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Revision 0

SWITS Forecast Module for Forecasters

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
under Contract DE-AC06-08RL14788

CH2MHILL
Plateau Remediation Company
P.O. Box 1600
Richland, Washington 99352

Approved for Public Release;
Further Dissemination Unlimited

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Program/Project: WFM

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CH2M HILL Plateau Remediation Company

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SWITS FORECAST Guide

CH2MHill Plateau Remediation Company
And
U.S. Department of Energy

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SWITS Forecast Module

The Solid Waste Information and Tracking System (SWITS) has a module called Forecast. This module was created to be like the former tool by Pacific Northwest National Laboratory (PNNL) called Solid Waste Integrated Forecast Tool (SWIFT). The purpose of this module is to estimate the amount of solid radioactive waste that will be disposed of at Hanford site and record important parameters describing that waste. The types of information gathered includes waste generators, waste streams, number and type of containers in which the waste is contained, waste specification records, radionuclides in the waste, physical forms of the waste, hazardous characteristics of the waste, and relevant assumptions and references. The information from each waste generator is aggregated and summarized in an annual report to provide decision makers at the Hanford site with a reliable estimate of the amount of waste to be disposed of on site.

This guideline is geared for the forecaster and how to enter their data. This guideline does not go into the administration side for the forecasting.

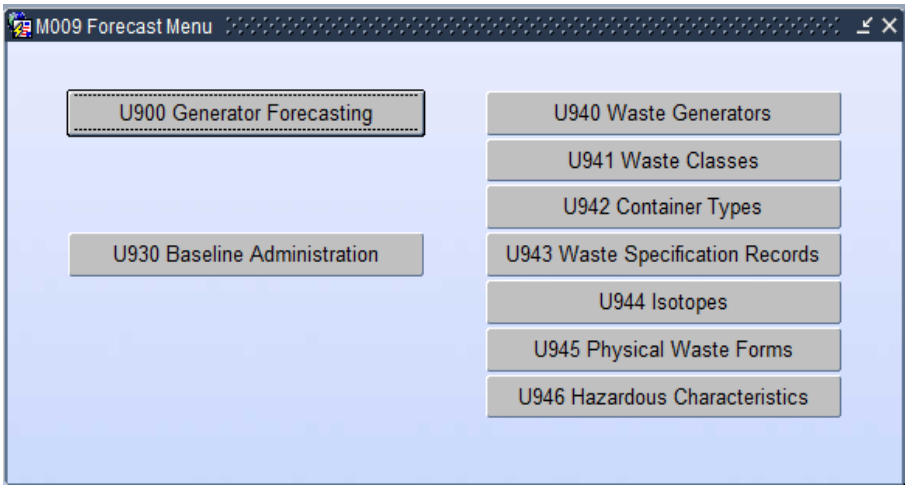
1 Requirements to enter Forecast data in SWITS

The forecast data entry screen is part of the SWITS application. You must have a SWITS account with at least the role of FORECASTER. The SWITS Request for Access form can be found on Site Forms with form number A-6006-196. Once you have SWITS access with the FORECASTER role you must have the Forecast Administrator grant you the generator for which you are to forecast. SWITS access is allowed on the HLAN network, the PNNL network and on the WCH network. For generator that cannot gain access they must provide their data to the Forecast Administrator. To install the SWITS icon to your desktop you can find it on Software Distribution by clicking on Hanford Site Applications then SWITS – Solid Waste Information and Tracking System.

2 Launching the Application and overview

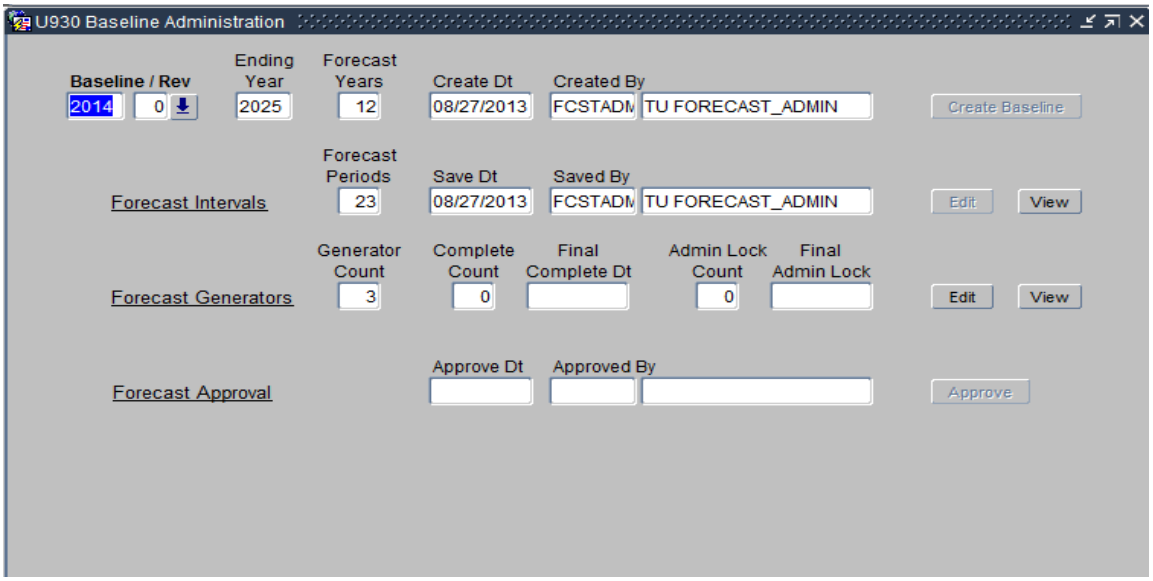
Once logged into the SWITS application click on the menu item **M009 – Forecast**

