

A. Status of Current EPACMTP Run

A Run Manager dialog box will be displayed during each EPACMTP run to help you monitor the model's progress in real time. Note that the information displayed on this screen includes: constituent name, WMU type and liner scenario, current realization number, time elapsed, and estimated time remaining.

The summary table displayed on the Run Manager (24) screen, presented below in Figure 5.46, shows you the overall progress of the Tier 2 analysis – the liner recommendation for each completed EPACMTP model run and which (if any) model runs have not yet begun.

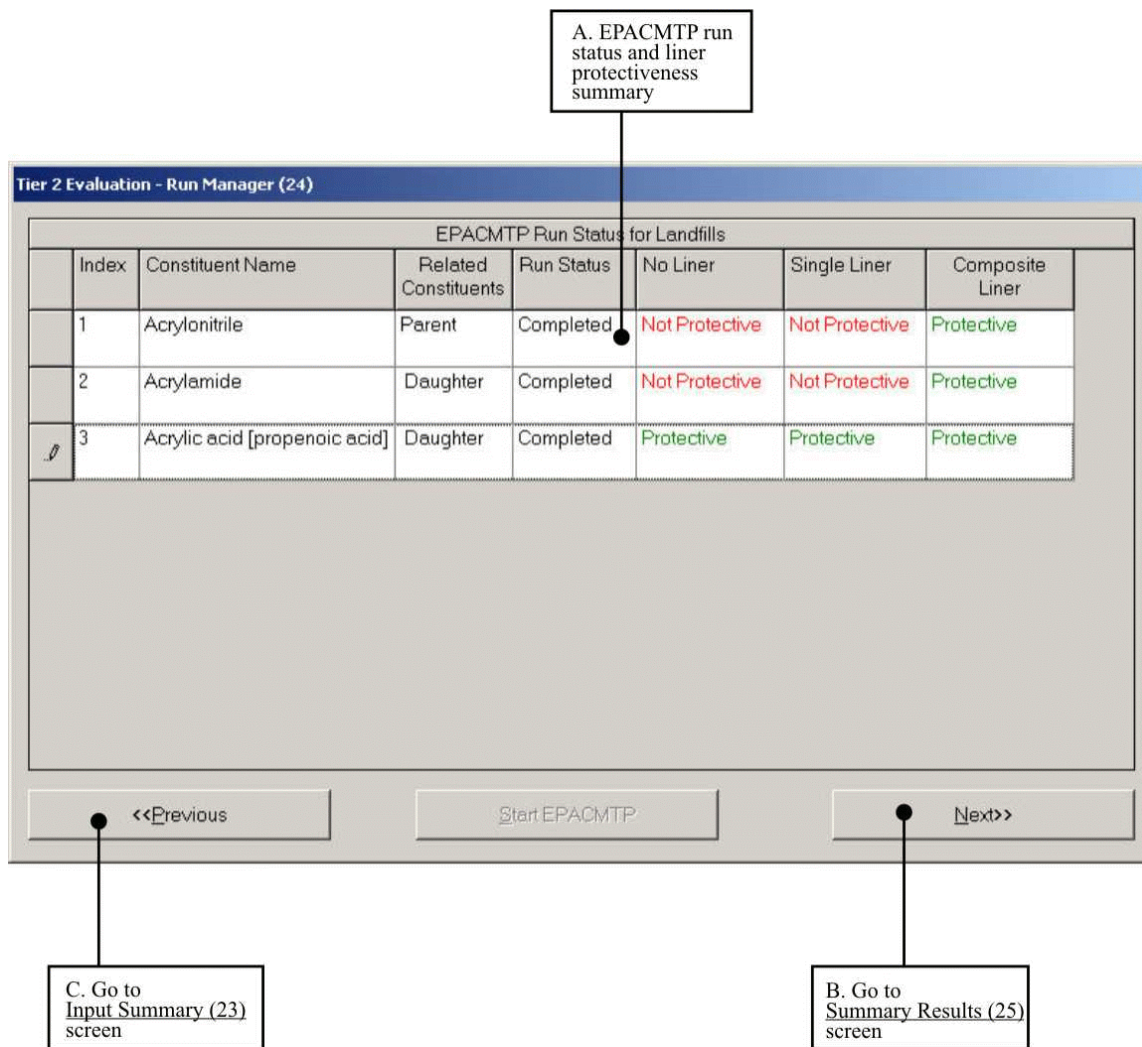


Figure 5.46 Tier 2 Evaluation: Run Manager (24) - Status and Liner Protectiveness Summary.

The features identified in Figure 5.46 are explained in more detail in the following paragraphs.

A. EPACMTP Run Status and Liner Protectiveness Summary

This summary table shows the current status of the analysis. For each waste constituent, you can see whether the required modeling is in progress or has been completed. In addition, this table will tell you whether or not each liner scenario is protective of ground water.

