Chapter 6

Customizing Reports

You've had the opportunity to create basic report formats, including sorting and grouping, and learned how to do some basic customization of the report document during runtime. This chapter takes that knowledge a little further by showing you how to add more customization to your report. This consists of filtering records that the report selects from, using report sections for advanced formatting techniques, and creating running totals. Once you are finished with this chapter, you will have the foundation needed to generate the majority of reports needed on a daily basis.

Selecting Records

The examples up to now have all selected records from a table without regard to filtering the data. It was assumed that you wanted to display every record in the table. While this may be true some of the time, you will frequently want to filter the data so that only a subset of records is printed. This gives you the ability to customize a report to only show the information that pertains to the current user. For example, you can design a sales report so that it selects data based upon the region, or the sales person, or even on a sales person for just the last month. Almost any way that you can imagine to filter data can be done for a report.

Crystal Reports makes selecting records easy. It provides you with a Select Expert dialog box that lets you pick one or more fields and set the selection critieria to use. Fortunately, it is easy to learn because it is similar to other Crystal Report experts.

Using the Select Expert

To open the Select Expert, right click on your report and choose Report | Select Expert. If this is the first time the Select Expert has been run for the report, then you will be shown the Choose Field dialog box. As you can see in Figure 6-1, it simply lists all the fields available, including report fields as well as database fields.

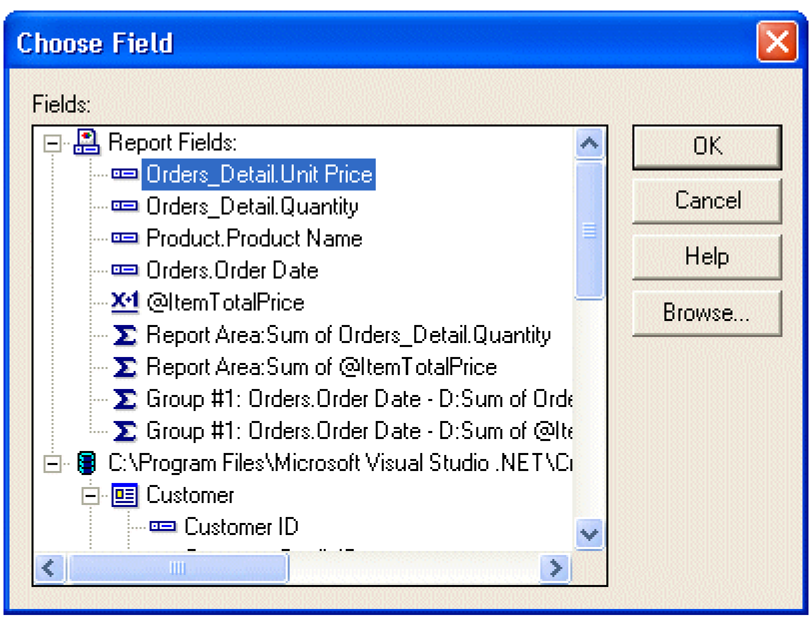


Figure 6-1. The Choose Field dialog box.

Once you select a field from this dialog box and click the Ok button, this dialog box will not be shown again. Instead, you will always be immediately taken to the Select Expert dialog box that is shown in Figure 6-2.

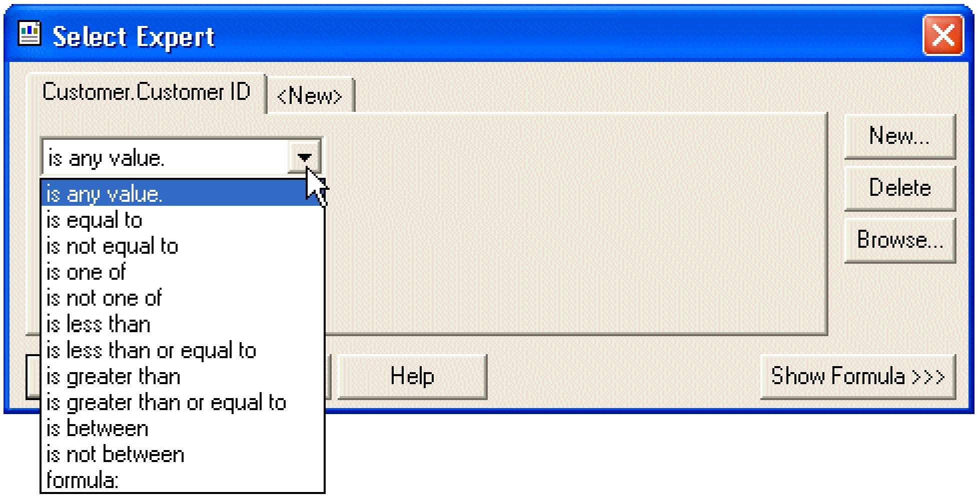


Figure 6-2. The Select Expert dialog box.

There are two tabs in this dialog box. The first is titled with the field that you selected in the Choose Field dialog box and the second is titled <New>. The tab with the field name has a combobox where you select the filter criteria. By default this is set to "is any value". That is because your report doesn't have any filters turned on and every record gets selected. Click the combobox to view available filtering options and select the one you want. The dialog box in Figure 6-2 shows all the options in this combobox. As you can see, these are textual equivalents of the basic comparison operators that you would normally use in your programming code (e.g. =, >, <=, etc.). Except for the "formula:" option (discussed later), these are all standard comparisons and require no explanation.

> Note: If you selected a field that is of the DateTime data type, you will have more options listed with the comparison operators. Additional options include selecting dates that are within a certain fiscal quarter, within the past month, or even aging dates according to how many days ago it occurred. These options demonstrate the power of Crystal Reports for working with dates. See Chapter 8 for more information on how these date functions work.

Once you select a comparison method, the right side of the dialog box changes so that you can enter the value to compare the field to. With the majority of the comparisons, only a single combobox will be shown. A very helpful feature is that you can see all the current values for the field by clicking on the dropdown arrow. Crystal Reports will populate the list with the current data for that field from all the records. In fact, you will probably notice a short delay as it opens and reads in the records from the table. You can either select one of these fields from the list or enter a new value.