On the**M009 Forecast Menu** you have several screens of information



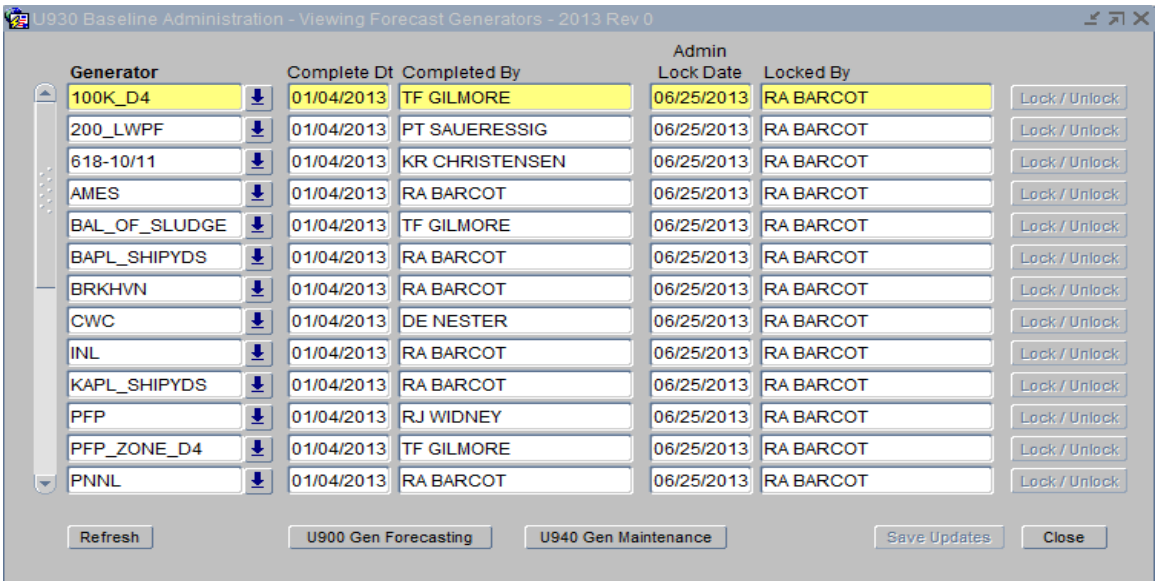
The buttons on the right are to modify or enter new lookup items for the forecasting. Generally this is done by the Forecast Administrator. However any Forecast user can view these screens and the look up information. To do this you would press the button for the screen you require than press the **F8** key to query all data. Use the down arrow to go down the list of data. Each screen has a field called **Active?**. If the active field has a checkmark then the entry is still valid for a current baseline. If there is no check then it was valid for past baselines but not for current or future baselines. If you do not see a selection you feel you need for you forecast, contact the Forecast Administrator and request your data to be added. These screens are controlled by the Forecast Administrator and will not be discussed further in this guideline.

The **U930 Baseline Administration** screen is used by the Forecast administrator to create a new baseline or to view past baseline information. This screen is also used to set the forecast intervals for a baseline. They can be annual, quarterly, or monthly. This screen can also be used to see the progress of all generators on one Baseline / Rev. The screen will default to the most current baseline in the system. Pressing the down arrow next to the Baseline / Rev will show all baselines available.



The current baseline and revision are displayed under **Baseline / Rev.** The ending year and number of years in the forecast are indicated. The **View** button next to **Forecast Intervals** can be pressed to display what the intervals are for each year in the baseline (i.e. annual, monthly, and quarterly). The **View** button next to the **Forecast**

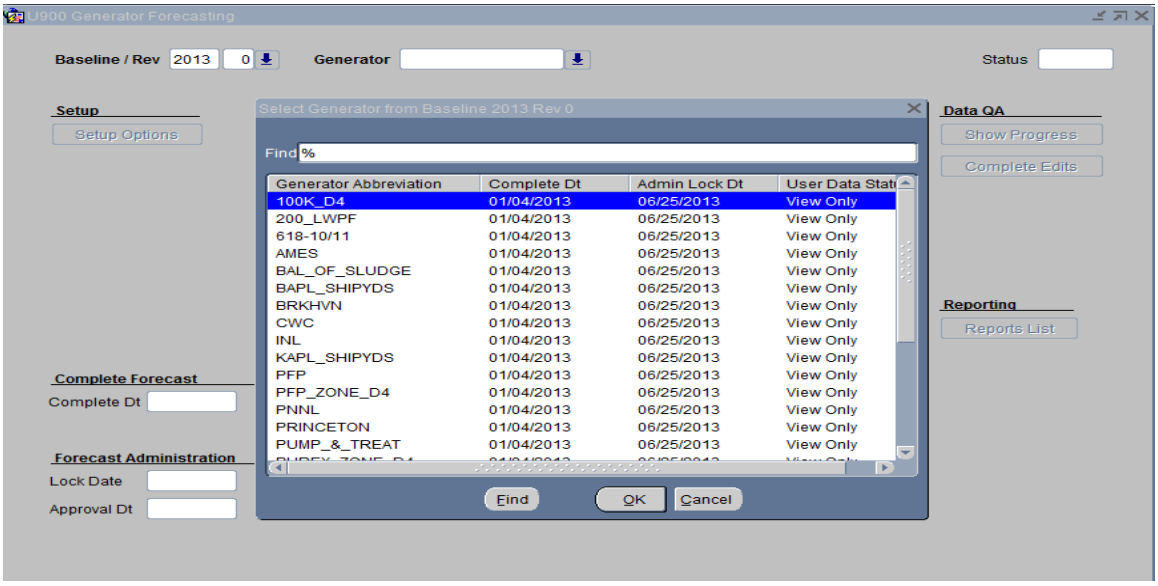
Generators can be pressed to see the status of all the generators. If there is an **Approve DT** listed on the last line then the baseline has been completed and all data is locked.



When the forecaster presses the **Compete** button on the U900 Generator Forecasting screen, the date will be in the first date column indicating when they finished with their input. At this point the data is locked from editing. If the Forecast Administrator presses the **Lock/Unlock** then the **Complete Dt** and **Completed By** columns are filled in locking the data from the generator. When the entire row is filled in this implies that the generator indicated they are complete with their input and the forecast administrator has accepted their data.

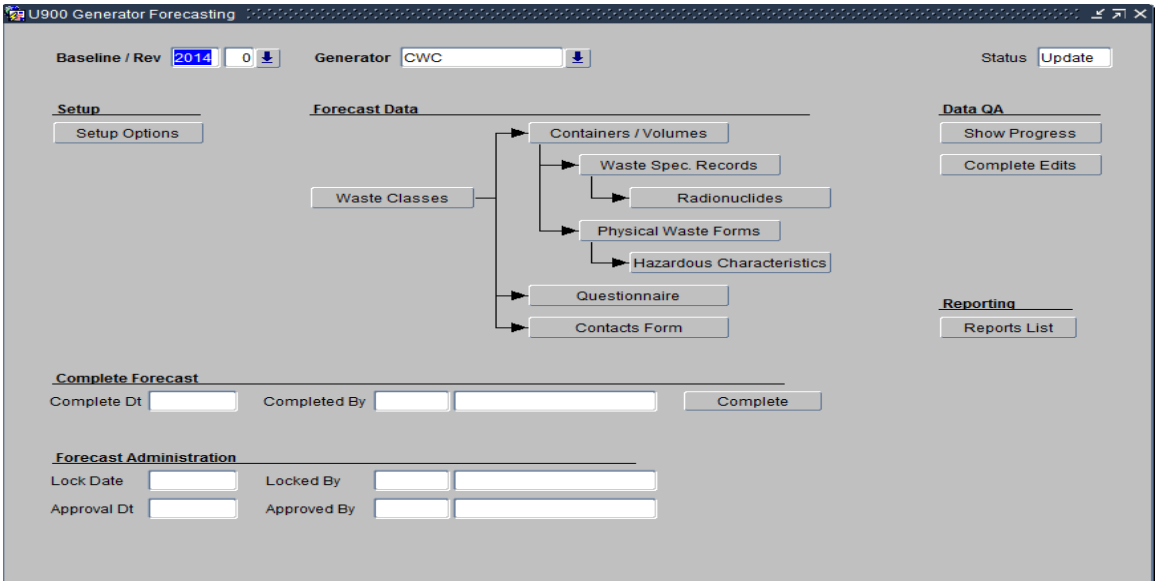
3 Entering Data

The **U900 Generator Forecasting** is the main screen for forecasters to use to enter data.



