

Data Analysis Tools



Data Analysis Tools

Objective:

To show how data analysis assists in compliance auditing for travel and entertainment expenses.

Data Analysis Tools



Data Analysis Tools

Disclaimers:

- **Names and non-compliances shared have been modified to protect the employee.**
- **ACL 10 tool used for examples but the concept can apply across different software tools using different types of data.**



Travel and Entertainment Risks

Excessive meals

Falsifying Receipts

Airfare not in accordance with Company policy

Excessive tipping on meals

Submitting Fake Expenses

Using incorrect categories

Approving Personal Expenses

Reimbursement of unauthorized expenses

Submitting Personal Expenses

Approving Duplicate Reports

Submitting Duplicate Reports

Purchase of gift cards

Not providing required receipts for expenses

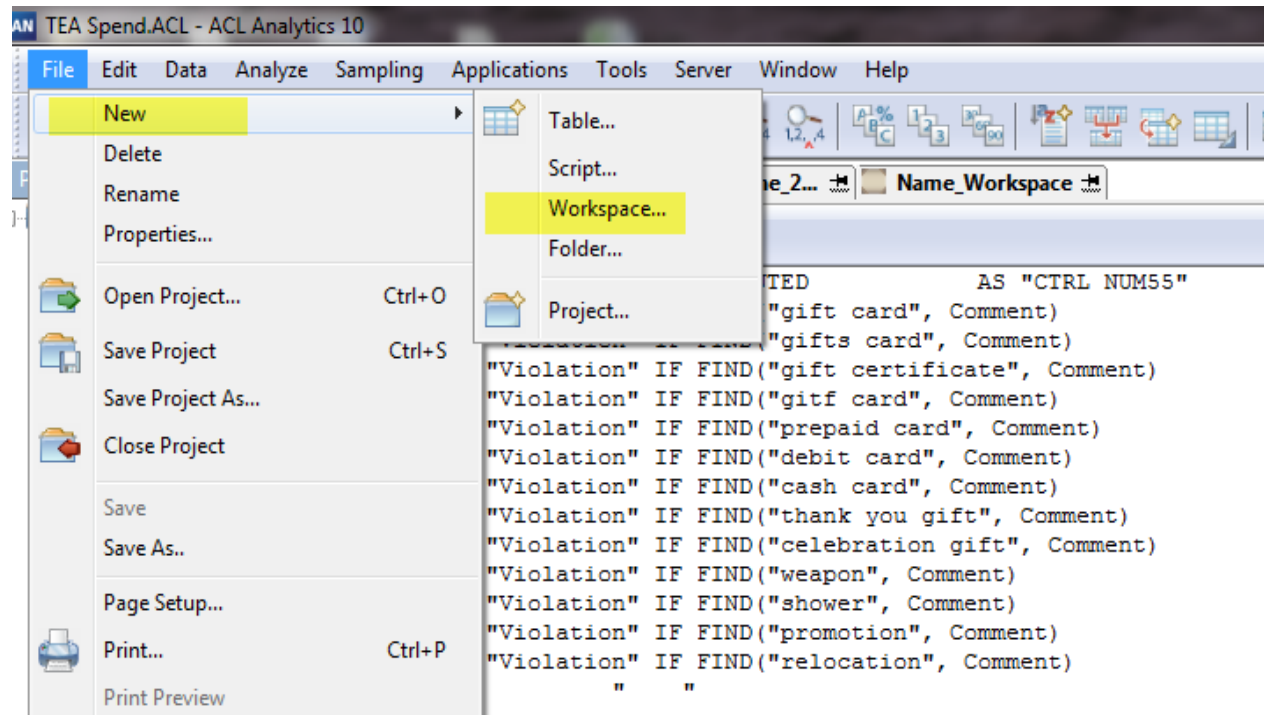
Submitting a fraudulent report

Submitting and approving your own expenses

Project Lopez

Audit Test: Gift Cards Review

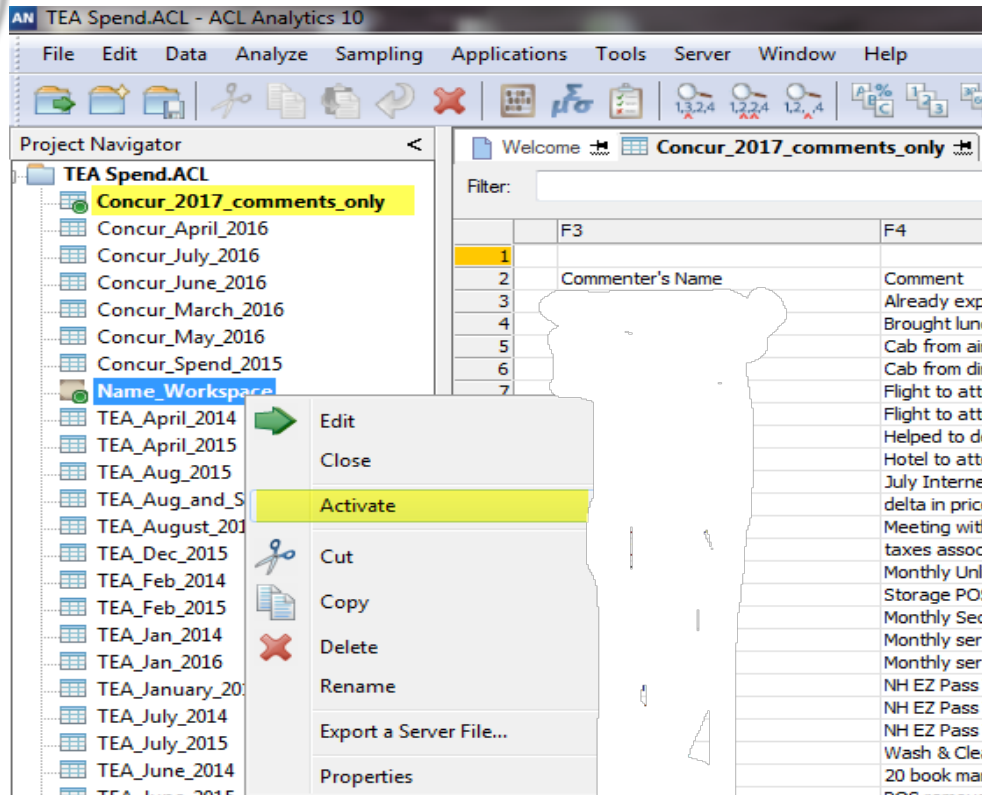
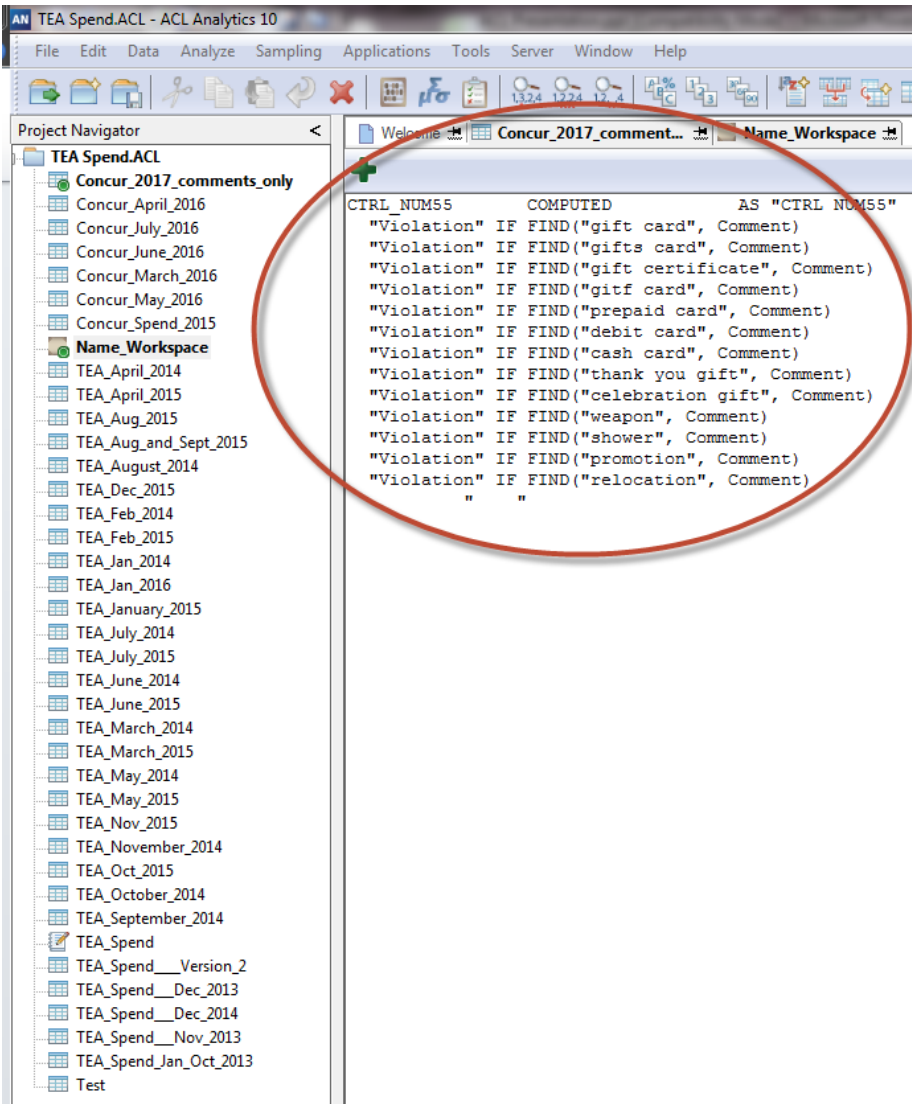
ACL Function: Workspace