Although most comparison operators only have a single combobox for entering values, there are a couple of exceptions. The is between and is not between comparisons show two comboboxes. This lets you enter a beginning and ending range. The "is between" comparison is inclusive. The is not between comparison is exclusive. The other exception is when you choose a comparison of is one of or is not one of then the dialog box looks like the one in Figure 6-3. As you select items from the combobox, they are added to the listbox below it. These items let you select records where the field either matches an item in the list or it doesn't (depending on the comparison). If you type in a value manually, then you can add it by clicking on the Add button. If you add an item by mistake, you can delete it from the list by clicking the Remove button.

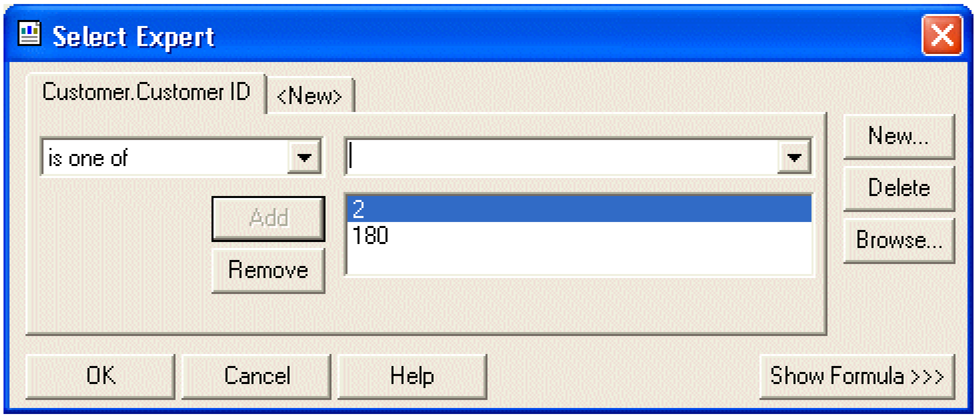


Figure 6-3. Building a list of items.

You are not limited to selecting records based on a single field. The <New> tab lets you select multiple fields for record selection. When you click on this tab, you are shown the same Choose Field dialog box that you saw when you first opened the Select Expert. Once you select a field you are brought back to the tab and the field that you selected is now in the tab header. The rest of the selection process is the same as what was just discussed.

When selecting multiple fields, Crystal Reports treats each field as being part of a Boolean AND statement. For a record to be selected by the report, it must successfully meet the criteria specified for each field listed in the dialog box. If there were four fields listed, and a record matched three of the fields, then the record wouldn't be selected.

From what you have seen so far, the Select Expert is a very helpful tool for selecting one or more fields using basic the basic comparison operators. This will probably be adequate for many of the reports you write. But what about the other reports where this isn't good enough? For those reports, you have the Formula Editor. The Formula Editor is described in complete detail in Chapter 7, but here is a summary of how to use it.

The Formula Editor lets you use Crystal Syntax, a built-in programming language, to create sophisticated selection formulas. There are a vast array of functions to choose from for building a selection formula. A simple example is when you don't want to use the Select Experts default of requiring a field to match all the criteria selected. You can change the formula so that rather than use a Boolean AND to join the fields, it will use a Boolean OR. Another example would be that rather than selecting a range of records based upon customer name, you could select the records based upon the first character of the customer name. This would let you choose all the customers with names starting with the letter "B".

Caution! When opening the Formula Editor from within the Select Expert, you are only given the option of using Crystal syntax as your programming language. As you will see in Chapter 7, Crystal Reports also gives you the option of using Basic syntax, which is very similar to VB.NET. Unfortunately, you don't have that option here. See Appendix A for a summary of the differences between Crystal syntax and Basic syntax.

Entering a custom formula is done two different ways. The first wayis that you click on the Show Formula button. This shows you the current formula that was built using the current fields selected. You can change this formula directly so that it matches the selection criteria you need. If you can't remember the different built-in functions available, then you can click on the Formula Editor button. This brings up the Formula Editor dialog box (discussed in Chapter 7) and you can use it as a reference tool to build the formula. The second way to enter a formula is to click on the comparison list and at the very bottom is an item called "formula". Clicking on this item changes the right side to a multi-line text box that lets you enter a formula from scratch.

Selecting Records for Grouping

If you want to set a filter on summary data, then you won't be able to do so with the regular selection formula. Selecting records has the limitation that you can only set filters for raw data or basic formulas. You can't set filters that on summary fields or on formulas that use summary fields. You also can't use any fields that use second-pass data. As mentioned in Chapter 2, second-pass data includes summaries and subtotals. The reason for these restrictions is that filtering is done during a report's first pass. Second-pass data hasn't been calculated yet and therefore you can't filter on something that doesn't exist. To get around this problem, you can perform a grouping selection. Grouping selections are performed during the second-pass and have access to that data.

There are two ways to add a grouping filter. The first is use the standard Select Expert dialog box and enter the filter as normal. The expert will recognize that the formula you entered is only valid as a grouping filter and will flag it as such. You can see this by clicking on the Show Formula button and the Grouping option button will be selected.

The second way to add a grouping filter is to right-click on the report designer and select Reports | Edit Selection Formula | Group. This brings up the Formula Editor dialog box where you can enter the necessary formula.

Sections

Sections are used to determine where report objects will appear on a report. Each section has a different purpose and different rules that it follows to determine when and where it should appear on a report. For example, the Report Header section only appears at the top of the first page of a report. It does not appear on any other pages in the report. Although each section follows certain rules, there are many options available for customizing a section so that your report comes out just the way you like. This section of the book shows you the different formatting options available as well as how to add sub-sections to a report for greater customization.

Formatting Sections

The sections of a report have many formatting options. You can hide a section, force it to print at the bottom of the page, force a page break afterwards and many other options. Creative use of these formatting options gives you control over how your report looks.

The formatting of each section is controlled by a single dialog box. The Section Expert, shown in Figure 6-4, is accessed by right-clicking on the report designer and selecting Format Section. The Section Expert lists every section in your report and the formatting options available. The options on the right are the formatting options that you can turn on or off to change the formatting. Beside each option is a formula button that lets you set the option using a formula. This gives you flexibility for setting when a formatting option is turned on because you can use data available to the report in a formula. Every time a section is printed, the formula is evaluated and its result determines whether the formatting option should be applied. This is described in more detail in Chapter 7.

