860E+08	1.0860E+08	0.0000E+00	1.0860E+08	1.0860E+08	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
3.7722E+00	1.8935E+00	3.7713E+00	5.4832E+00	1.2053E-02	0.0000E+00	4.7690E+05	4.7690E+05	0.0000E+00	4.7690E+05	4.7690E+05	0.0000E+00	
6.9684E-04	0.0000E+00	6.9689E-04	1.0127E-03	2.2259E-06	0.0000E+00	8.8076E+01	8.8076E+01	0.0000E+00	8.8076E+01	8.8076E+01	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
1.5190E+02	8.2000E+01	1.5187E+02	2.2103E+02	0.0000E+00	0.0000E+00	1.9205E+07	1.9205E+07	0.0000E+00	1.9205E+07	1.9205E+07	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
7.1179E-06	0.0000E+00	7.1144E-06	1.0344E-05	2.2737E-08	0.0000E+00	8.9965E-01	8.9965E-01	0.0000E+00	8.9965E-01	8.9965E-01	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
7.5660E+01	2.3409E+01	7.5635E+01	1.0997E+02	2.4172E-01	0.0000E+00	9.5644E+06	9.5644E+06	0.0000E+00	9.5644E+06	9.5644E+06	0.0000E+00	
1.0353E+02	5.0922E+01	1.0350E+02	1.5048E+02	3.3078E-01	0.0000E+00	1.3088E+07	1.3088E+07	0.0000E+00	1.3088E+07	1.3088E+07	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
2.4532E+01	5.0000E+00	2.4523E+01	3.5654E+01	7.8372E-02	0.0000E+00	3.1010E+06	3.1010E+06	0.0000E+00	3.1010E+06	3.1010E+06	0.0000E+00	
1.2927E+00	7.3893E-01	1.2924E+00	1.8791E-01	4.1304E-03	0.0000E+00	1.6343E+05	1.6343E+05	0.0000E+00	1.6343E+05	1.6343E+05	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
2.8611E+01	1.7374E+00	2.8598E+01	4.1580E+01	9.1397E-02	0.0000E+00	3.6164E+06	3.6164E+06	0.0000E+00	3.6164E+06	3.6164E+06	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
5.6109E-01	0.0000E+00	5.6082E-01	8.1540E-01	1.7923E-03	0.0000E+00	7.0918E+04	7.0918E+04	0.0000E+00	7.0918E+04	7.0918E+04	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
1.2334E-02	0.0000E+00	1.2328E-02	1.7925E-02	3.9400E-05	0.0000E+00	1.5590E+03	1.5590E+03	0.0000E+00	1.5590E+03	1.5590E+03	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00						

[illegible]

is the O from the air but not accounted for in feed

This case

Stream 74 = 0

Stream 80 = Stream 82

Sample Calculation for

Q.Y. NO_3
(08/15/00)

Unit Balance

Skipped.

Formula same as in

Case 1

② Entrance Balance

Zurmt = Φ # 80

$$= 5.0922 \bar{e} 1 \times$$

5.5E4

Output = \$82

$$= 5.0922 \text{ E} 1 *$$
$$5.5 \in 4$$

Input = Output

③ oxygen gained

1.6648 E6 g/d

due to

[illegible]

is the Q from the air but not accounted for in feed

July 17/00

- This case

Stream 74 $\neq 0$

Stream 80 $\neq 0$

Sample Calc. for NO_3^-

① unit balance

Formula same as i'n

Case 1

Skipped

② Entrance Balance

$$\text{Input} = \$74 + \$80$$
$$= 1.5049 \text{E} 2 \times 8.6864 \text{E} 4$$

$$+ 50.922 \text{E} 0 \times 5.5 \text{E} 4$$
$$= 1.58729E7$$

Output: #82

$$= 1.1189 \text{E}2 \times 1.4186 \text{E}5$$
$$= 1.58727 \text{ E7}$$

Input = output

O.k.

③ Oxygen gained

15430E7 g/d

due to

July 17/00

To this point, the mass balances in all units and the entrance points of all units have been verified again (in addition to the March verification).

The interface also works fine. No apparent error was found in last week's use.

Note: The interface should never be launched from the VB Editor. If from the Editor, every time the "GoTo" Button is pressed, all the variables in the program are reset, and the user cannot go back to the previous worksheet, and ~~the~~ user form. The program lost tracking ability.

File saved as PRETREAT-July 13.

Read Only on D:\Work\working\ and in Zip Disk

July 08/15/00

July 21/00

To address NRC comments, linking Stream input properties to Envelope A, B, C, or D Waste streams.

Added the following worksheet to the model:

Envelope - A - Comp

Envelope - B - Comp

Envelope - C - Comp

Envelope - D - Comp

for the compositions of these streams. and

Stream-2B for specifying Stream-2 without linking to A, B, C, or D (the second option)

Stream-2, the input stream to the feed is linked to Stream-2B if the user elect not to link, or is linked to the for Envelopes' sheet if the user elect to link.