Project Lopez

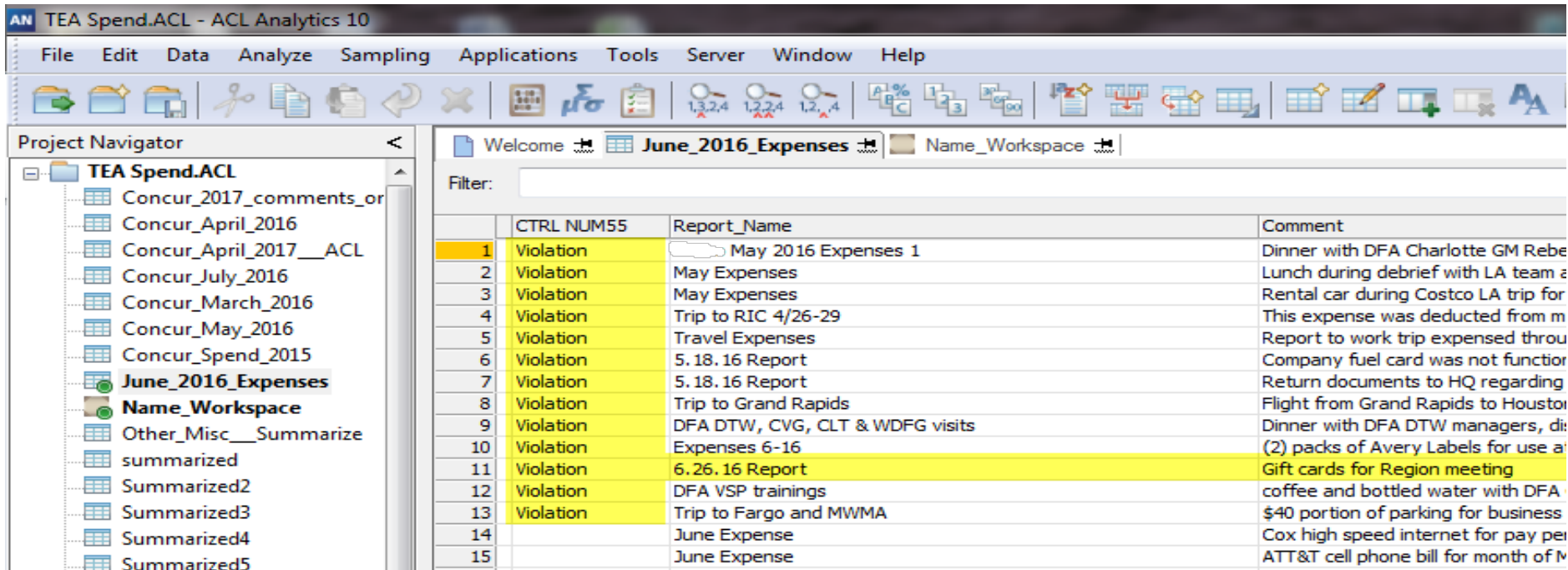
ACL Function - Workspace

Ability to search multiple words within a mass amount of data, identifying matches.



Project Lopez - Results

- **Workspace identifies the items based on the query**
- **Data review still important to eliminate false positives**
- **Data identification is just a starting point**



The screenshot shows the ACL Analytics 10 interface. The 'Project Navigator' on the left lists various folders, with 'June_2016_Expenses' selected. The main window displays a table with columns: CTRL NUM55, Report_Name, and Comment. The table contains 15 rows, all of which are marked as 'Violation'.

	CTRL NUM55	Report_Name	Comment
1	Violation	May 2016 Expenses 1	Dinner with DFA Charlotte GM Rebe
2	Violation	May Expenses	Lunch during debrief with LA team a
3	Violation	May Expenses	Rental car during Costco LA trip for
4	Violation	Trip to RIC 4/26-29	This expense was deducted from m
5	Violation	Travel Expenses	Report to work trip expensed throu
6	Violation	5. 18. 16 Report	Company fuel card was not functio
7	Violation	5. 18. 16 Report	Return documents to HQ regarding
8	Violation	Trip to Grand Rapids	Flight from Grand Rapids to Housto
9	Violation	DFA DTW, CVG, CLT & WDFG visits	Dinner with DFA DTW managers, di
10	Violation	Expenses 6-16	(2) packs of Avery Labels for use a
11	Violation	6. 26. 16 Report	Gift cards for Region meeting
12	Violation	DFA VSP trainings	coffee and bottled water with DFA
13	Violation	Trip to Fargo and MWMA	\$40 portion of parking for business
14		June Expense	Cox high speed internet for pay per
15		June Expense	ATT&T cell phone bill for month of M

Project Lopez - Results

CONCUR

Travel

Expense

Reporting

App Center

Administration

J. Lopez



Manage Expenses

View Transactions

Process Reports

6.26.16 Report

Expenses

Move Delete Copy View

Date	Expense Type	Amount	Requested
06/27/2016	Meals - Individual Dinner Chilis, Bronx/New York, New York	\$24.86	\$24.86
06/24/2016	Other / Miscellaneous Walgreen's, Bronx/New York, New York	\$503.95	\$503.95
TOTAL AMOUNT		\$528.81	\$528.81
TOTAL REQUESTED		\$528.81	\$528.81

Expense

Available Receipts

Expense Type: Other / Miscellaneous
Transaction Date: 06/24/2016
Business Purpose: Region Meeting

Enter Vendor Name: Walgreen's
City of Purchase: Bronx/New York, New York
Payment Type: Cash

Amount: 503.95 USD
 Receipt Attached? Do not reimburse

Comment: Gift Cards for Region Meeting

Save Itemize Allocate Attach Receipt Cancel



Project Washington

Audit Test: Duplicate Expense Review

ACL Function: Analyze (Look for Duplicates)

The screenshot shows the ACL (Audit Command Language) software interface. The 'Analyze' menu is open, and the option 'Look for Duplicates...' is highlighted in yellow. The background shows a data table with columns 'Name' and 'Expense_Type'.

Project Navigator:

- TEA Spend - Dup C
- Concur_Dups
- Concur_Spend
- Duplicates
- Duplicates__Ju
- Duplicates2
- Duplicates3
- Potential_Dupli
- Potential_Dupli
- Potential_Dupli
- Potential_Dupli
- TEA_and_Conc
- TEA_and_Conc
- TEA_and_Conc
- TEA_Spend__D
- TEA_Spend__Ja
- TEA_Spend_Du

Analyze Menu:

- Count Records... (Ctrl+3)
- Total Fields... (Ctrl+4)
- Statistical
- Stratify... (Ctrl+5)
- Classify...
- Histogram... (Ctrl+8)
- Age...
- Summarize... (Ctrl+0)
- Cross-tabulate...
- Perform Benford Analysis...
- Examine Sequence... (Ctrl+6)
- Look for Gaps...
- Look for Duplicates...**
- Fuzzy Duplicates

Data Table:

Name	Expense_Type
Education Day	Seminar / Conference/Training
es 12.13.15	Company Car Expense - Fuel
es 12.13.15	Company Car Expense - Other
es 12.13.15	Company Car Expense - Other
es 12.13.15	Meals - Employees Only- Business Discussed
es 12.13.15	Meals - Employees Only- Business Discussed
es 12.13.15	Meals and/or Entertainment With Others (Employees/Non Employees;
es 12.13.15	Meals and/or Entertainment With Others (Employees/Non Employees;
es 12.13.15	Wireless Devices (Smartphone, Tablet, etc.) / Telephone
Expense	Internet/Wireless
Expense	Meals and/or Entertainment With Others (Employees/Non Employees;
er / December 2015	Agency Booking Fees
er / December 2015	Airfare
er / December 2015	Hotel
er / December 2015	Hotel
er / December 2015	Hotel
er / December 2015	Hotel
er / December 2015	Hotel
er / December 2015	Hotel
er / December 2015	Hotel
er / December 2015	Hotel

Project Washington

ACL Function – Look for Duplicates

Identifies duplicates based on selected fields.