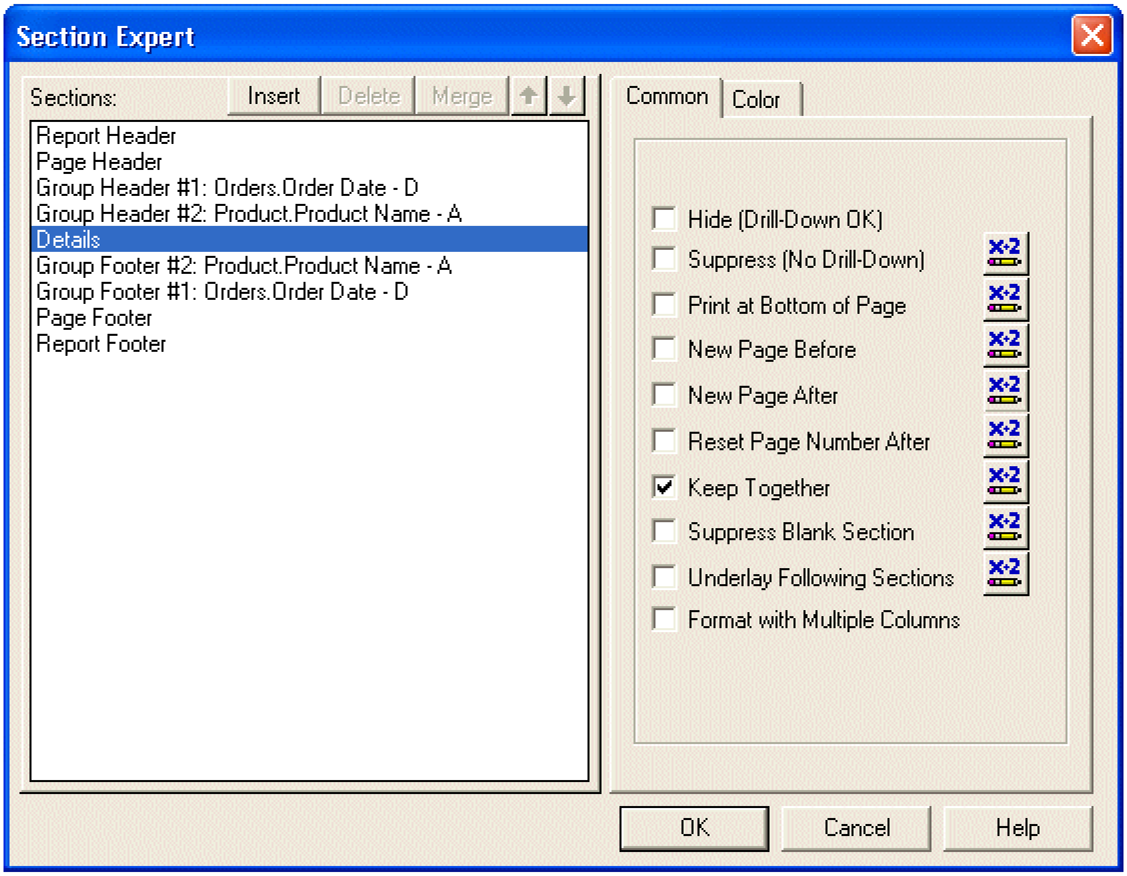


Figure 6-4. The Section Expert dialog box.

If you are familiar with prior versions of Crystal Reports, then the Section Expert is nothing new to you. However, with .NET, you can also access these properties via the Properties Window of the IDE. When you click on a section header, the properties in the window change to match the section you selected. The one drawback of using the Properties Window is that is has the limitation of not being able to use the Formula Editor. The Section Editor has the advantage of being a custom dialog box, so it can have the Formula Editor buttons next to each formatting option. The Properties Window is not able to provide such customization so it can only let you set the current value of the property.

When you select the section from the list on the left, the formatting options on the right that are applicable to that section are enabled and the other options are grayed out. The list of formatting options doesn't change, but you are prevented from choosing the ones that don't apply. The formatting options are described in Table 6-1.

Table 6-1. The formatting options for sections.

Formatting Option	**Description**
Hide (Drill-Down OK)	Don't show the section, but allow the user the drill-down into the data.
Suppress (No Drill-Down)	Don't show the section. Drill-down is not allowed.
Print at Bottom of Page	Force the section to always print at the bottom of the page.
New Page Before	Force a page break before the section prints.
New Page After	Force a page break after the section prints.
Reset Page Number After	Reset the page number counter back to 1 after the section prints.
Keep Together	Keep the section together on the same page.
Suppress Blank Section	If there is no data in the section, do not print it.
Underlay Following Sections	Print the current section on top of the following

	sections. Proper alignment is critical so that objects don't overlap each other.
Format with Multiple Columns	Lets you create mailing labels and newspaper column style reports. This is only listed for the Details section.

Hiding and Suppressing Sections

Hiding sections is used for drilling-down on detail records. As discussed in Chapter 4, you can design your report so that groups only display summary information. This presents the user with a much smaller report. If they are previewing the report with the CrystalReportViewer, then they can look at the detail information by double clicking on the group header. This creates a new tab in the viewer with the detail information being displayed inside.

Suppressing a section is done when you don't want the user to see the information in it. Of course, this leads to the question that if you don't want the user to see the information then why did you add the section? Suppressing sections is used in conjunction with conditional formatting. The Formula Editor is used to turn this option on or off depending upon other data that the report has access to. For example, if this is sensitive data then you would only let administrators see the detail information. All other users would have the detail section suppressed and they would only be able to see the summary information.

Printing Sections at the Bottom of a Page

Printing sections at the bottom of the page is useful when printing form style reports that are one page long and have summary data listed at the bottom. Put the summary data in a group footer and turn this option on for the group footer. This is very common with invoices where the bottom of the page prints all the totals. Invoices can also print the aging schedule of past due balances. Another example is a form letter that requires authorized signatures of certain parties. Just put the signature lines in the group footer and set it to always print at the bottom of the page.

> Note: Although you can set the Details section to always print at the bottom, this will have no effect. The detail records always print one after the other as they normally would.

Forcing a Page Break

Page breaks are useful when you want groups to appear on their own pages. Its very common to want groups to appear by themselves so that data is listed separately from the other groups. This useful for a large report that uses groups to identify which parts go to different people. Use the page breaks so that it is easy to tear the report apart and distribute it to the appropriate people.