The Streams Form was modified (see next page) ^{Fig. 1}

a check box was added. if the check box is checked, the Streams Form would look like Fig 2 in the next page.

Validation of the linking calculation see Page III

July 21/00

July 21/60

Streams

Stream Properties

Properties:

Stream No. Current New

Component Properties

Components

Ag

Current Mass

Formula, No

New Mass

Current Activity

Formula, No

New Activity

Spreadsheet

Navigation buttons: Left arrow, Up arrow, Down arrow, Right arrow, Print, GoTo

Back

☐ Stream Composition Linked to Envelope A, B, C or D

591

Streams Form after modification.
a check box added.

Streams

Stream Properties

Properties: Current: New

Stream No 2

**Please specify the percentage of Envelopes above.
To change Eynvelope compositions go to the
Input Streams Form**

Spreadsheet

<< < > >>
Print GoTo

☒ Stream Composition Linked to Envelope A, B, C or D

Back

Fig. 2

Look of Streams Form if the Check Box is True.

Stream No
Stream Name
Stream Temp
Envelope A (%)
Envelope B (%)
Envelope C (%)
Envelope D (%)
Mass Flow, g/d
Volume Flow, L/d
Density, g/L*
Activity Flow, Bq/d
Component*
INORGANICS
Ag
Al
Am/Am241,242
As
Ba
Ba/Ba137
Be
Bi
C (as CO3)
Ca
Cd
Ce
Cl
CN
Co/Co60
Cr
Cs/Cs137,134
Cu
Eu/Eu154,155
F
Fe
H2(Molecule)
H2O/H3
Hg
I/I129
K
La
Li
Mg
Mn
Mo
N2(Molecule)
Na
Np /Np-237
NiH3(Molecule)
Ni/Ni63,59
NO2(molecule)
NO2
NO3
O (in others, Note 9)
OH
P (as PO4)
Pb
Pu/Pu238-241
S (as SO4)
Sb
Se
Si
Sm/Sm151
Sr/Sr90
Te/Tc99
Th/Th232,229
Ti
U/U233-238
Y/Y90
Zn
Zr
Others Inorg.
ORGANICS
Acetate
Butanol
Citric Acid
Formic Acid
DBP
ED3A
EDTA
Glycolate
HEDTA
NPH
NDA
NTA
Oxalate
TBP
Other Organics
SUM
Total TRU
TIC
TOC
Total solids
Pu239/241 in solids
U235 in solids
END.

Mass Summaries					Mass Balances		
					Out - In	Weighted Conc In	Conc Out
A	B	C	D	2	A+B+C+D 2		
Envelope A	Envelope B	Envelope C	Envelope D	LAW Feeds			
	0.0			20.0			
		96.0		0.0			
			4.0	96.0			
				4.0			
			0.0	0.0			
Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/L	Mass, g/L
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
9.3312E+00	7.7760E+00	1.0886E+01	1.0886E+01	7.9004E+00	0.0000E+00	7.9004E+00	7.9004E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
6.6234E-05	5.5195E-05	7.7272E-05	7.7272E-05	5.6078E-05	0.0000E+00	5.6078E-05	5.6078E-05
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
2.3952E-03	1.9960E-03	2.7944E-03	2.7944E-03	2.0279E-03	0.0000E+00	2.0279E-03	2.0279E-03
2.6797E-03	2.3997E-03	3.3596E-03	3.3596E-03	2.4381E-03	0.0000E+00	2.4381E-03	2.4381E-03
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
1.7828E-01	1.4857E-01	2.0799E-01	2.0799E-01	1.5094E-01	0.0000E+00	1.5094E-01	1.5094E-01
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
1.4102E+00	1.1752E+00	1.6453E+00	1.6453E+00	1.1940E+00	0.0000E+00	1.1940E+00	1.1940E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
2.3826E+00	1.9855E+00	2.7797E+00	2.7797E+00	2.0173E+00	0.0000E+00	2.0173E+00	2.0173E+00
1.5401E-04	1.2834E-04	1.7988E-04	1.7988E-04	1.3039E-04	0.0000E+00	1.3039E-04	1.3039E-04
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
8.9000E+02	8.9000E+02	9.8000E+02	9.8000E+02	8.9360E+02	0.0000E+00	8.9360E+02	8.9360E+02
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
4.0117E+00	3.3431E+00	4.6803E+00	4.6803E+00	3.3965E+00	0.0000E+00	3.3965E+00	3.3965E+00
7.0672E-04	5.8994E-04	8.2451E-04	8.2451E-04	5.9836E-04	0.0000E+00	5.9836E-04	5.9836E-04
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
1.3812E+02	1.1500E+02	1.6114E+02	1.6114E+02	1.1685E+02	0.0000E+00	1.1685E+02	1.1685E+02
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
7.2189E-04	6.0157E-04	8.4220E-04	8.4220E-04	6.1120E-04	0.0000E+00	6.1120E-04	6.1120E-04
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
7.8660E+01	6.5550E+01	9.1770E+01	9.1770E+01	6.6599E+01	0.0000E+00	6.6599E+01	6.6599E+01
8.5560E+01	7.1300E+01	9.9820E+01	9.9820E+01	7.2441E+01	0.0000E+00	7.2441E+01	7.2441E+01
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
1.2852E+01	1.0710E+01	1.4994E+01	1.4994E+01	1.0881E+01	0.0000E+00	1.0881E+01	1.0881E+01
1.3110E+00	1.0925E+00	1.5295E+00	1.5295E+00	1.1100E+00	0.0000E+00	1.1100E+00	1.1100E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
2.9203E+01	2.4338E+01	3.4070E+01	3.4070E+01	2.4725E+01	0.0000E+00	2.4725E+01	2.4725E+01
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.3157E-05	0.0000E+00	0.0000E+00	3.1830E-05	0.0000E+00	3.1830E-05	3.1830E-05
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
1.2509E+00	1.0424E+00	1.4594E+00	1.4594E+00	1.0591E+00	0.0000E+00	1.0591E+00	1.0591E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00		0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0						