B. Go to Summary Results (25) screen

You can click on the |NEXT| button at the bottom right of the screen to proceed to the brief listing of the Tier 2 results that is presented on the Summary Results (25) screen.

C. Go to Input Summary (23) screen

You can click the |PREVIOUS| button at the bottom left of the screen to go back to the Tier 2 Input Summary (23) screen.

5.5.3 Tier 2 Evaluation Summary: Summary Results Screen (Screen 25)

The presentation of the liner recommendation for the Tier 2 evaluation is determined by which option you chose to specify the infiltration rate (either a location-based estimate or a user-specified value) and your WMU type. But whichever infiltration option you choose, the results are divided into two sets: summary results and detailed results. The first set of results is a summary which reports a liner recommendation for each individual waste constituent and the overall liner recommendation that is protective for all constituents. The second set of results, the detailed results, present the data upon which the liner evaluation is based. For each waste constituent, the expected leachate concentration, the DAF, the Tier 2 LCTV, specified RGC type and value, and the resulting 90th percentile ground-water concentration calculated by EPACMTP are listed. These detailed results allow you to understand how the liner design recommendations were developed.

The results of the Tier 2 Evaluation are first presented on-screen in a summary form. The Summary Results screen provides a liner design recommendation for each of the selected constituents which are listed by name and CAS number. The recommendation is based on a comparison of the resulting 90th percentile ground-water concentration and the specified RGC. If the ground-water concentration does not exceed the specified RGC, then the evaluated liner scenario is protective for that constituent. If

the ground-water concentration exceeds the specified RGC, then the evaluated liner scenario is not protective for that constituent. Only the no-liner soil scenario is evaluated for LAUs. In this case, if the no-liner scenario is not protective of ground water, then land application of the modeled waste is not recommended at the site.