The screenshot shows the ACL software interface. The 'Duplicates' dialog box is open, displaying a list of fields to be checked for duplicates. The 'Selected Fields' dialog box is also open, showing the process of selecting fields from the 'Available Fields' list to the 'Selected Fields' list. Red arrows point from the 'Duplicates On...' and 'List Fields...' buttons in the 'Duplicates' dialog to the 'Selected Fields' dialog.

Duplicates On...

N.	Title
1	A... Amount
	BI... BI_Manager
	BI... BI_Manager_ID
	C... Comment
	C... Comment1
	C... Comment_Date_Time

List Fields...

N.	Title
	A... Amount
	BI... BI_Manager
	BI... BI_Manager_ID
	C... Comment
	C... Comment1
	C... Comment_Date_Time

Selected Fields

Available Fields:

N.	Title
	Amount
	BI_Manager
	BI_Manager_ID
	Comment
	Comment1
	Comment_Date_Time
	Comment_for
	Commenter_s_Name
	Default_Approver
	Employee

Selected Fields:

N.	Title
	Amount
	Employee_ID
	Transaction_Date

From Table: Concur_Spend

The screenshot shows the 'Selected Fields' dialog box. It displays a list of available fields and a list of selected fields. The 'Available Fields' list includes: N. Title, A... Amount, B... BI_Manager, B... BI_Manager_ID, C... Comment, C... Comment1, C... Comment_Date_Time, C... Comment_for, C... Commenter_s_Name, D... Default_Approver, F... Employee. The 'Selected Fields' list includes: Amount, BI_Manager, BI_Manager_ID, Comment, Comment1, Comment_Date_Time, Comment_for, Commenter_s_Name, Default_Approver, Employee, Employee_ID, Entry_Approved_Amount, Entry_City_Location, Expense_Type, Extracted_Date_Time, Number of Attendees. The 'From Table' dropdown is set to 'Concur_Spend'.

Selected Fields

Available Fields:

N.	Title
	Title
	A... Amount
	B... BI_Manager
	B... BI_Manager_ID
	C... Comment
	C... Comment1
	C... Comment_Date_Time
	C... Comment_for
	C... Commenter_s_Name
	D... Default_Approver
	F... Employee

Selected Fields:

N.	Title
	Amount
	BI_Manager
	BI_Manager_ID
	Comment
	Comment1
	Comment_Date_Time
	Comment_for
	Commenter_s_Name
	Default_Approver
	Employee
	Employee_ID
	Entry_Approved_Amount
	Entry_City_Location
	Expense_Type
	Extracted_Date_Time
	Number of Attendees

From Table: Concur_Spend

Project Washington - Results

- Easy to sort duplicates based on amount, other criteria
- May need additional analysis to eliminate false positives

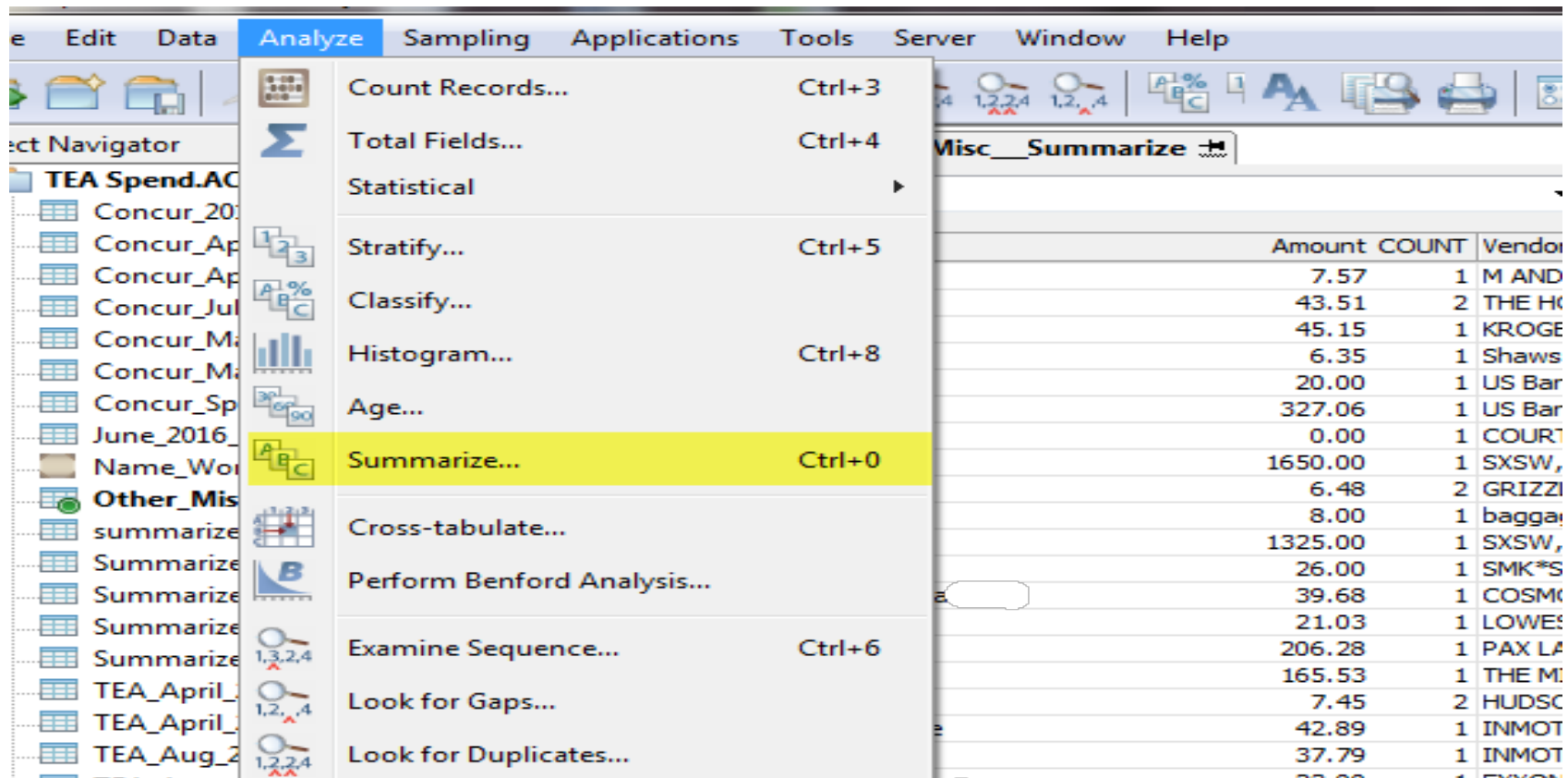
The screenshot shows a software application interface with a menu bar (File, Edit, Data, Analyze, Sampling, Applications, Tools, Server, Window, Help) and a toolbar with various icons. The main window displays a table of expenses with columns: Date__Expe, Home_Cur, Claim__Report_Name, Expense__Payment_Text, Expense__Vendor_Name, and Er. The table contains five rows of data, with the first two rows highlighted in yellow.