Page breaks can be forced to occur either before or after the section. Both options have the same problem of causing a blank page to be printed. If you force a page break before a group header, then the first page will be blank. If you force a page break after the group footer, then the last page will be blank. The way around this is to use one of two built-in functions in the conditional formula: OnFirstRecord or OnLastRecord. By doing a Boolean Not in the formula, it turns suppression off for either section. For example, if you wanted to force a page break after the group footer, then you would use the following formula (using Basic syntax) in the New Page After format option:

```
Formula = Not OnLastRecord
```

Resetting the Page Number

Resetting a page number back to Page 1 makes the page appear as if it is the first page in the report. This is good to use in combination with forcing a page break after a section. When you distribute the pages of the report to different people, each person will have a report that starts on page 1.

Keeping Sections Together

Since it is very hard to control exactly where a section will be printed on a page, it is common for sections to be split across pages. A report can start printing a section at the bottom of the page but not have enough room to print all of it. It will print the remaining portion of the section on the next page. If it is important that all the information within a section be printed together, then turn this option on. Before the section is printed, it is analyzed to see whether it fits on the page. If it doesn't fit then a page break will be forced and the section will print on the next page.

As discussed in Chapter 4, when using this formatting option with groups, the report will try to fit the entire group (including the footer) onto the page. If the group doesn't fit, then a page break will be forced and the group gets printed on the next page.

Suppressing Blank Sections

Printing sections that don't have any data will leave blank rows in your report. This can make a report look unprofessional because of the gaps that seem to randomly occur. To fix this, set the section to be suppressed if it is blank. The report will skip over a section that doesn't have any data and go to the next record. This option is used most frequently in conjunction with creating multiple report sections. That is covered in the section Adding Multiple Sections.

Underlaying the Following Sections

When you format a section so that it underlays the following sections, the following sections will print on top of it. This has the effect of merging one or more sections on top of another section. This is frequently use with a group header so that all the detail records within that group will print on top of the group header.

This is useful when working with images or charts and you want the related information printed next to the picture. As an alternative, you could put the image in the detail section next to the related information. Figure 6-5 shows an Employee Report using the Extreme database. Each record has a picture of the employee with the employee's information next to it.

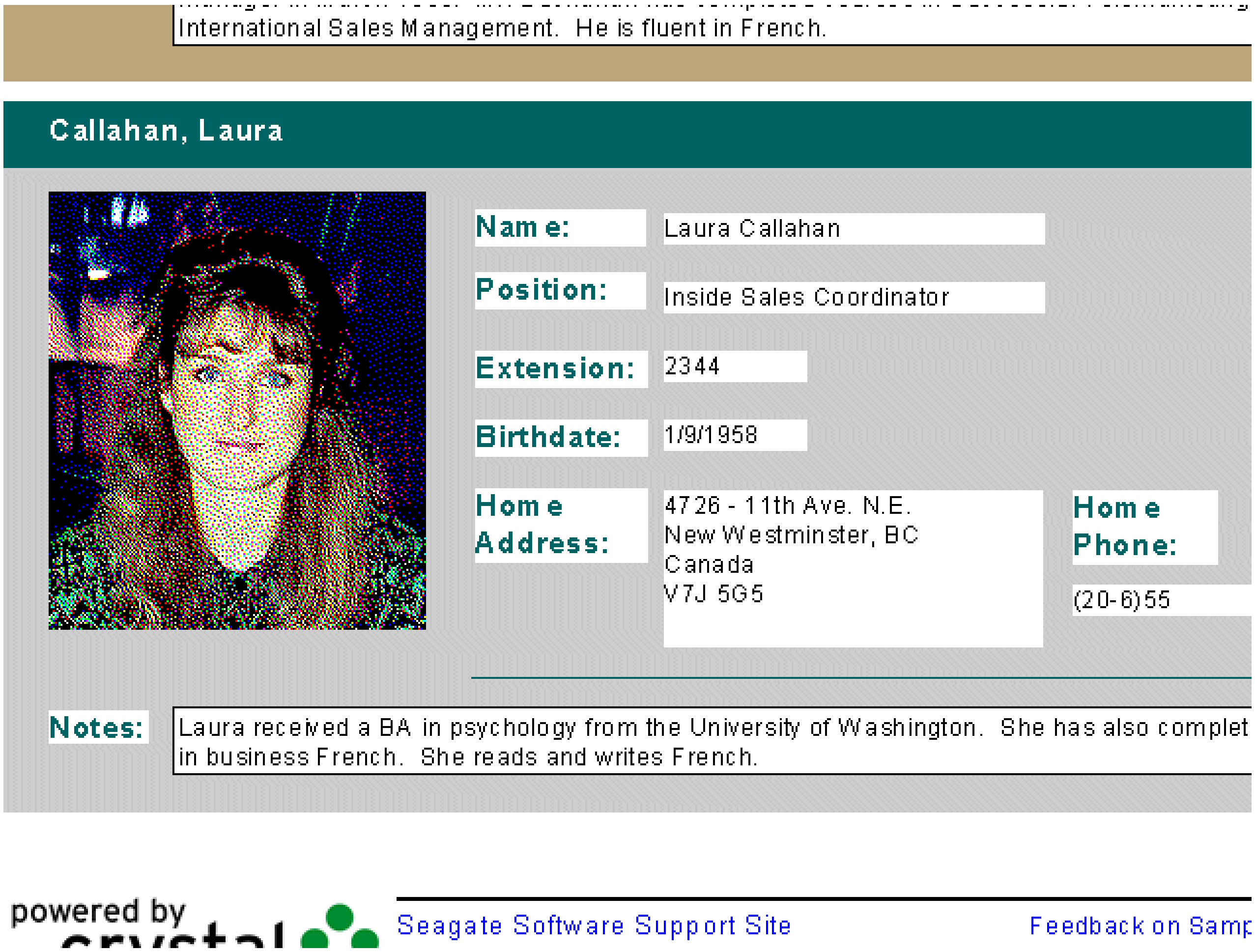


Figure 6-5. Employee Profile report with photo.

The limitation this example has is that the photo can only be printed next to the data within a single employee record. The photo has a one-to-one relationship with the employee data shown. If you wanted to print a photo with multiple detail records next to it, then this approach won't work. To fix this problem, put the photo in the group header and turn on the Underlay format option. This will cause all the related detail records to be printed on top of the group header section. As long as you make sure to position the image appropriately, then the detail records will be listed next to the photo. Figure 6-6 shows the design view of the report.