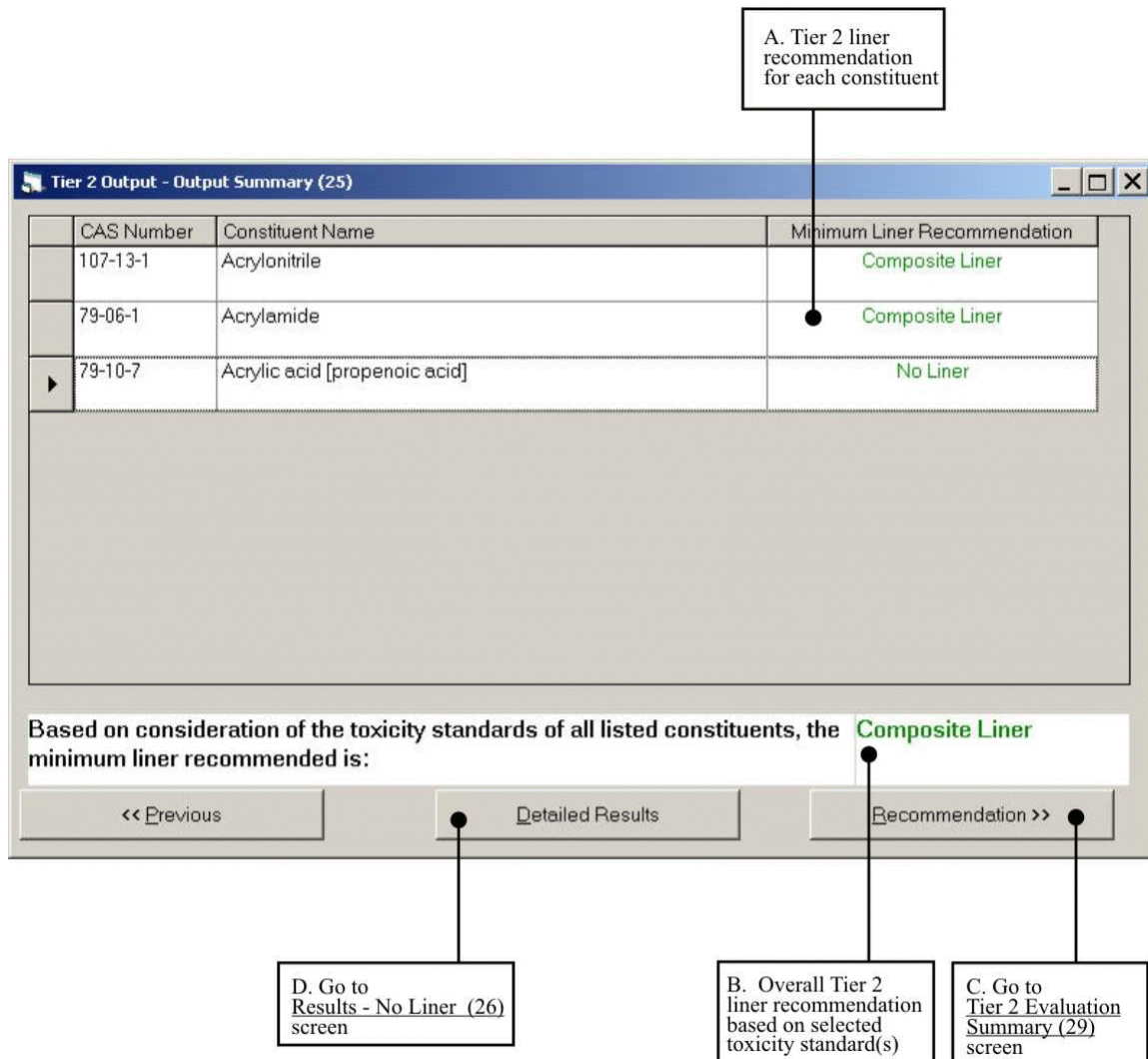


Figure 5.47 Tier 2 Output (Summary): Summary Results (25).

The features identified in Figure 5.47 are explained in more detail in the following paragraphs.

A. Tier 2 Liner Recommendation for Each Constituent

If you evaluated a landfill, waste pile, or surface impoundment and used a location-based estimate of the infiltration rate, the liner recommendation is the minimum recommended liner of the three types that are evaluated (no liner, single clay liner, and composite liner). If you evaluated a LAU and used a location-based estimate of the infiltration rate, the resulting recommendation is whether or not land application of this waste at this site will be protective of ground-water.

If you entered a site-specific infiltration rate (for any type of WMU), then the liner recommendation is whether or not the modeled liner type is recommended as being protective of ground water.

For a Tier 2 evaluation, the no-liner, single clay-liner, and composite-liner recommendations are displayed in green text. If the composite liner is not protective, then this message is displayed in red text. If the liner recommendation is “Not Applicable,” then this message is displayed in black text.

B. Overall Tier 2 Liner Recommendation Based on Selected Toxicity Standard(s)

The bottom of the screen displays an overall liner recommendation which is based on consideration of all waste constituents (and their daughter products).

If EPACMTP predicts that the 90th percentile values of ground-water well concentration for all constituents under the no-liner scenario are below their respective RGCs, then IWEM will recommend that no liner is needed to protect groundwater. If the modeled ground-water concentration of any constituent under the no-liner scenario is higher than its RGC, then at least a single clay liner is recommended (or in the case of LAUs, land application is not recommended). If the predicted ground-water concentration of any constituent exceeds the RGC under the composite liner scenario, then consider pollution prevention, treatment, and more protective liner designs, as well as consultation among regulators, the public, and industry to ensure such wastes are protectively managed. See Chapter 4 of the *Guide* (U.S. EPA, 2002d) for further information.

For waste streams with multiple constituents, the least stringent liner design that is protective for all constituents is the overall recommended liner design.

C. Go to Tier 2 Evaluation Summary (29) screen

Clicking on the |RECOMMENDATION| button will take you to the Tier 2 Evaluation Summary screen where you can choose to view the Tier 2 report or save your analysis and exit the IWEM software.

D. Go to Results - No Liner (26) screen

Clicking on the |DETAILED RESULTS| button will take you to a detailed listing of the Tier 2 results, including the constituent-specific modeling results for all evaluated liner scenarios.

5.5.4 Tier 2 Output (Details) Screen Group (26, 27, and 28)

The detailed results table for each evaluated liner type presents the data on which the liner recommendation are based. For each waste constituent, this information includes the expected leachate concentration, the DAF, the Tier 2 LCTV, the specified RGC type and value, the resulting 90th percentile ground-water concentration, and text explaining whether or not the liner is recommended as being protective of ground water. These detailed results allow you to understand how the liner design recommendations were developed.

If you directly enter a value for infiltration (for any of the four types of WMUs), EPACMTP will use this value of the infiltration rate in its fate and transport simulation, and IWEM will then compare the predicted ground-water well concentration to each constituent's RGC. In this case, the detailed results will consist of only one screen, rather than the three that are shown below in Figures 5.48 through 5.50.

Also, for a Tier 2 analysis of a LAU, only the no-liner scenario is evaluated since engineered liners are not typically used at this type of facility. In this case, the detailed results will consist of only one screen.