	Date__Expe	Home_Cur	Claim__Report_Name	Expense__Payment_Text	Expense__Vendor_Name	Er
1	07/13/2017	431.72	West Coast Conference	Corporate Card	DELTA AIR 0068609519925	W
2	07/13/2017	431.72	Conference Trip	Cash	Delta Air	W
3	12/15/2015	425.00	General Expenses	Cash	empty	Do
4	12/15/2015	425.00	General Expenses	Corporate Card	KS.GOV ONLINE PAYM	Do
5	01/15/2016	420.33	SAD Training (Tina Barry)	Corporate Card	EMBASSY SUITES DICHMONG	Cr

Project Kent

Audit Test: Unauthorized Expenses

ACL Function: Analyze (Summarize)



The screenshot displays the ACL software interface. The 'Analyze' menu is open, showing various data analysis options. The 'Summarize...' option is highlighted in yellow. The background shows a data table with columns for Amount, COUNT, and Vendor.

Amount	COUNT	Vendor
7.57	1	M AND
43.51	2	THE HK
45.15	1	KROGE
6.35	1	Shaws
20.00	1	US Bar
327.06	1	US Bar
0.00	1	COURT
1650.00	1	SXSW,
6.48	2	GRIZZI
8.00	1	bagga!
1325.00	1	SXSW,
26.00	1	SMK*S
39.68	1	COSMO
21.03	1	LOWE!
206.28	1	PAX LA
165.53	1	THE M!
7.45	2	HUDSC
42.89	1	INMOT
37.79	1	INMOT
37.00	1	EXYON

Project Kent

ACL Function - Summarize

Allows you to summarize by a particular field or field(s).

The screenshot shows the TEA Spend ACL application. The main window displays a table with columns: Employee, Employee_ID, Report_Name, and Expense_Type. A 'Summarize' dialog box is open in the foreground. The dialog has three tabs: 'Main', 'More', and 'Output'. Under the 'Main' tab, there are two sections: 'Summarize On...' and 'Subtotal Fields...'. In 'Summarize On...', the field 'Vendor' is selected. In 'Subtotal Fields...', the fields 'Entry_Amount', 'Number_of_Attendees', 'Total_Approved_Amount', and 'Total_Report_Amount' are listed. The dialog also has a 'Presort' checkbox which is checked, and buttons for 'OK', 'Cancel', and 'Help'.

The screenshot shows the output of the Summarize function. The table has columns: Report_Name, Amount, COUNT, and Vendor. The data is summarized by Vendor.

Report_Name	Amount	COUNT	Vendor
Recruiting Shirts	5586.91	1	VCU
Recruiting Shirts	3222.47	1	UNIVERSITY OF RICHMOND
Strayer 3-27-2017	3024.78	1	STRAYER UNIVERSITY
Market Walk	2220.75	1	DAILY PLANET CLOTHING STORE
ANA Conference and SXSW	1699.49	1	SXSW, LLC
ANA Conference and SXSW	1650.00	1	SXSW, LLC
ANA Conference and SXSW	1325.00	1	SXSW, LLC
ANA Conference and SXSW	1325.00	1	SXSW, LLC
AP Conference	1068.43	1	UNIV. OF KENTUCKY
4/4/17	950.00	1	DUKE UNIVERSITY
Hoops & Hops--Las Vegas	730.29	2	UNIVERSITY OF RICHMOND
April Apartment Expense Report	616.21	3	AFR FURNITURE RENTAL
Wood Eagle	600.00	1	Sawbillies
March Misc	592.00	1	STATE FARM
Market Walk IQOS	579.31	2	IQOS STORE BERLIN AS2
Temporary Housing Expense	577.28	3	CORT Furniture
Int'l IQOS	557.38	1	IQOS STORE BERLIN AS2
IQOS Market Walk	530.89	1	IQOS STORE BERLIN AS2
March Miscellaneous	526.50	1	CORT TRADESHOW FURNISHIN
Russo Expense Report March	477.00	1	PALMER SPORTING GOODS INC
IQOS Market Walk	418.75	1	IQOS STORE BERLIN AS2
Refunding US Bank Cr Balance	327.06	1	US Bank
A.Barone Expenses	326.55	1	BP#9530023CARNEGIE BP
March Expenses	315.98	1	AMAZON MKTPLACE PMTS
Asia Trip	315.84	1	SPEEDWAY 2876 7700
PM USA Men's Softball team	310.00	1	Bobby Collins
March Expense Report	293.18	1	DA VINCI LITTLE ITALIAN
ASSE, Event, Mileage	255.15	1	COSTCO WHSE #0205
Lowe's and mileage	244.21	1	LOWES #00687*
March 2017 Expenses	212.68	6	CVS/PHARMACY #02169
Expenses through 4/21/17	206.28	1	PAX LABS INC.
KOP/phone;IFT reg & flight	165.53	1	THE MIRAGE - ADVANCE DEP
February-March 2017	163.22	2	Roberts Oxygen Company
FLAVORCON AND BART	157.90	1	VA ABC STORE 169
PMI Expenses	150.90	1	PMI
SRNT2017 Supplement	150.13	1	US Bank
Adobe Summit	150.00	1	RITE AID STORE - 3715
4 26 17	130.88	1	WALGREENS #3582