The most recent Baseline / Rev will be displayed along with a list of generators to select from. The list will show if the generator has completed data entry and weather the forecast administer has accepted the data. The last

column will indicate if the data can be viewed only or modified. The generator will then select the data they wish to view or modify. Once selected the U900 screen will then appear.

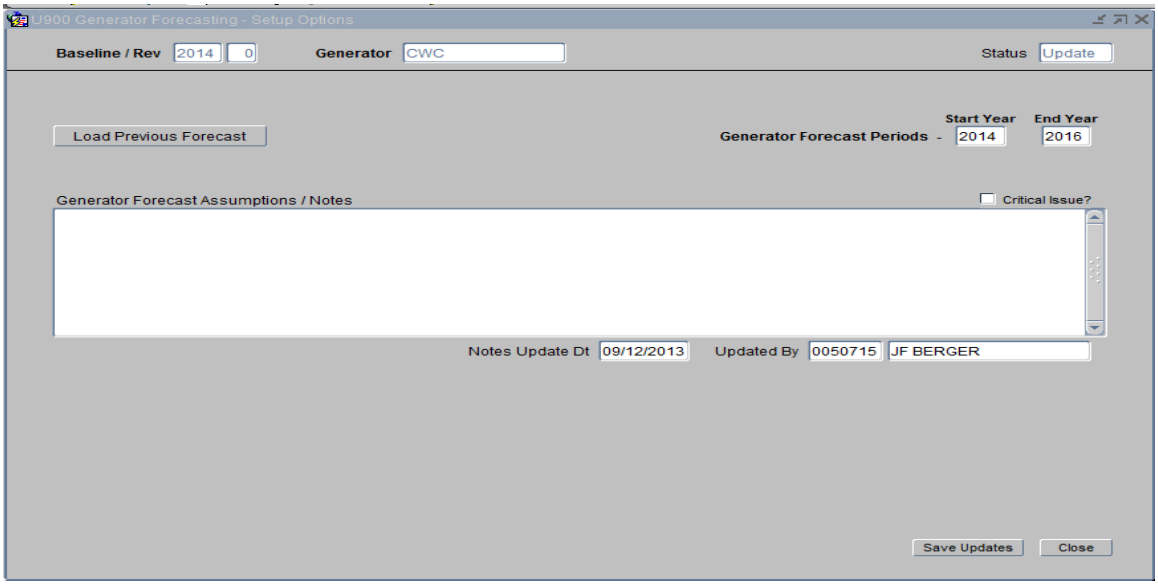


This U900 Generator Forecasting screen has six defined areas. They are:

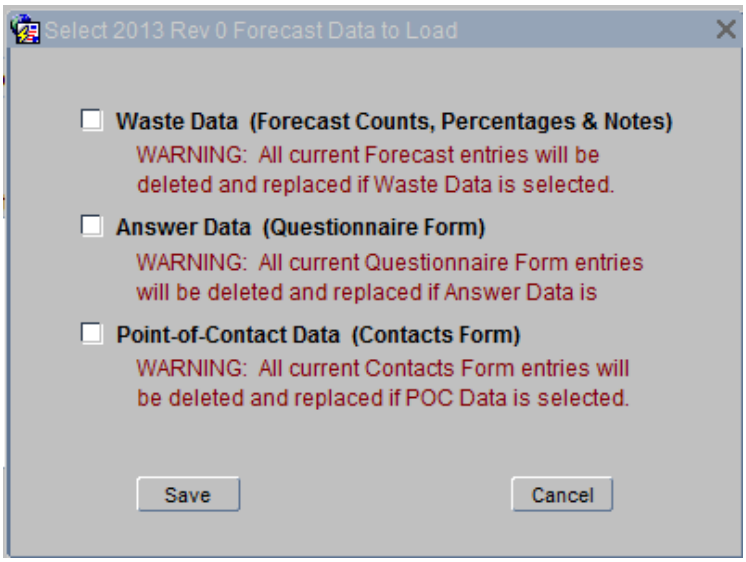
- Setup
- Forecast Data
- Data QA
- Reporting
- Complete Forecast
- Forecast Administration

3.1 U900 Generator Forecasting - Forecast Data Setup

Prior to entering data into the Forecast module you need to initialize the data first. This is done by pressing the **Setup Options** button on the screen. This will take you to the **U900 Generator Forecasting – Setup Option** screen.



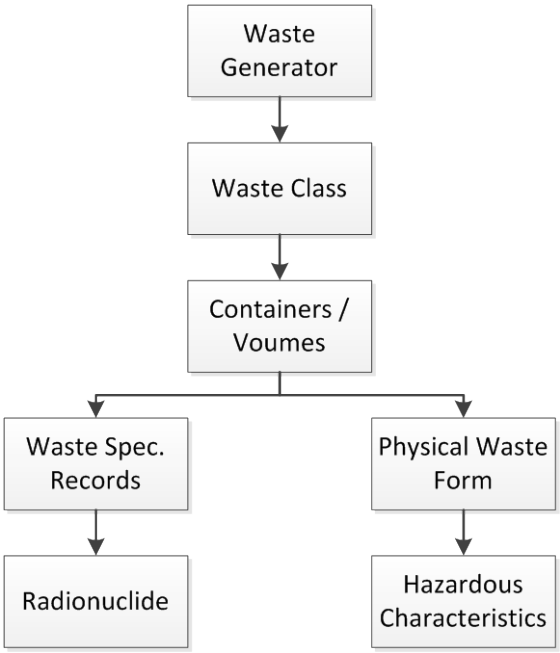
The Generator Forecast Periods can show a **Start Year** or **End Year** different than the baseline shows. It is important that the generator correctly sets this date range. If the dates are left to match the baseline and not what the generator actually requires then the generator will have to enter zeros for all the years they do not require data. Pressing the **Load Previous Forecast** button will display the **Select YYYY Rev N Forecast Data to Load** popup.



The generator can determine what data they wish to copy forward. If data has already been entered for the current baseline preceding here can overwrite or erase data. If you need to start over with your data entry you can run this again to overwrite any data. Data will be copied from the previous baseline to the current baseline provided the interval for that reporting year matches between the two baselines. If one year was monthly and in the current baseline it is annual then no data will be copied forward for that year. The screen will allow you to view your previous baseline data for that year. Once you have initiated your data you can the press the **Save Updates** and **Close** button on the bottom of the U900 Generator Forecasting.