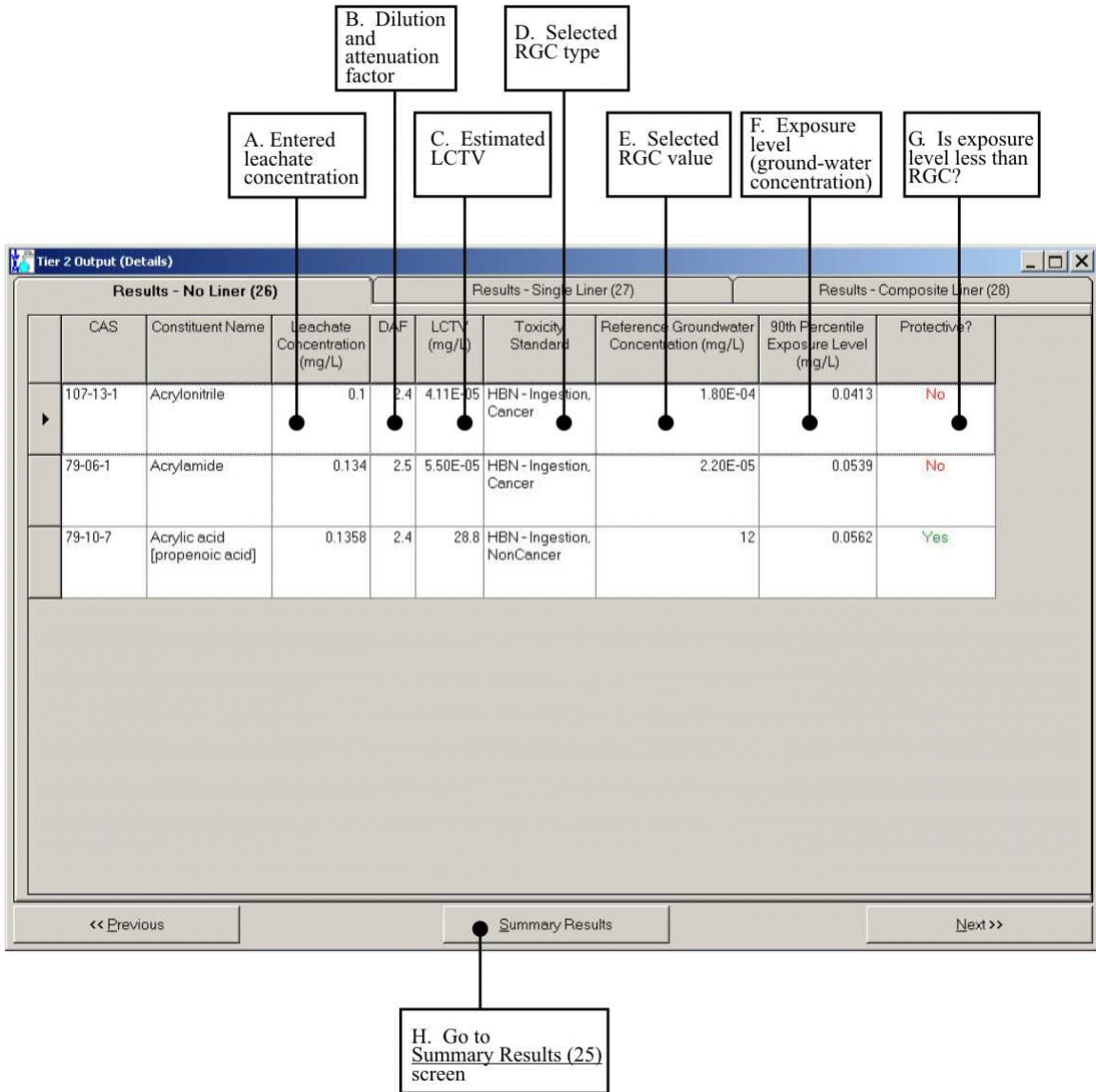


Figure 5.48 Tier 2 Output (Details): Results-No Liner (26).