Project Kent - Results

- Summarizing the data identifies the items of higher risk
- Allows for the use of other information (vendor, for example) to further our research

The screenshot shows a software application window with a title bar containing 'Welcome', 'Statistics', and 'Other_Misc_Summarize'. Below the title bar is a 'Filter:' field and an 'Index: (None)' dropdown. The main area contains a table with the following data:

Employee	Report_Name	Amount	COUNT	Vendor
1	Recruiting Shirts	5586.91	1	VCU
2	Recruiting Shirts	3222.47	1	UNIVERSITY OF RICHMOND
3	Strayer 3-27-2017	3024.78	1	STRAYER UNIVERSITY
4	Market Walk	2220.75	1	DAILY PLANET CLOTHING STORE
5	ANA Conference and SXSW	1699.49	1	SXSW, LLC
6	ANA Conference and SXSW	1650.00	1	SXSW, LLC
7	ANA Conference and SXSW	1325.00	1	SXSW, LLC
8	ANA Conference and SXSW	1325.00	1	SXSW, LLC
9	AP Conference	1068.43	1	UNIV. OF KENTUCKY
10	4/4/17	950.00	1	DUKE UNIVERSITY
11	Hoops & Hops--Las Vegas	730.29	2	UNIVERSITY OF RICHMOND
12	And Apartment Europe Depart	616.21	2	AER BURTONS DENTAL

Project Johansson

Audit Test: Fraudulent expenses (\$50 receipt threshold)

ACL Function: Analyze (Stratify)

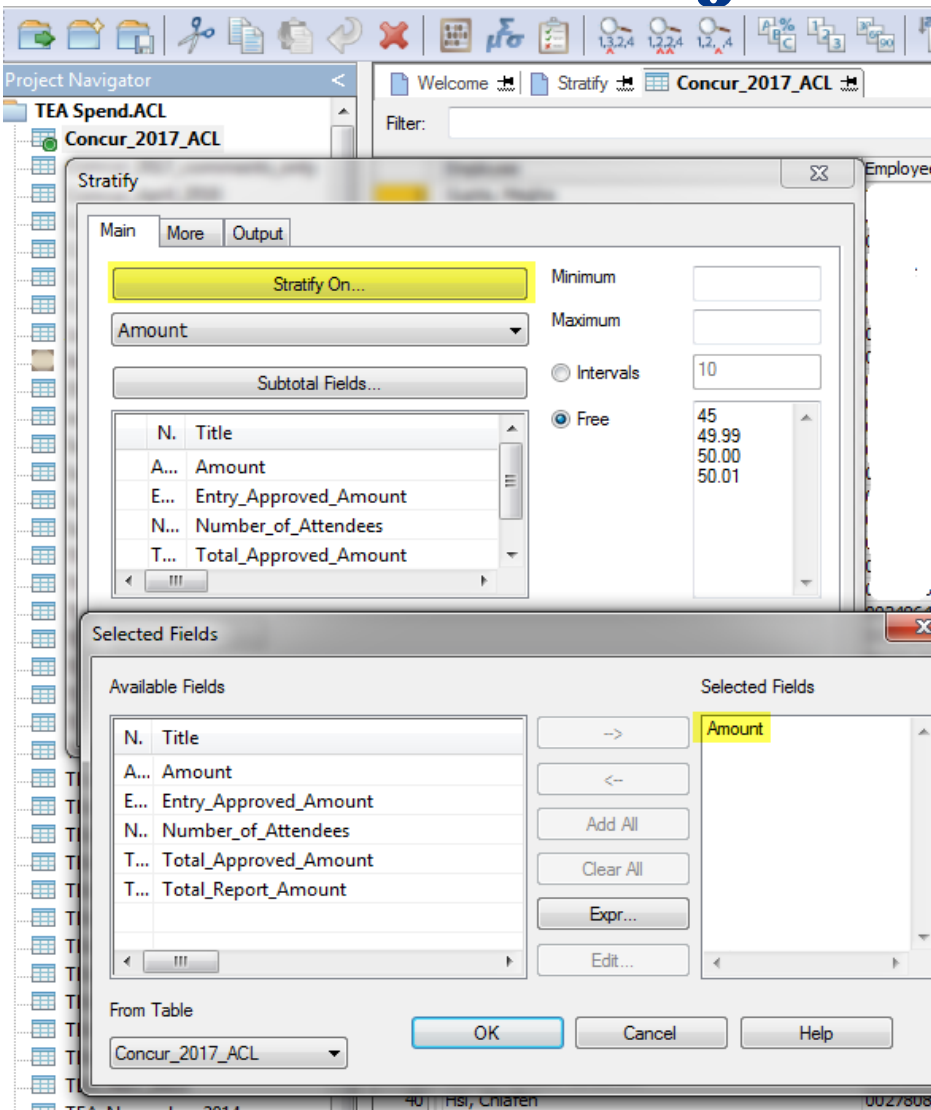
The screenshot displays the ACL Analytics 10 software interface. The 'Analyze' menu is open, showing various data analysis functions. The 'Stratify...' option is highlighted in yellow. The background shows a data table with columns for Transaction Date, Personal, and Vendor.