3.2 U900 Generator Forecasting – Forecast Data

Under Forecast Data section of the U900 Generator Forecasting is a series of buttons with a hierarchy tree. This indicates what data is dependent on other data. In general the Waste Classes data is required before any other data. The remaining buttons are best if worked from top to bottom. Buttons may be grayed out if the waste classes selected does not pertain. When entering data it may be helpful to go through all screens for one waste class at a time. The focus on the screens will try to remember what waste class and container type you were on and set the focus on the next screen to match. It is important to always look the screen over before entering data to ensure you have the right focus on the screen.

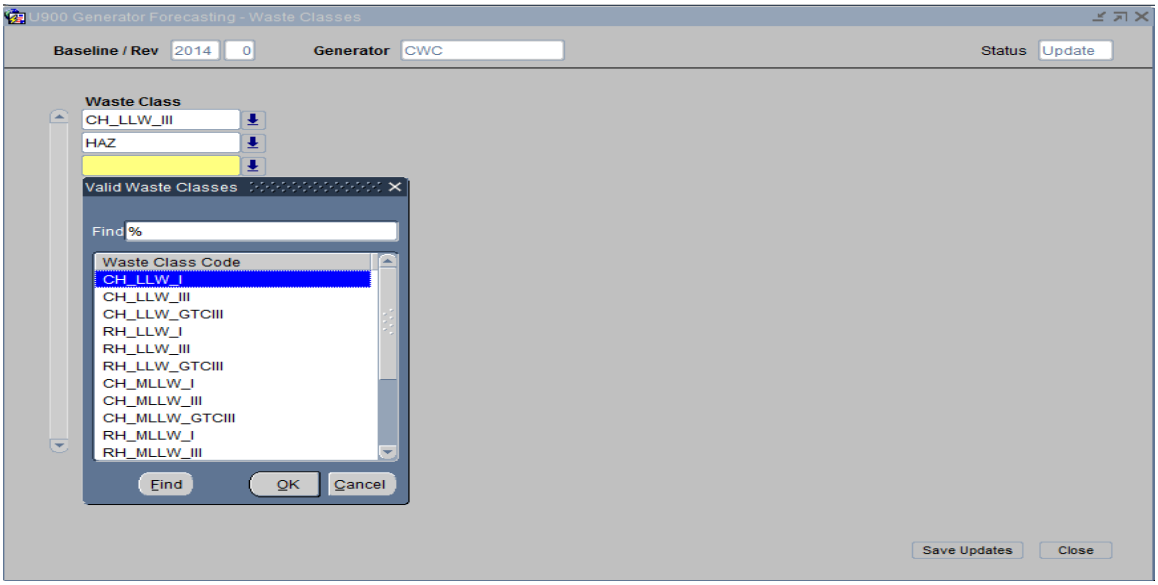


Data Collection Model Hierarchy 1

While entering data it is important to press the **Close** button to return to the hierarchy tree. If entering data on one of the input screens and the 'X' in the upper right is pressed you will leave forecasting altogether.

3.2.1 U900 Generator Forecasting – Waste Classes

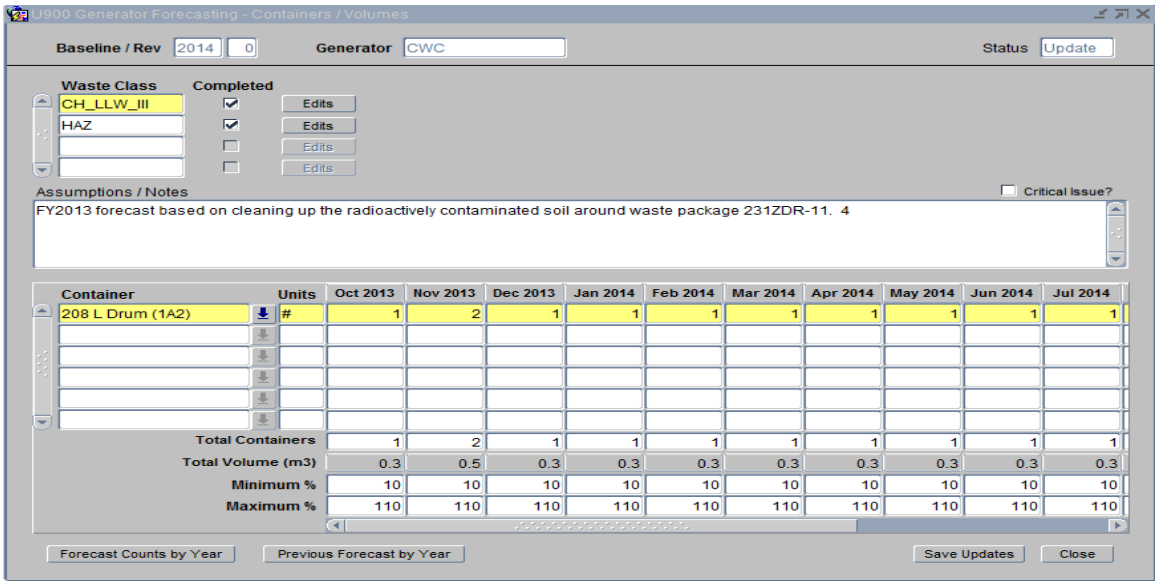
Selecting a blank Waste Class entry and pressing the down arrow will show a list of Valid Waste Classes. Select all that apply for the generator group.



Once complete press the **Save Updates** then **Close** buttons to return to the previous screen.

3.2.2 U900 Generator Forecasting – Containers / Volumes

The containers / Volumes screen will display the **Baseline / Rev** and **Generator** on the top of the screen.



The Waste Classes are displayed on the screen. The focus is on the waste class highlighted in yellow. A check will appear in the **Completed** column when all data has been entered. Pressing the **Edits** button will bring up a Microsoft Excel spreadsheet indicating what data is missing or a popup will appear stating "Complete Edits found 0 Container errors." Assumptions / Notes may be entered for each waste class and marked as **Critical Issue**.

Under containers a new container can be added for a waste class by pressing the down arrow and selecting a container type from the list. To remove a container, ensure it is highlighted in yellow then press the red 'X' on the tool bar. For each Waste Class – Container combination, you must specify the following three parameters for each time period.