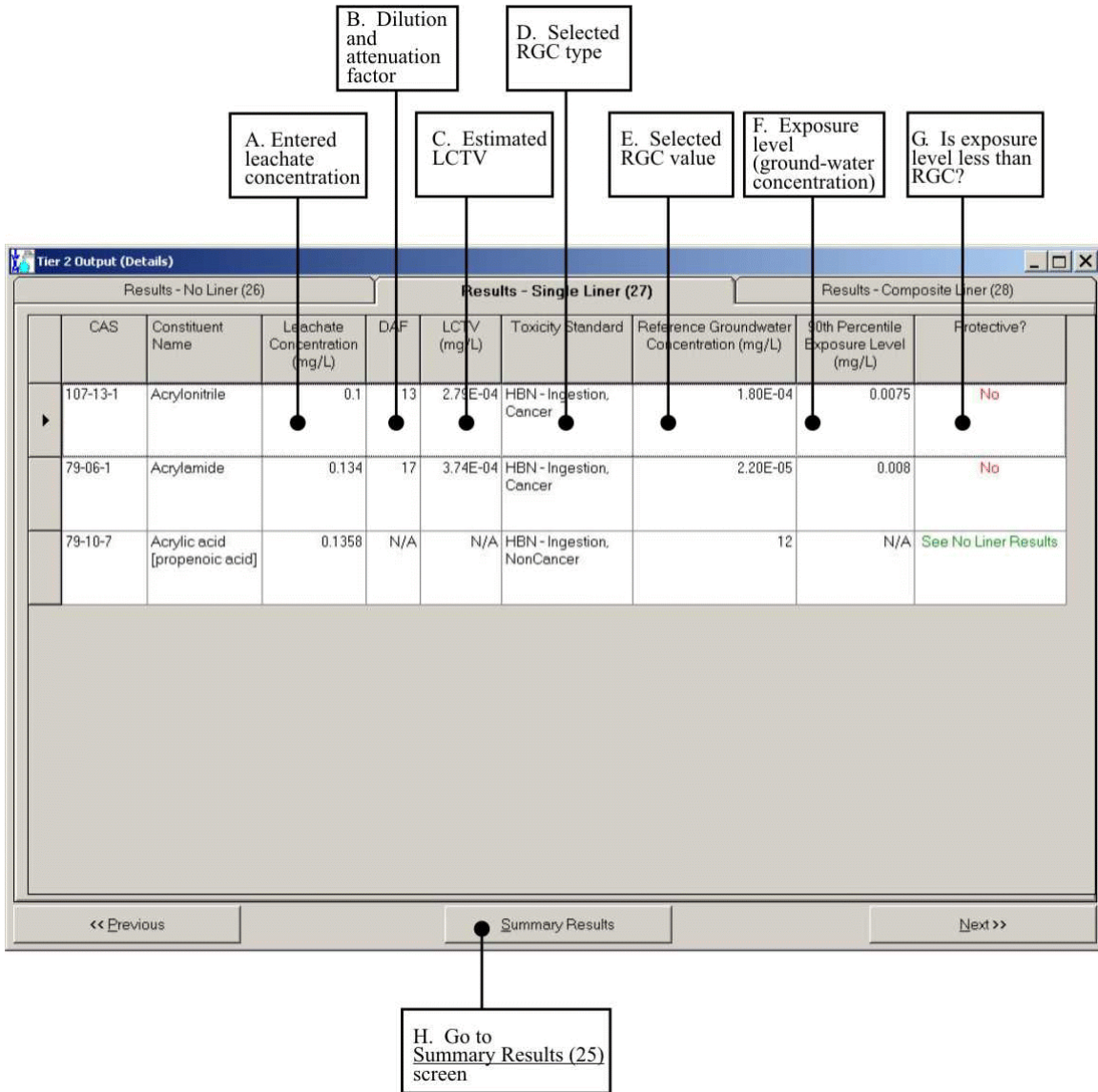


Figure 5.49 Tier 2 Output (Details): Results-Single Liner (27).