Transaction Date	Personal	Vendor
05/05/2016	N	Cox C
05/25/2016	N	AT&T
04/20/2016	N	Restar
04/07/2016	N	Suntru
04/28/2016	N	PARKI
04/19/2016	N	Hotel
04/20/2016	N	Hotel
05/03/2016	N	VZWR
05/15/2016	N	VZWR
04/10/2016	N	BRIGH
04/04/2016	N	ATT
04/15/2016	N	AGENT
04/15/2016	N	United
05/16/2016	N	HILTO
05/17/2016	N	HILTO
05/18/2016	N	HILTO
05/19/2016	N	HILTO
05/16/2016	N	HILTO
05/17/2016	N	HILTO
05/18/2016	N	HILTO
05/19/2016	N	HILTO

Project Johansson

ACL Function – Stratify

Categorizes amounts based on selected fields



Amount	Count	Percent of Count	Percent of Field	Amount
<u><45.00</u>	21,298	60.54%	8.29%	269,583.81
<u>45.00 - 49.98</u>	810	2.3%	1.18%	38,464.23
<u>49.99 - 49.99</u>	17	0.05%	0.03%	849.83
<u>50.00 - 50.01</u>	1,485	4.22%	2.28%	74,250.00
<u>>50.01</u>	11,568	32.88%	88.21%	2,867,835.73
Totals	35,178	100%	100%	3,250,983.60

Project Johansson - Results

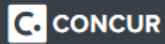
- Identifies outliers, items that differ from the general population

Filter: (Amount >= 49.99 AND Amount <= 49.99)

	Employee_ID	Transaction_Da	Report_Name	Expense_Type
50	11989	06/01/2017	360 Feedback Survey	Other / Miscellaneous
103	77724	06/18/2017	June 2017 Report	Other / Miscellaneous
107	17903	05/08/2017	5.26.17 Report	Other / Miscellaneous
205	14695	06/12/2017	June 2017 Expenses	Meals - Individual Di
206	14695	06/13/2017	June 2017 Expenses	Meals - Individual Di
207	14695	06/14/2017	June 2017 Expenses	Meals - Individual Di
208	14695	06/15/2017	June 2017 Expenses	Meals - Individual Di
209	14695	06/16/2017	June 2017 Expenses	Meals - Individual Di
210	14695	06/17/2017	June 2017 Expenses	Meals - Individual Di
211	14695	06/18/2017	June 2017 Expenses	Meals - Individual Di
212	14695	06/19/2017	June 2017 Expenses	Meals - Individual Di
213	14695	06/20/2017	June 2017 Expenses	Meals - Individual Di
214	14695	06/21/2017	June 2017 Expenses	Meals - Individual Di
215	14695	06/22/2017	June 2017 Expenses	Meals - Individual Di
4543	16171	12/01/2016	December Expense Rep	Wireless Devices (Sma
4628	18403	12/18/2016	Megan Blaschke 1.3.17	Internet/Wireless
26049	14097	01/05/2017	January 2017	Internet/Wireless

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Project Johansson - Results



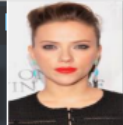
Travel

Expense

Reporting ▾

App Center

Administration ▾



S. Johansson

Manage Expenses

View Transactions

Process Reports

June 2017 Expenses

Expenses

Move ▾ Delete Copy View ▾ <<

<input type="checkbox"/>	Date	Expense Type ▾	Amount	Requested
<input checked="" type="checkbox"/>	06/12/2017	Meals - Individual Dinner Wolfgang's, Los Angeles, California:	\$49.99	\$49.99
<input type="checkbox"/>	06/13/2017	Meals - Individual Dinner Wolfgang's, Los Angeles, California:	\$49.99	\$49.99
<input type="checkbox"/>	06/14/2017	Meals - Individual Dinner Wolfgang's, Los Angeles, California:	\$49.99	\$49.99
<input type="checkbox"/>	06/15/2017	Meals - Individual Dinner Wolfgang's, Los Angeles, California:	\$49.99	\$49.99
<input type="checkbox"/>	06/16/2017	Meals - Individual Dinner Wolfgang's, Los Angeles, California:	\$49.99	\$49.99
<input type="checkbox"/>	06/17/2017	Meals - Individual Dinner Wolfgang's, Los Angeles, California:	\$49.99	\$49.99
<input type="checkbox"/>	06/18/2017	Meals - Individual Dinner Wolfgang's, Los Angeles, California:	\$49.99	\$49.99
<input type="checkbox"/>	06/19/2017	Meals - Individual Dinner Wolfgang's, Los Angeles, California:	\$49.99	\$49.99
<input type="checkbox"/>	06/20/2017	Meals - Individual Dinner Wolfgang's, Los Angeles, California:	\$49.99	\$49.99
<input type="checkbox"/>	06/21/2017	Meals - Individual Dinner Wolfgang's, Los Angeles, California:	\$49.99	\$49.99
<input type="checkbox"/>	06/22/2017	Meals - Individual Dinner Wolfgang's, Los Angeles, California:	\$49.99	\$49.99