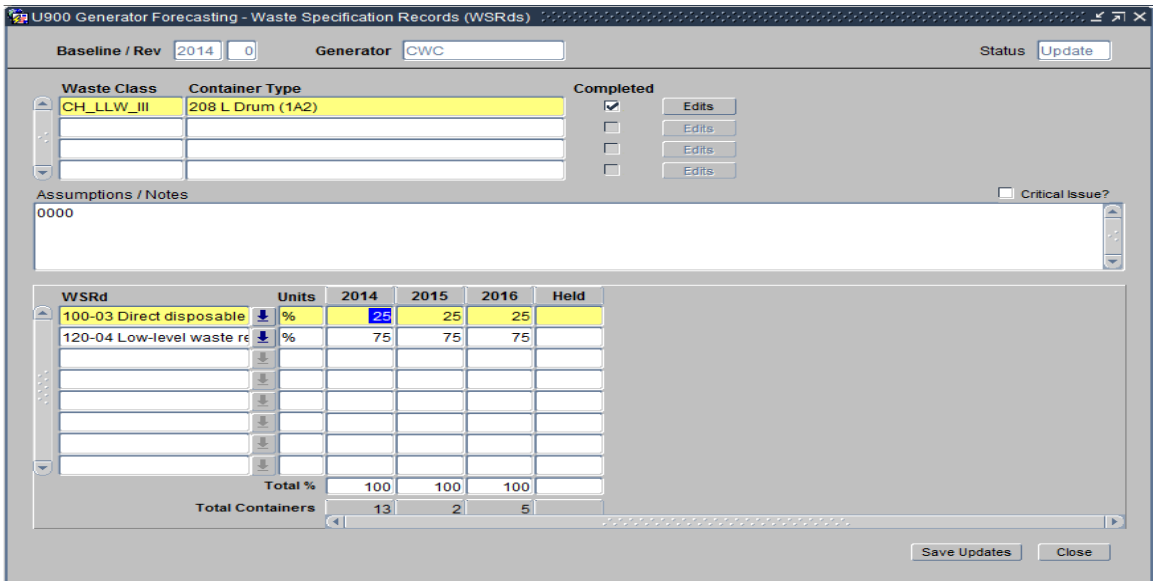
Parameter	Description	Units
#	The expected number of containers that will be generated in the specified time period	Number of containers
Minimum %	The lower bound of expected containers	Percentage of expected containers
Maximum %	The upper bound of expected containers	Percentage of expected containers

Along the bottom of the screen the button **Forecast Counts by Year** will bring up Microsoft Excel showing all the container counts for the current baseline. The **Previous Forecast by Year** will display Microsoft Excel with the previous baseline counts. To save all changes press the **Save Updates** button. To return to the previous screen press the **Close** button.

3.2.3 U900 Generator Forecasting – Waste Specification Records (WSRds)

For each Waste Class – Container combination you must specify the relative proportions of each Waste Specification Record (WSRd). WSRds are categories used at the Hanford site to classify waste by treatment, storage and disposal methods.

The containers / Volumes screen will display the **Baseline / Rev** and generator on the top of the screen.



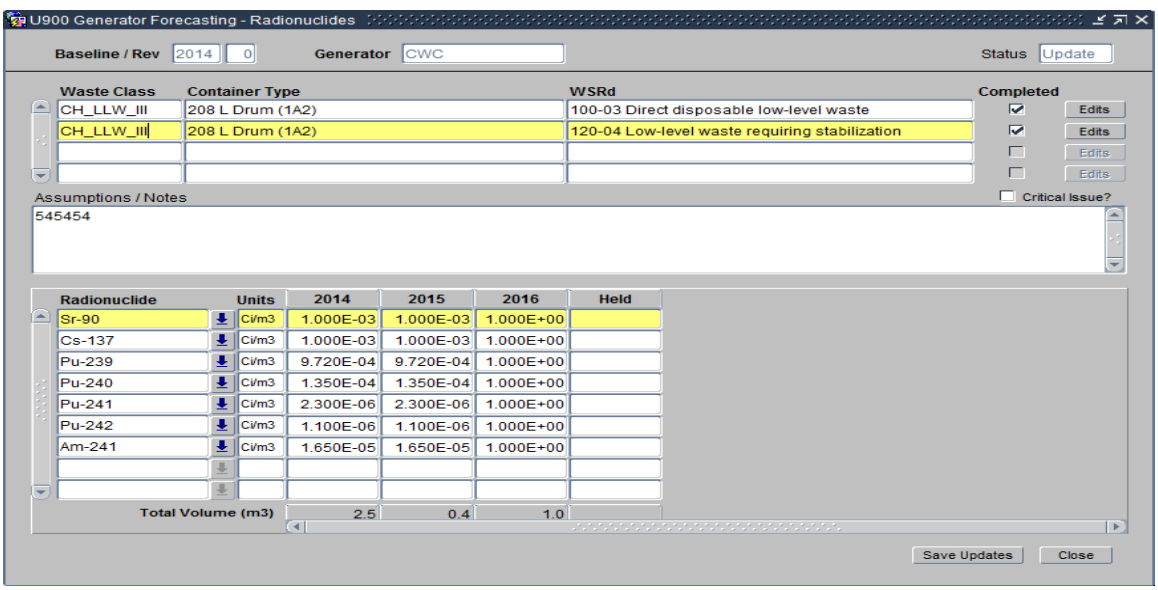
The Waste Classes and Container Types are displayed on the top half of the screen. The focus is on the waste class – Container Type is highlighted in yellow. A check will appear in the **Completed** column when all data has been entered. Pressing the **Edits** button will bring up a Microsoft Excel spreadsheet indicating what data is missing or a popup will appear stating "Complete Edits found 0 Container errors." Assumptions / Notes may be entered for each waste class and marked as **Critical Issue**.

Under WSRd enter a percentage each reporting period for each WSRd so they total to 100 percent at the bottom. Ensure each Waste Class – Container Type is selected. Press the **Save Updates** button to save changes. Press the **Close** button to go back to the previous screen.

3.2.4 U900 Generator Forecasting – Radionuclides

For each Waste Class – Container – WSRd combination you must specify the radionuclides associated with the waste and the concentration of each radionuclide present. Concentration is reported in curies per cubic meter

The Radionuclides screen will display the **Baseline / Rev** and generator on the top of the screen.