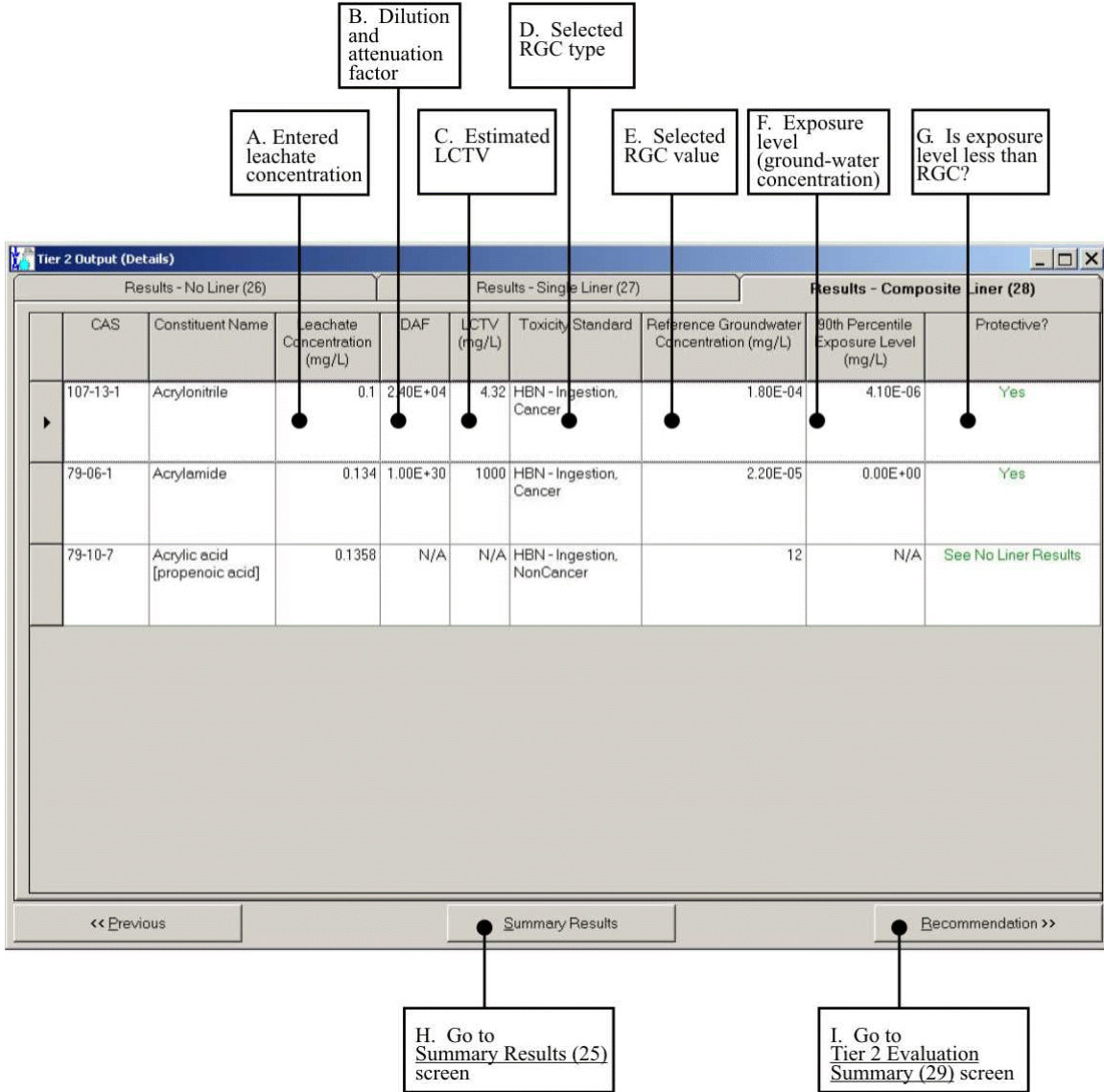


Figure 5.50 Tier 2 Output (Details): Results-Composite Liner (28).

The features identified in Figures 5.48 through 5.50 are explained below.

A. Entered Leachate Concentration

The entered leachate concentration for each constituent is displayed in the third column. This is the value that was used by IWEM in the EPACMTP ground-water fate and transport modeling.

B. Dilution and Attenuation Factor

This column shows the 90th percentile value of the ground-water DAF calculated by EPACMTP. DAF values are capped at 1×10^{30} .

C. Estimated LCTV

The constituent- and liner-specific Tier 2 LCTV is also displayed on this screen. The LCTV for organics is calculated as follows:

$$\text{LCTV} = \text{DAF} \times \text{RGC}$$

where:

LCTV	=	leachate concentration threshold value (mg/L)
DAF	=	dilution-attenuation factor (EPACMTP model output) (dimensionless)
RGC	=	reference ground-water concentration (MCL, HBN, or user-specified value) (mg/L)

In Tier 2, the LCTV for metal constituents is an estimated value due to the non-linear nature of metals adsorption (that is, for metals the DAF is not constant across all leachate concentrations, as it is for organics). For this reason, an adjustment factor of 0.85 is used to estimate the LCTVs for metals in order to ensure adequate protection of the ground water. The Tier 2 LCTV for metals is calculated as follows:

$$\text{LCTV} = \text{DAF} \times \text{RGC} \times 0.85$$

D. Selected RGC Type

The selected RGC type is displayed in this table for your reference. In addition to regulatory MCLs, four types of HBNs can be evaluated in the IWEM software, covering the direct ingestion and inhalation pathways, and carcinogenic and non-carcinogenic health effects. However, if the existing values in the IWEM software are not appropriate for your analysis, you may enter your own RGC to be used in the Tier 2 analysis. In any case, the specified RGC type and value are displayed for each waste constituent.

E. Selected RGC Value

The selected RGC value is also displayed in this table for your reference. Note that its value may be an MCL, an HBN, or a user-defined value.

F. Exposure Level (Ground-water Concentration)

In order to determine whether or not this liner scenario is protective for a given constituent, the resulting 90th percentile ground-water concentration is compared with the specified RGC. If the ground-water concentration does not exceed the specified RGC, then the evaluated liner is protective for that constituent. If the ground-water concentration exceeds the specified RGC, then the evaluated liner is not protective for that constituent.

G. Is the Exposure Level Less than the RGC?

The result of the comparison between the modeled 90th percentile exposure level (ground-water concentration) and the specified RGC is displayed at the far right of this table.

If the 90th percentile exposure level does not exceed the specified RGC, then the evaluated liner is protective for that constituent and the text in the last column of this table will read |YES| for that constituent.

If the 90th percentile exposure level exceeds the specified RGC, then the evaluated liner is not protective for that constituent and the text in the last column of this table will read |NO| for that constituent.