Stream-2 linked
to 96% B, 4% C.

Stream-2 Composition
Should be the
Weighted Composition.

e.g. k :

weighed camp

$$= (4.0117 \times 10 + 3.3431 \times 96 + 4.6803 \times 4 + 4.6803 \times 0) = 3596$$

$\Rightarrow$ Stream-2-Conn.

O.k.

From: <http://twins.pnl.gov:8001/tcd/main.html>
Assumed 1060 M^3 volue
Concen, kg/L Ci/L
Tank: 241-AN-102_Envelope C

Ac		4.62264E-09	
Al	0.059339623		
Am		0.000767011	0.000767
Ba		1.330188679	
Bi	0		
C		3.07547E-06	
Ca	0.002528302		
Cd		0.000533019	
Cl	0.014433962		
Cm		2.00028E-05	2.13E-06
Co		0.000716981	
Cr	0.001707547		
Cs		1.405718774	5.84E-05
Eu		0.00315783	2.58E-05
F	0.007009434		
Fe	0.000981132		
H-3		4.30189E-06	
Hg	0		
I		2.99057E-06	
K	0.014528302		
La	0		
Mn	0.000366981		
Na	0.962264151		
Nb		6.96226E-05	
Ni	0.001556604	0.001086321	
NO2	0.311320755		
NO3	0.85		
Np		5.39623E-06	
OH (total)	0.246226415		
Pa		2.21698E-08	
Pb	0.000773585		
PO4	0.018490566		
Pu		0.00016434	1.16E-05
Ra		1.62339E-06	7.51E-10
Ru		4.57547E-08	
Sb		0.001188679	
Se		3.06604E-06	
Si	0.000719811		
Sm		0.069245283	
Sn		2.9717E-05	
SO4	0.061226415		
Sr	1.61321E-05		
Sr		0.347169811	
Tc		0.000536792	
Th		2.10283E-07	3.76E-08
TIC as CO:	0.263207547		
TOC	0.100943396		
U (total)	0.000831132	2.54057E-06	

continue on back

July 21/00

Envelope Compositions:

Typical Envelope C composition was obtained from
website: <http://twins.pnl.gov:8001/tcd/main.html>
see pasted page on left page.

J. Yang / 08/15/00

Latest spreadsheet was saved as
PRETREAT-Revision-Aug16.xls
after the fixing of an initialization error found by Vijay.

J. Yang / 08/16/00

All BNFL appearances in the spreadsheet were
removed for "proprietary" reason. After the removal,
the latest file was saved as:

~~PRETREAT00~~ J. Yang / 08/21/00

PRETREAT-VOO.XLS, sent to Bobby P.

J. Yang / 08/21/00

The project is closed and this book is

submitted to QA for records. The final version
of the program, PRETREAT_V00.XLS is attached in the CD
at the back of this book.

J. Yang. 10/04/00

I have reviewed this scientific notebook and
find it in compliance with QAP-001. There is
sufficient information regarding procedures
used for conducting tests, acquiring and
analyzing data so that another qualified
individual could repeat the activity.

~~V. JAIN~~ for N.S.
N. SRIDHAR
10-4-00

ADDITIONAL INFORMATION FOR SCIENTIFIC NOTEBOOK #: 352

Document Date:	06/14/1999		
Availability:	Southwest Research Institute® Center for Nuclear Waste Regulatory Analyses 6220 Culebra Road San Antonio, Texas 78228		
Contact:	Southwest Research Institute® Center for Nuclear Waste Regulatory Analyses 6220 Culebra Road San Antonio, TX 78228-5166 Attn.: Director of Administration 210.522.5054		
Data Sensitivity:	☒ "Non-Sensitive" ☐ Sensitive ☐ "Non-Sensitive - Copyright" ☐ Sensitive - Copyright		
Date Generated:	1999		
Operating System: (including version number)	Windows		
Application Used: (including version number)	Microsoft Excel and others		
Media Type: (CDs, 3 1/2, 5 1/4 disks, etc.)	2 - CDs		
File Types: (.exe, .bat, .zip, etc.)	various		
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