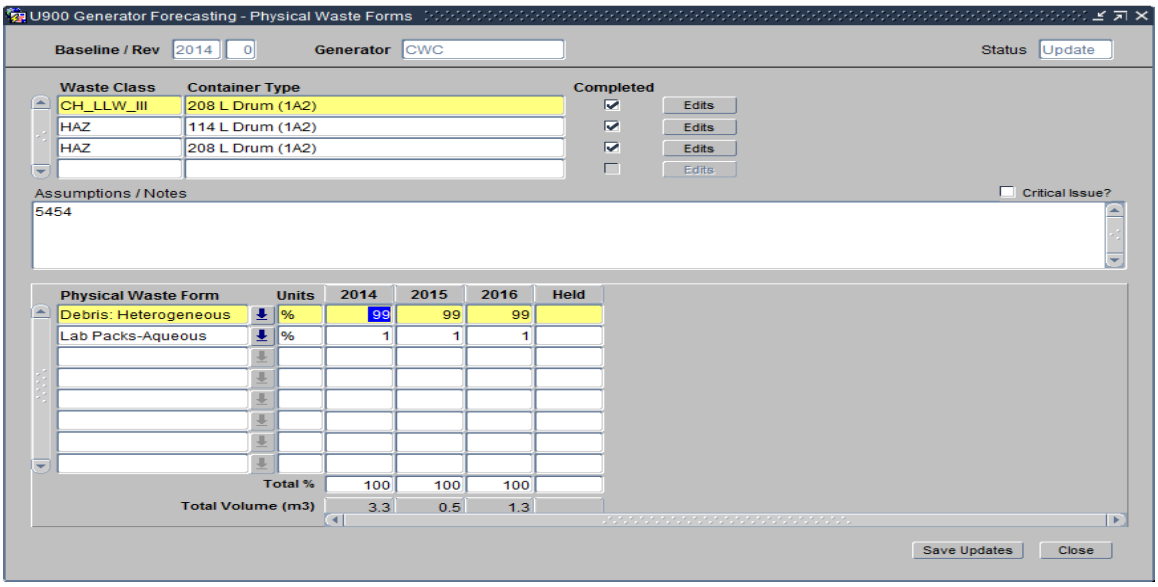
The Waste Classes, Container Types, and WSRds are displayed on the top half of the screen. The focus is on the waste class – Container Type - WSRd is highlighted in yellow. A check will appear in the **Completed** column when all data has been entered. Pressing the **Edits** button will bring up a Microsoft Excel spreadsheet indicating what data is missing or a popup will appear stating "Complete Edits found 0 Container errors." Assumptions / Notes may be entered for each waste class and marked as **Critical Issue**.

To enter new radionuclides press the down arrow in the first blank row. A listing of available radionuclides will be displayed. For each radionuclide enter a number for each reporting period for each radionuclide. Ensure each Waste Class – Container Type – WSRd is selected. Press the **Save Updates** button to save changes. Press the **Close** button to go back to the previous screen.

3.2.5 U900 Generator Forecasting – Physical Waste Forms

For each Waste Class – Container you must specify the relative proportions of each constituent physical waste form (PWF). Physical waste forms are categories used to classify waste by important physical characteristics.

The containers / Volumes screen will display the **Baseline / Rev** and generator on the top of the screen.



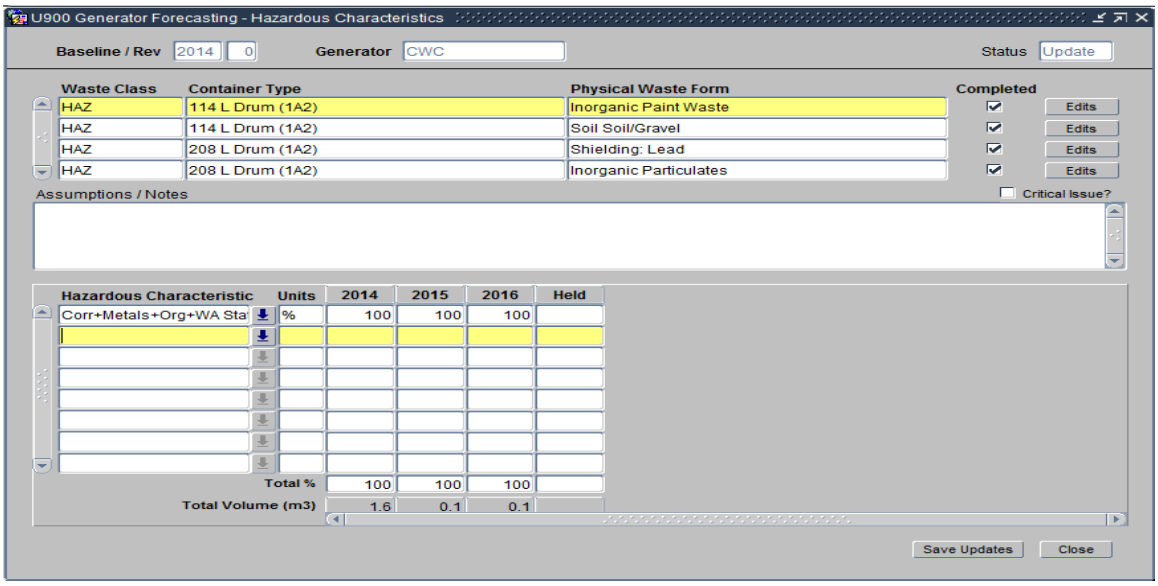
The Waste Classes - Container Types are displayed on the top half of the screen. The focus is on the waste class – Container Type is highlighted in yellow. A check will appear in the **Completed** column when all data has been entered. Pressing the **Edits** button will bring up a Microsoft Excel spreadsheet indicating what data is missing or a popup will appear stating "Complete Edits found 0 Container errors." Assumptions / Notes may be entered for each waste class and marked as **Critical Issue**.

To enter a Physical Waste Form press the down arrow in the first blank row. A listing of available PFWs will be displayed. For each PWF enter a percentage for each reporting period for each PWF so they total to 100 percent at the bottom. Ensure each Waste Class – Container Type is selected. Press the **Save Updates** button to save changes. Press the **Close** button to go back to the previous screen.

3.2.6 U900 Generator Forecasting – Hazardous Characteristics

For each Waste Class – Container – PWF combination of mixed waste you must specify the relative proportions of each constituent hazardous characteristic. Hazardous characteristics are characteristics like flammability, reactivity, corrosiveness, or toxicity regulated by environmental laws because they pose substantial risks to public health and the environment.

The containers / Volumes screen will display the **Baseline / Rev** and generator on the top of the screen.