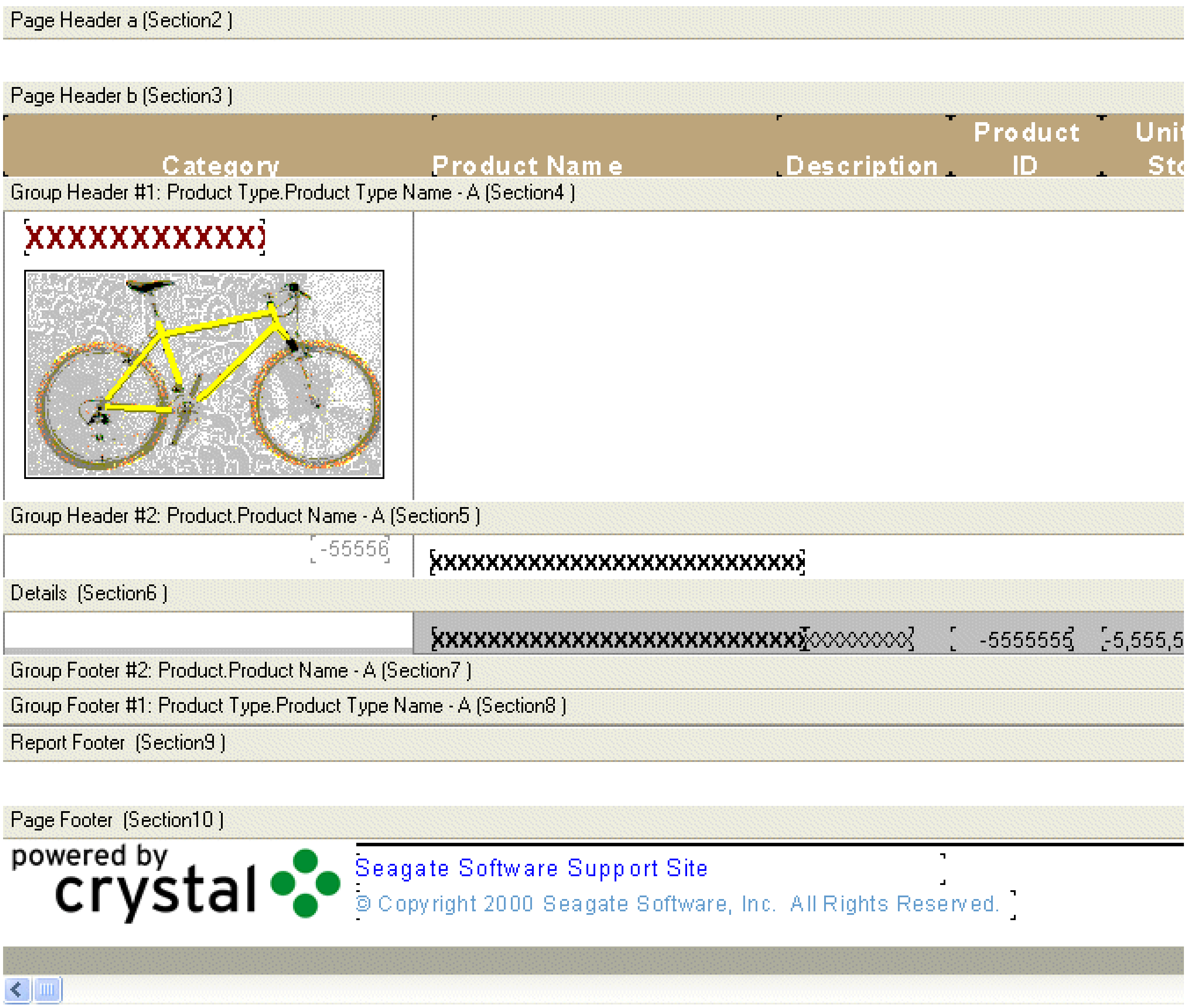
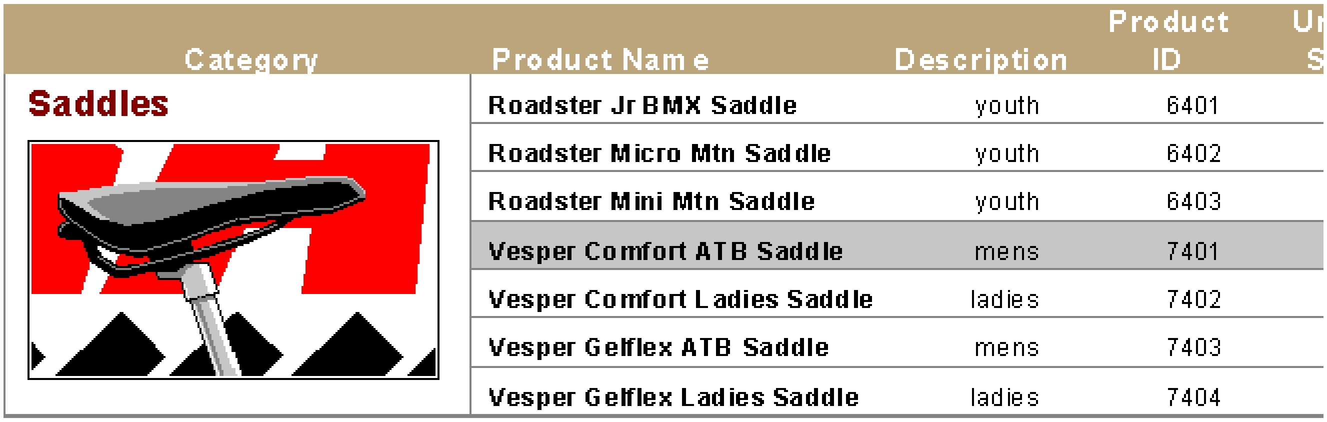


Figure 6-6. Inventory report with Underlay turned on from the report designer.

The image is put in the group header, along with its product name, and there is no other data in the group header. Below the header is the Details section which uses a single row to display the product detail. Also notice that the detail section has nothing in the area that is directly below the image. When the report is run, the image appears alongside the related detail records. Figure 6-7 shows that the image now has a one-to-many relationship with the detail records.