H. Go to Summary Results (25) Screen

Clicking on the |RESULTS SUMMARY| button will take you back to the Tier 2 Summary Results (25) screen.

I. Go to Tier 2 Evaluation Summary (29) Screen

Clicking on the |RECOMMENDATION| button will take you to the next screen, the Tier 2 Evaluation Summary (29) screen where you can choose to view the Tier 2 report or save your analysis and exit the IWEM software.

5.5.5 Tier 2 Evaluation Summary (29)

The Tier 2 Evaluation Summary screen identifies the overall Tier 2 liner recommendations and lists the available options within the IWEM software.

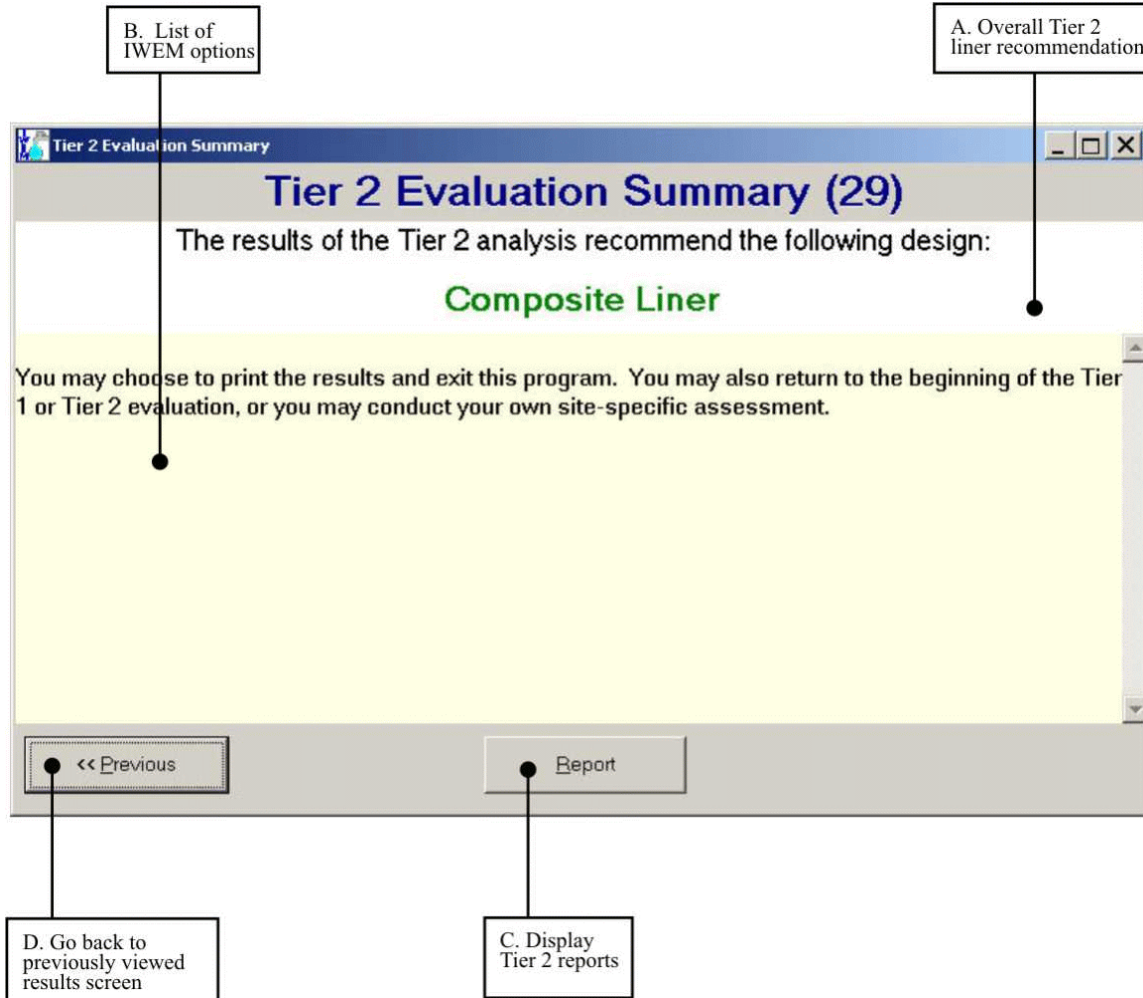


Figure 5.51 Tier 2 Evaluation Summary (29).

The features identified in Figure 5.51 are explained in more detail in the following paragraphs.