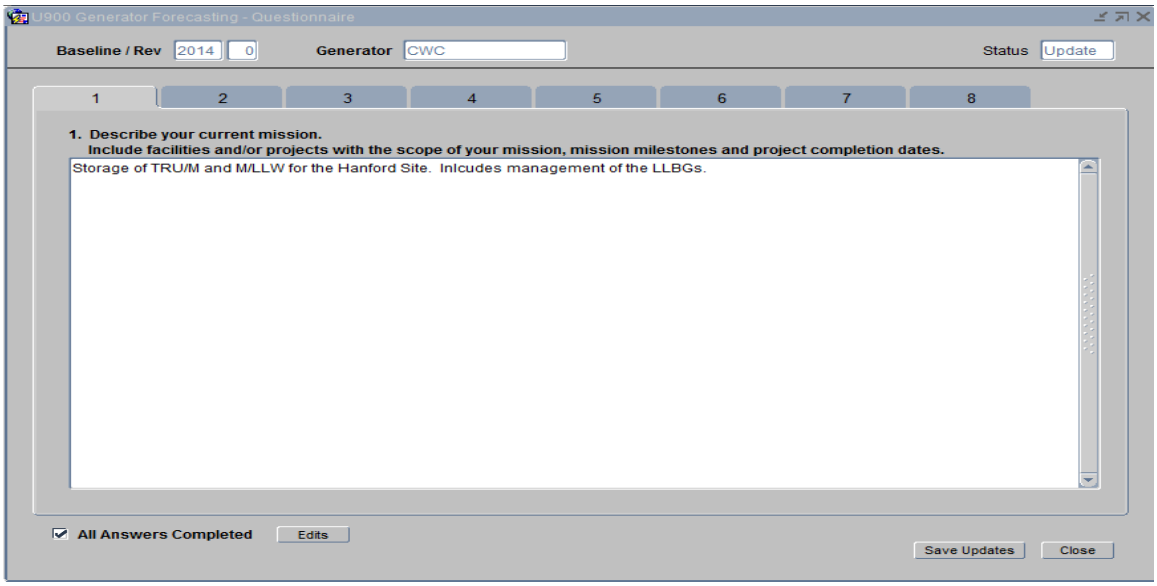
The Waste Classes - Container Types – Physical Waste Form are displayed on the top half of the screen. The focus is on the waste class – Container Type is highlighted in yellow. A check will appear in the **Completed** column when all data has been entered. Pressing the **Edits** button will bring up a Microsoft Excel spreadsheet indicating what data is missing or a popup will appear stating "Complete Edits found 0 Container errors." Assumptions / Notes may be entered for each waste class and marked as **Critical Issue**.

To enter a Hazardous Characteristic press the down arrow in the first blank row. A listing of available Hazardous Characteristics will be displayed. For each Hazardous Characteristic enter a percentage for each reporting period for each Hazardous Characteristic so they total to 100 percent at the bottom. Ensure each Waste Class – Container Type – Physical Waste Form is selected. Press the **Save Updates** button to save changes. Press the **Close** button to go back to the previous screen.

3.2.7 U900 Generator Forecasting – Questionnaire

The Questionnaire provides crucial information about the assumptions and processes used by the forecaster in preparing the forecast. Follow the steps below to complete the Questionnaire form.

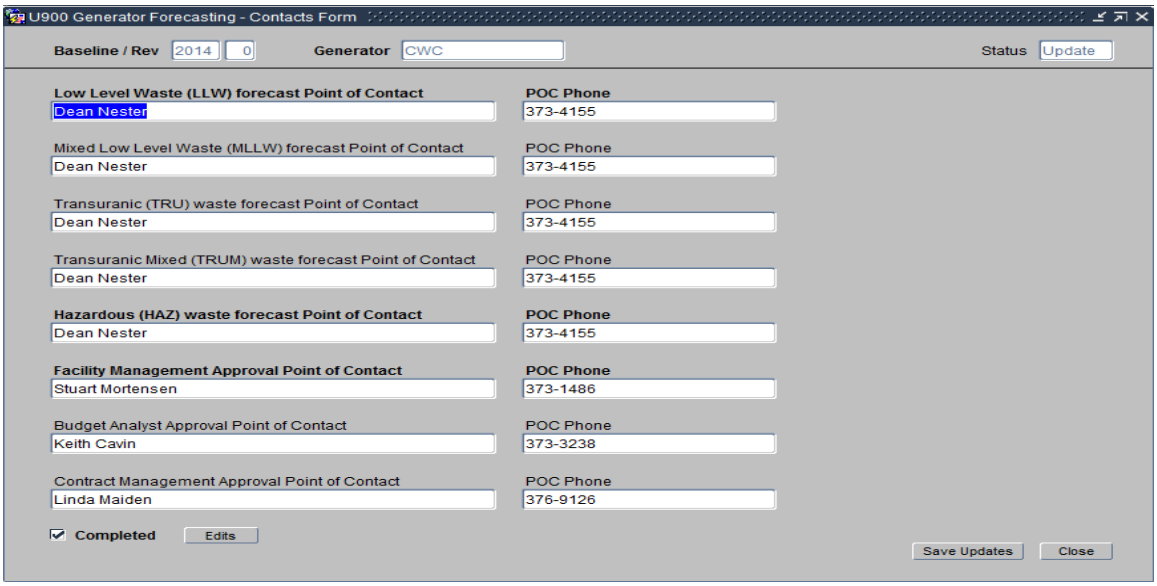
Click the questionnaire button on the U900 Generator Forecasting screen and the following form appears.



- Ensure that the generator to which the Questionnaire applies is correct.
- Use the tabs near the top of the form to access each of the questions and answer the questions in the space provided. Note that some tabs contain multiple questions.
- If you copied your answers from the previous year then the questions should have anwsers. Please go through each question and make sure the answers still apply. If not then modify the response.
- If the checkbox on the bottom stating **All Answers Completed** is not checked then press the **Edits** button to view the missing information.
- Click on **Save Updates**, the **Close**.

3.2.8 U900 Generator Forecasting – Contact Form

Click the Contact Form button on the U900 Generator Forecasting screen to view the **Contacts Form**



- Ensure the generator to which the contact applies is correct.
- In the fields provided enter the contact's name and phone number as applicable.
- Click on **Save Updates**, the **Close**.

3.3 U900 Generator Forecasting – Data QA

At any time during data entry you may view your progress by pressing the **Show Progress** button from the U900 Generator Forecasting screen. This will bring up a Microsoft Excel spreadsheet with three columns. The columns are

- Containers / Questionnaire
- WSRds / Physical Waste Forms
- Radionuclides / Haz Chars

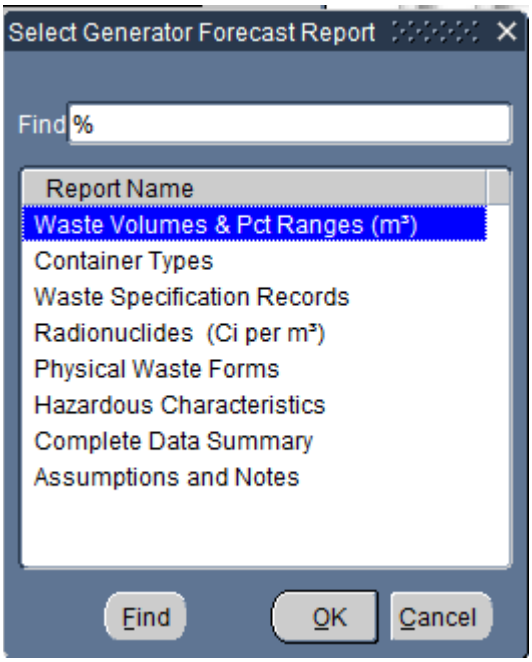
In the first column will be the different Waste Classes selected. Under each column will be RED or GREEN text indicating the completeness of the section or what is left to fill out.

At any time during data entry you may view your complete edits by pressing the **Complete Edits** button from the U900 Generator Forecasting screen. This will bring up a Microsoft Excel spreadsheet with multiple tabs. The first tab will show the number of errors for the major categories of the data entry. There will be a tab for each category indicating what is required to complete that section.