TOTAL AMOUNT
\$849.89

TOTAL REQUESTED
\$849.89

Expense

Available Receipts

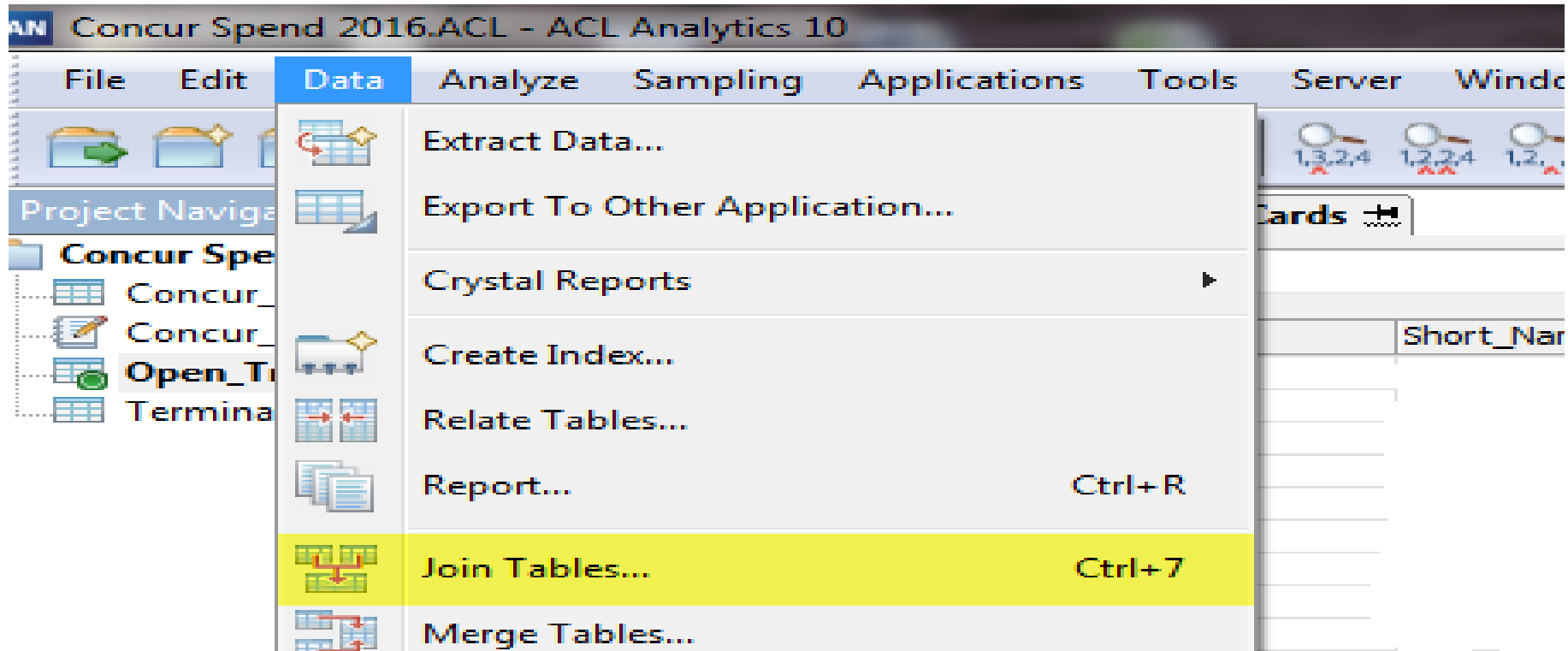
Expense Type Meals - Individual Dinner ▾	Transaction Date 06/12/2017
Business Purpose June 2017 Expenses	Enter Vendor Name Wolfgang's
City of Purchase Los Angeles, California	Payment Type Cash ▾
Amount 49.99 USD ▾	<input type="checkbox"/> Receipt Attached?
<input type="checkbox"/> Do not reimburse	Comment <input type="text"/>

Save Itemize Allocate Attach Receipt Cancel

Project Brady

Audit Test: Termination Testing

ACL Function: Data (Join Tables) – “Matching”



Project Brady

ACL Function – Join Table

Matches items from two lists using a common identifier

The screenshot shows the 'Join' dialog box in a software application. The dialog is titled 'Join' and has two tabs: 'Main' and 'More'. The 'Main' tab is selected. The dialog is divided into two main sections: 'Primary Table' and 'Secondary Table'.

Primary Table:

- Primary Keys...** (highlighted in yellow):

N.	Title
O...	Other_Transaction_Limit
P...	Perno
1 P...	Perno2
P...	Physical_Card
P...	Physical_Card_Re_issue_Status
- Primary Fields...**

N.	Title
S...	Setup_Method
1 S...	Short_Name
Si...	Single_Purchase_Limit
S...	Social_Security_Number
- Presort Primary Table

Secondary Table:

- Secondary Keys...** (highlighted in yellow):

N.	Title
M...	Middle_Name
M...	Month
P...	PerNo
1 P...	PerNo_
Q...	Quarter
- Secondary Fields...**

N.	Title
1 E...	Employment_Status
2 F2	F2
3 Fi...	First_Name
4 Fr...	From_Company
- Presort Secondary Table

Project Brady - Results

- **List of 'matches' with all of your selected fields**

The screenshot displays a software interface with a 'Project Navigator' on the left and a data table on the right. The 'Project Navigator' shows a tree structure with the following items: 'Concur Spend 2016.ACL' (folder), 'Concur_March_2016' (spreadsheet icon), 'Concur_Spend_2016' (spreadsheet icon), 'Final' (spreadsheet icon with a green checkmark), and 'Open Cards' (spreadsheet icon). The main window shows a 'Filter:' field and a table with the following data:

	Short_Name	Employment_Status	From_Company	From_Employee_Sub_Group
1	BRADY TOM	Withdrawn	Altria Client Services	Exempt
	<< End of File >>			

Project Brady - Results

Account Profile




Switch Accounts

 T. Brady

Product
Corporate Card

Account Overview

Summary 

Account Status	Open
Credit Limit	\$20000
Available Credit	\$19148
Expiration Date	07/2021

Payment Information 

Statement Balance	\$1,578.20 due on 07/17/2017
Current Balance	\$851.80
Statement Close Date	06/26/2017

Takeaways

- **Data analytics is a means to an end**
 - **Without the use of a competent tool, large amounts of time spent data mining**
 - **Narrows down the data to items that are truly risky**

Takeaways

- **ACL Functions**
 - **Project Lopez – Workspace**
 - **Project Washington – Duplicates**
 - **Project Kent – Summarize**
 - **Project Johansson – Stratify**
 - **Project Brady – Matching**

Questions