Category	Product Name	Description	Product ID	U S
Saddles	Roadster Jr BMX Saddle	youth	6401	
	Roadster Micro Mtn Saddle	youth	6402	
	Roadster Mini Mtn Saddle	youth	6403	
	Vesper Comfort ATB Saddle	mens	7401	
	Vesper Comfort Ladies Saddle	ladies	7402	
	Vesper Gelflex ATB Saddle	mens	7403	
	Vesper Gelflex Ladies Saddle	ladies	7404	

Figure 6-7. Output of the Inventory report with Underlay turned on.

Using the underlay feature is also useful when you want your report to have a watermark image on each page. Put the image in the page header and everything after it will be printed on top of it. Be sure to test the image to make sure it isn't too dark. A faint image works best as a watermark because it allows the rest of the report to be easily read.

Formatting with Multiple Columns

The default layout of a report is designed so that each detail record uses the entire width of the page. Sections aren't designed so that they only use a partial page width. However, if you want to print mailing labels or a newspaper style report, then you need to use sections that are small enough that they can be repeated across the page. Setting this option lets you do that.

When selecting this option, a Layout tab appears in the dialog box. This tab lets you set the column width and spacing so that your information can be put onto mailing labels. You can also set whether the records will go down the page first and then to the next column, or go across the page first before going down to the next row. Figure 6-8 shows the options on the Layout tab.

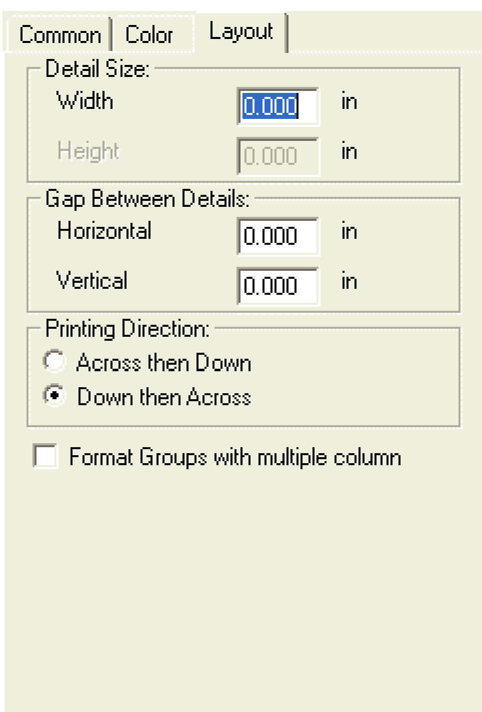


Figure 6-8. The Layout tab of the Section Editor.

The only problem with using the Layout tab, is that it can take a little experimentation to get the formatting perfect. If you are printing out labels, then precision is a necessity and making a mailing list could take a lot of experimentation to get it right. You are much better off by using the Report Expert dialog box to create mailing labels. As Figure 6-9 shows, using the Report Expert lets you pick from a list of standard Avery numbers for your label format. Unless you are using a custom designed label, you can let Crystal Reports do all the work in figuring out how to format the label. This makes it easy to quickly create mailing labels that prints perfect the first time!

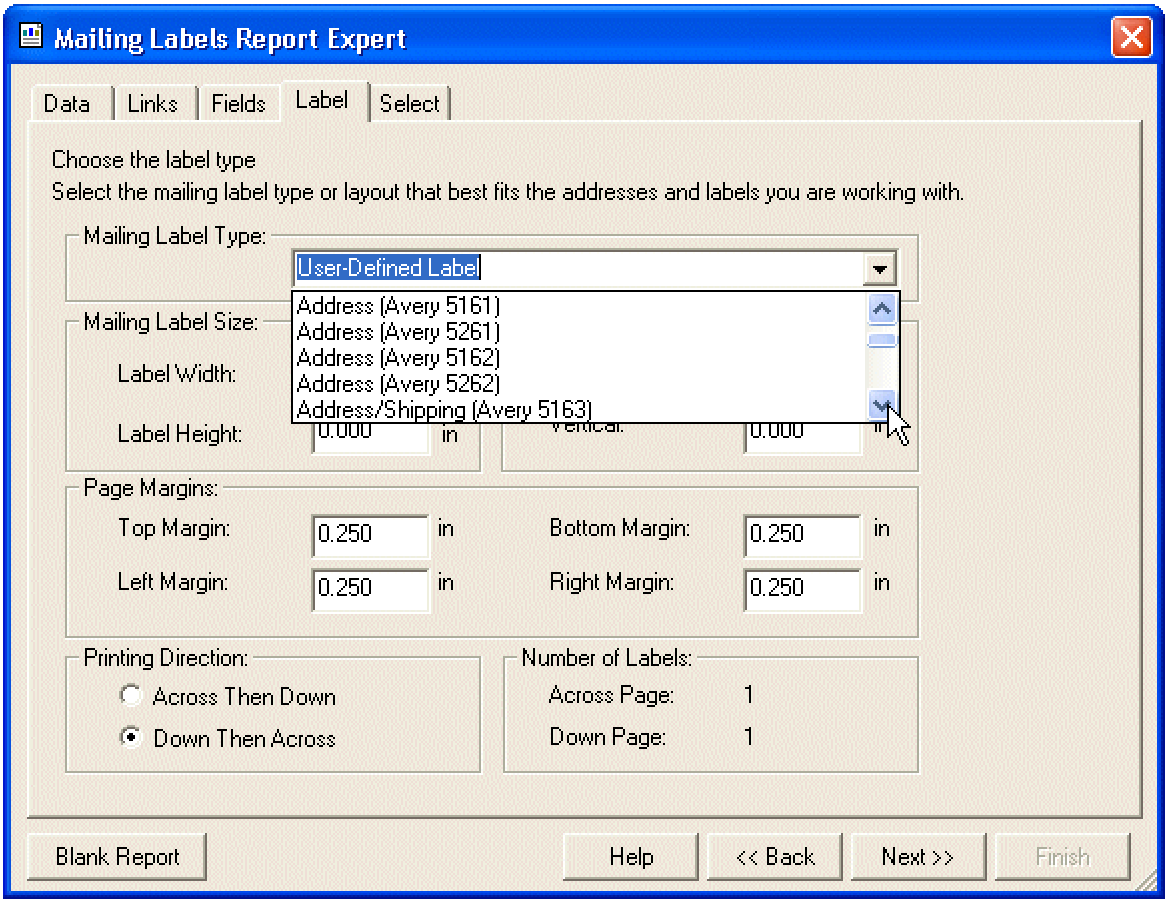


Figure 6-9. The Mailing Labels Report Expert.