Each report has the last tab labeled **RPT INFO** describing what report was run and at what time for what baseline and generator. This is useful information to know what was run and when.

3.4 U900-Generator Forecasting – Reporting

There are eight Microsoft Excel spreadsheet reports that can be accessed by pressing the **Report List** button on the U900 Generator Forecasting screen.



When selecting a report it will run against the data that is at the top of the U900 screen. The report will be for the Baseline / Rev indicated and also for the Generator listed. The report can be run by highlighting the desired report then pressing the OK button. Below is a brief description of each report.

Report Name	Description
Assumptions / Notes	Assumption / Note entries by hazardous characteristic or radionuclide, physical waste form, container, waste class, and waste generator.
Waste Volumes & Percent Ranges (m^3)	Waste volumes in cubic meters and minimum and maximum percentages by waste class and waste generator.
Container Types	Container counts by waste class and waste generator.
Waste Specification Record	Waste specification record from percentages by container type, waste class, and waste generator.
Physical Waste Forms	Physical waste form percentages by container type, waste class, and waste generator.
Hazardous Characteristics	Hazardous characteristic percentages by physical waste form, container type, waste class, and waste generator.
Radionuclide Concentrations (curies / m^3)	Radionuclide concentrations in curies per cubic meter by waste specification record, container type, waste class, and waste generator.

Report Name	Description
Complete Data Summary	A broad data summary providing volume, container, waste specification record, radionuclide, physical waste form, and hazardous characteristic data.

3.5 U900 Generator Forecasting – Complete Forecast

After completing all data entry for a generator and the **Complete Edits** button indicates that the generator is complete. The **Complete** button under **Complete Forecast** will become available. If you have the role of FORECASTER and you have the generator group shown at the top you can press the **Complete** button. This will lock your data from being further edited. It will also indicate to the Forecast Administrator that you are complete and they can review your data. If it is determined that the data need further input the Forecast Administrator can remove the **Complete Date** entered by the generator and open the data for additional update.

Note: when pressing the **Complete** button you may see a popup asking for conformation whether you did review your questionnaire. This only appears if you copied your answers forward when in the **Setup Options**. This is to confirm you did not just copy them but also did go through them for change.

3.6 U900 Generator Forecasting – Forecast Administration

Once the Forecast Administrator has review all the generators and accepts the data entered they can then lock then lock the entire baseline / rev forecast using the U930 Baseline Administration screen. That date will also show on the U900 Generator Forecasting screen. This indicates that all data entry for the Baseline / Rev is complete and all data edits for that baseline / rev are locked. No additional changes can be made without involving the SWITS programming team.

4 Forecasting References

4.1 Solid Waste Naming Conventions

The waste class definitions used in the **FORECAST MODULE** are based on three properties of radioactive waste: handling method, waste type, and waste category. The name of each waste class is composed of an acronym representing the value of each property, delimited by an underscore. For example, contact handled mixed low-level waste of category I is named CH_MLLW_I (see below) defines each waste class component.

Part	Options	Definition	Acronym
	Hazardous Waste	Non-radioactive waste that is hazardous according to federal (RCRA) or state regulation	HAZ
Handling Method*	Contact Handled	Dose rate ≤ 200 mrem / hr	CH
	Remote Handled	Dose rate > 200 mrem / hr **Note:** shielded RH waste should be reported as RH waste	RH
Waste Type	Low-level	Meets the definition for low-level waste	LLW
	Low-level Mixed	Meets the definition for low-level waste, and is hazardous per WAC 173-303	MLLW
	Transuranic	Contains > 100 nCi / g of alpha-emitting isotopes with atomic numbers > 92 and half-lives > 20 years	TRU
	Transuranic Mixed	Meets the definition for transuranic waste, and is hazardous per WAC 173-303	TRUM
Waste Categories	Category I	Low-activity waste with very low concentrations of long-lived radionuclides	I
	Category III	Moderate- and high-activity waste, with low to moderate concentrations of long-lived radionuclides, in stabilized form that minimizes subsidence for a period of 1000 years	III
	Greater-than-Category III	Sum of the fraction of the radionuclides' Class III concentration limits > 1	GTCIII
* CH and RH refer to the waste, not the packaging.			

4.2 Determining the Waste Category

To determine the waste category:

1. If the waste includes only one radionuclide, use Table 4-2 to determine its category.

2. If the waste contains a mixture of radionuclides, use the sum of fractions rule described below to determine the category.

    - Divide each radionuclide's concentration by the Category I limits in Table 4-2.
    - Add the resulting values.
    - Divide each radionuclide's concentration by the Category III limits in Table 4-2.
    - Add the resulting values.

- Use the criteria in Table 4-1**Error! Reference source not found.** to determine the category:

Table 4-1 Waste Category Table

Category I sum	Category III sum	Waste Category
<1		Category I
>1	<1	Category III
	>1	Greater-than-category III

Table 4-2 Radionuclide Concentration Limits

Symbol	Radionuclide	Category I limit Ci / m^3	Category III limit Ci / m^3
3H	Tritium	9.9 E4	n / a
14C	Carbon14	9.1 E-2	2.1 E1
14C	Carbon14 (Activated Metal)	9.1 E-1	2.1 E1
32P	Phosphorus32	n / a*	n / a*
35S	Sulfur35	n / a*	n / a*
36Cl	Chlorine36	6.4 E-5	1.4 E-1
60Co	Cobalt60	7.5 E1	n / a
79Se	Selenium79	5.1 E-1	1.1 E2
90Sr	Strontium90	1.6 E-2	5.4 E4
99Tc	Technetium99	2.3 E-2	5.0 E0
129I	Iodine129	8.5 E-3	1.8 E0
137Cs	Cesium137	5.5 E-3	1.2 E4
210Pb	Lead210	3.7 E-2	2.1 E6
226Ra	Radium226	1.7 E-4	4.3 E-2
233U	Uranium233	7.4 E-3	9.7 E-1
234U	Uranium234	8.9 E-3	1.9 E0
235U	Uranium235	2.8 E-3	5.0 E-1
237Np	Neptunium237	6.8 E-4	lower of 1.5 E-1 or 100 nCi / gm
238Pu	Plutonium238	4.7 E-3	lower of 2.4 E1 or 100 nCi / gm
238U	Uranium238	5.7 E-3	1.2 E0
239Pu	Plutonium239	1.9 E-3	lower of 4.2 E-1 or 100 nCi / gm
240Pu	Plutonium240	1.9 E-3	lower of 4.3 E-1 or 100 nCi / gm
241Pu	Plutonium241	6.1 E-2	2.5 E1
241Am	Americium241	2.1 E-3	lower of 8.5 E-1 or 100 nCi / gm
243Am	Americium243	1.0 E-3	lower of 2.3 E-1or 100 nCi / gm