A. Overall Tier 2 Liner Recommendation

The Tier 2 liner recommendation is displayed at the top of this screen. For landfills, surface impoundments, and waste piles that were modeled using a location-based estimate of the infiltration rate, the available recommendations are: no-liner, single clay-liner, composite-liner, and not protective. For LAUs that were modeled using a location-based estimate of the infiltration rate, the available recommendations are: no-liner and not protective. If you entered a user-specified value for the infiltration rate, the

available recommendations are: protective and not protective. If your Tier 2 evaluation results in a recommendation of “not protective”, then the chosen WMU for managing the waste may not be appropriate at the selected site. In this case, consider pollution prevention, treatment, and more protective liner designs, as well as consultation among regulators, the public, and industry to ensure such wastes are protectively managed. See Chapter 4 of the *Guide* (U.S. EPA, 2002d) for further information.

B. List of IWEM Options

After reviewing your Tier 2 results on-screen, you have several options to continue within the IWEM software:

- Go back to the previous screens of the Tier 2 results by clicking on the |PREVIOUS| button.
- View the Tier 2 report by clicking the |REPORT| button.

At this point, you can also choose to save your results, exit the IWEM software, or conduct a Tier 3 Evaluation. For more information about Tier 3 Evaluations, see Chapter 7A (Protecting Ground Water - Assessing Risk) of the *Guide*.

There are several ways to save the Tier 2 Evaluation:

- Click on the |FILE| menu and choose |SAVE| or |SAVE AS|. A dialog box will then open which prompts you for the filename and directory location, as appropriate. Once you have provided a filename, the tool will save two files, automatically applying the “wem” and “mdb” extensions for you. The combination of these two files completely describes the data you have entered and any model-generated results. Please note that you cannot save any files to the cd-rom, so you must specify a directory on your hard-drive or a floppy disk to save the file.
- Click on the |SAVE| button on the toolbar. If you are editing a previously saved evaluation, the file will be automatically updated. If you have created a new evaluation, the |SAVE AS| dialog box will open, as described above.

Note that IWEM will not allow you to save both model inputs and results at a point where the inputs do not correspond to the model-generated results. If you do choose to save your work in a situation like this, only the inputs will be saved; that is, when you later open up this file, you will have to perform either the Tier 1 or Tier 2 evaluation to create the corresponding results. Once you have completed an evaluation

you should save it under an appropriate file name. If you want to start a new evaluation by editing an existing IWEM file, you should first save the new evaluation under a different name to avoid losing the results of your original evaluation.

You can exit the IWEM software by clicking on the **|FILE|** menu, and choosing **|EXIT|**. If you forget to save before trying to exit the IWEM software, a dialog box will ask if you want to save your data before exiting the software.

You can open a previously saved IWEM analysis by clicking on any one of the following options:

- **|OPEN|** button on the Tool Bar
- **|FILE|OPEN|** selection from the Menu Bar
- **|OPEN SAVED ANALYSIS (*.WEMFILE)|** radio button from the **|IWEM ANALYSIS OPTIONS|** dialog box (see Item B in Section 5.3)

Once the **|OPEN|** dialog box is displayed, highlight the appropriate file and click the **|OPEN|** button to open the desired file. You will then see a dialog box in which you can specify what type of analysis you want to perform – Tier 1 or Tier 2.

C. Display Tier 2 Reports

Clicking on the **|REPORT|** button displays the IWEM Tier 2 Report.

Once the Tier 2 report is displayed on-screen, you can then use the following toolbar buttons to print, save, and scroll through the pages of the report:



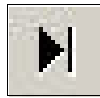
Print the report; the **|PRINT|** dialog box then appears where you can adjust printer setting or choose to print selected pages.



Export the report in order to save it to a file; after specifying the file type, destination type, and the pages to be included, the **|CHOOSE EXPORT FILE|** dialog box then appears; you can specify the file type, and then select the file name and directory. The file types in this list are dependent upon what software you have installed on your PC. Most users will find that the option for PDF format will produce a document-ready report.



View the next page of the report



View the last page of the report.



View the previous page of the report



View the first page of the report.



Change the display size of the report.

Tier 2 Report Includes:

- WMU facility data entered on screen 16
- List of selected constituents and their corresponding leachable concentrations entered on screen 20
- List of Tier 2 input values and explanations of user-input data, as summarized on screen 23
- Tier 2 summary results for each selected constituent, based on the user-specified RGC for each constituent
- Tier 2 detailed results for each selected constituent, based on the user-specified RGC for each constituent, and including an explanation of any appropriate caps or warnings about the presented results
- Constituent properties and RGCs for each selected constituent, including full references for the data sources

An example Tier 2 report is included in this *User's Guide* in Appendix B.

D. Go Back to Previously Viewed Tier 2 Results

Click on the | PREVIOUS | button to return to the Tier 2 results that were previously displayed. That is, if you navigated directly to the Tier 2 Evaluation Summary (29) screen from the Summary Results (25) screen, then screen 25 is the screen you will return to. However, if you viewed the detailed results before navigating to the Tier 2 Evaluation Summary (29) screen, then clicking the | PREVIOUS | button will return you to the Results-Composite Liner (28) screen.