> Caution! Once you create a report using the Mailing Label Report Expert, you can always go back and change the Avery lavel number by right-clicking on the report and selecting Report | Report Expert. However, if you create a standard report and later turn the Multiple Column option on, you have to custom format the labels. You will not be able to bring up the Mailing Label Report Expert.

Adding Multiple Sections

Throughout this book, when different areas of a report were discussed, they were referred to by their section name. For example, when adding an object to be displayed in the header of a group, the area would be called the Group Header section. However, reports also have Areas. By default, each area is composed of a single section, and every section is only in one area. This gives you a one to one relationship between areas and sections. Thus, there is an area for the Report Header, Page Header, Details section, etc. An area can have more sections added to it, but the sections must be of the same type. For example, the Details area can have two Detail sections in it, but it can't have a Group Footer section in it. An example of multiple sections is shown in Figure 6-10.

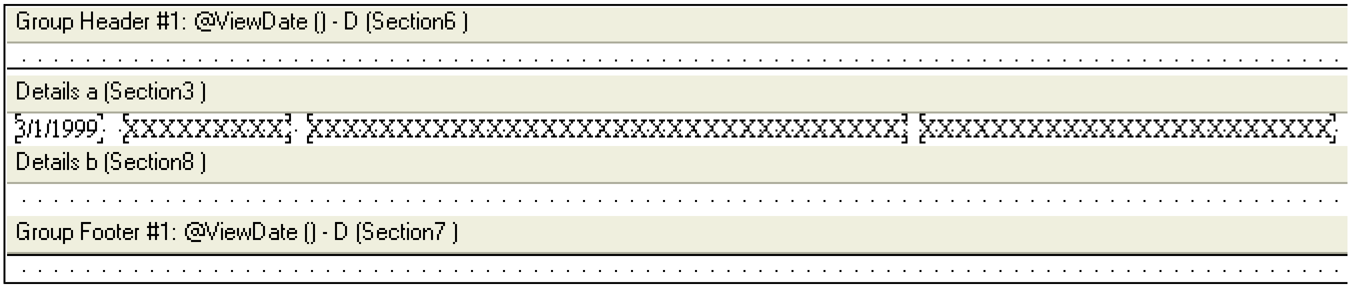


Figure 6-10. Mulitiple detail sections.

In this example, there are two sections between the group header and footer: Details a and Details b. Each of these sections are part of the Details area. The benefit of having two sections within the same area is that it gives you a lot of flexibility for formatting your report. Creative use of multiple sections can solve a variety of reporting problems.

Before you can get creative with multiple sections, you first have to understand a couple of rules. The first rule is that multiple sections are printed consecutively. The first section is printed first. The second section is printed second, and so on. The second rule is that you can change the formatting of any section and it won't effect the formatting of the other sections. You can suppress a section or change its background color and this won't effect whether another section is suppressed or not.

An example is the best way to see how these rules work. Lets say that you have a group header with three sections and you suppressed the second section. The group header would print the first section followed by the third section. The second section won't get printed. The formatting of the second section has no effect on the others sections.

Multiple sections can be inserted, deleted and merged with other sections. When you right-click on a section header, you get the menu shown in Figure 6-11.

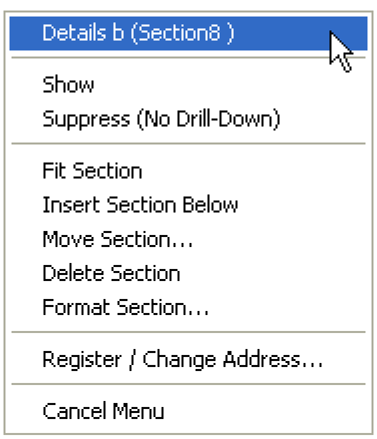


Figure 6-11. Mulitple section menu.

When you select Insert Section Below, it inserts a new section below the section that you clicked on. Select Merge Section Below to combine the current section with the one below it. Crystal Reports merges the two by taking all the objects in the lowest section and copying them to the section above it. All the new objects will go below the existing objects. Select Delete Section to delete a section from the report.

If a section has too much white space underneath the report objects, you make the space tighter by placing your cursor at the top of the section below it and dragging it higher. An easier, and more accurate, way of doing this is to select the Fit Section menu option. Crystal Reports will adjust the section height to fit the exact space needed for the report objects. No extra space will be allocated.

Selecting Move Section brings up the Section Expert again. This dialog box displays all the sections on your report on the left-hand side. Now that you have multiple sections, the tabs along the top are no longer disabled. The dialog box with multiple sections is displayed in Figure 6-12. Use the arrow keys shown at the top to move the sections up or down.

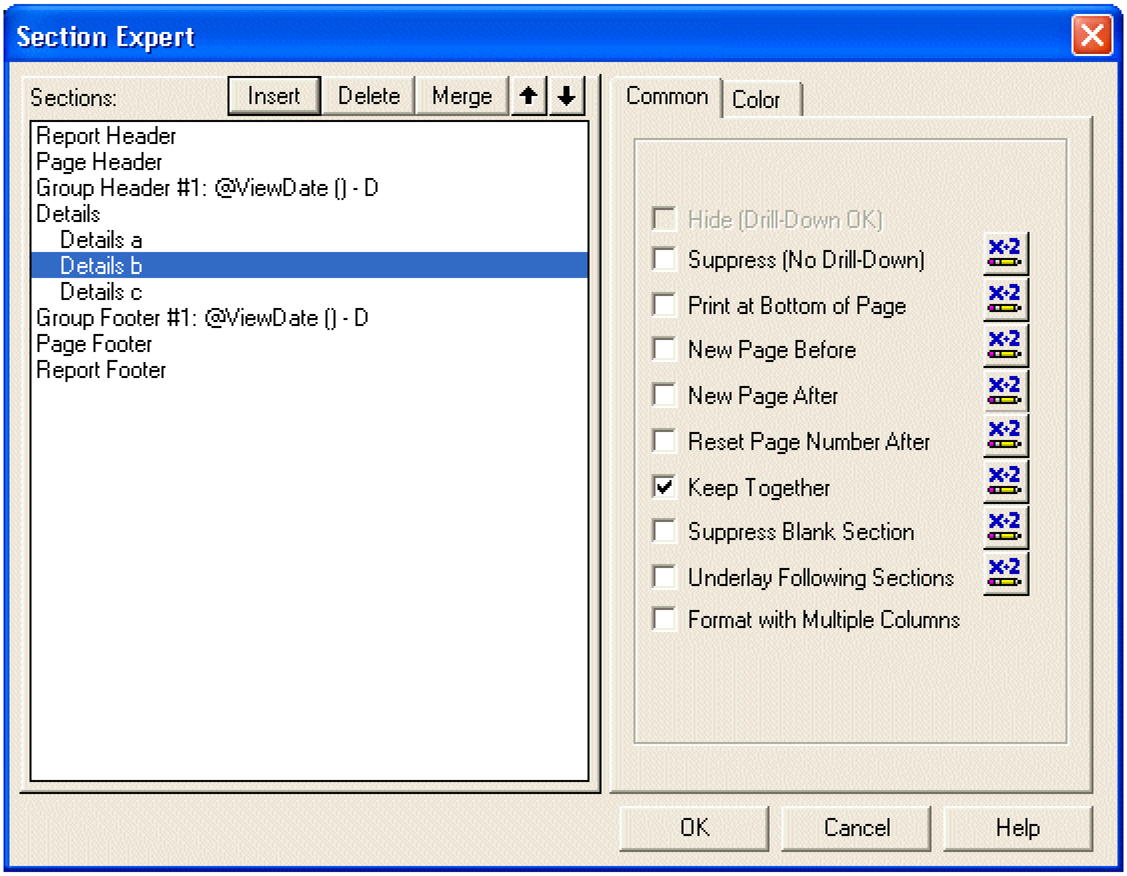


Figure 6-12. The Section Expert for multiple sections.

When looking at the menu options along the top of this dialog box, you see that it also has the options to Insert, Delete and Merge sections. If you are working in the designer, you can also go to this dialog box by right-clicking on a section header and selecting Format Section.

The key to making multiple sections work is to use formatting in combination with formulas. Although formulas are discussed in complete detail in Chapter 7, it is easy to understand the basic concepts before reading that chapter. Formulas are used to turn formatting options on and off using built-in functions with other data in the report. The best way to understand this is to see examples. Here are some common uses of formulas with multiple sections that you can start using right away.

Example 6-1. Eliminating blank lines in addresses.

A common problem with printing out an address is that each one can have a different number of lines. Every address has a line allocated for the street address. But some addresses need a second line for other miscellaneous information. This could be an "Attention:" comment or the suite number. If an address doesn't use this second line, then it appears as a blank line and messes up the formatting of the address. An example of these labels is shown in Figure 6-13.

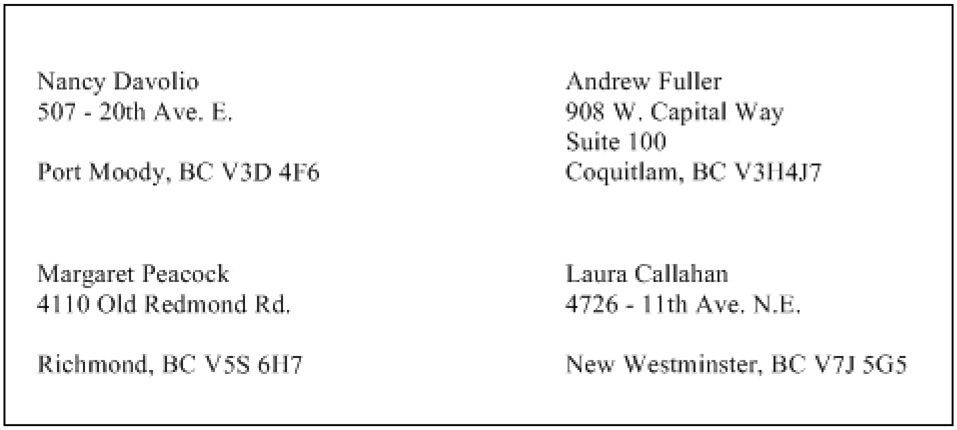


Figure 6-13. Address labels with blank lines.

To fix this problem, create a section just for the second address line. Set the formatting options on the section to be Suppress Blank Section. If the second address line doesn't have any information, then the section won't be printed and the blank line is eliminated. These labels are shown in Figure 6-14.

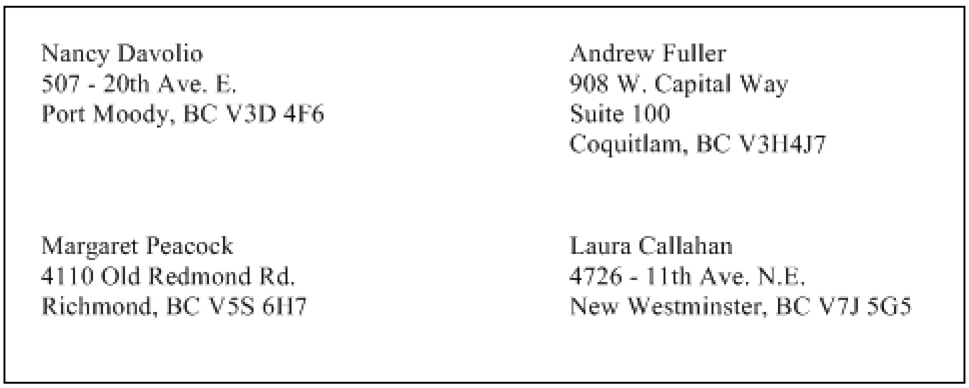


Figure 6-14. Address labels that suppress blank sections.

Example 6-2. Adding non-blank sections.

If you can use sections to suppress blank lines, then you can do just the opposite: use sections to show special information. For example, you may want a report to only print a section for unique circumstances. There are a multitude of examples on how to use this feature. An employee report could print an extra section if an employee's birthday falls within the current month. Invoices can print reminders to late customers that they need to pay or else penalties will be incurred. A recipe listing can print notes for favorite recipes. Each example benefits from using multiple sections because if the section doesn't have any data to print, additional room isn't allocated on the report.

Example 6-3. Suppressing sections for a repeated field.

The Suppress If Duplicated format option suppresses a field if its data is duplicated. However, your report may need to suppress the entire row when that field is duplicated. There is no built in function for doing this.