

# Annual Seasonal Adjustment Process for the Value of Construction Put in Place Survey

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# Overview

- Background of Value of Construction Put in Place (VIP) Survey
- Brief History of VIP Seasonal Adjustment Process
- VIP Seasonal Adjustment Process
  - Review Preparation
  - Preliminary Review
  - Final Review
  - Review Wrap Up

# Background of VIP Survey

- Began collecting data in 1960's
- Monthly estimates of dollar value spent on new construction and improvements
- Estimates provided by ownership
  - Federal construction
  - State & Local construction
  - Private construction
- Underwent classification change in 1993
- Further classified by type of construction (TC)

# Brief History of VIP Seasonal Adjustment Process

- 1993: Reclassification of construction categories
  - Prior to reclassification: manageable amount of series for staff review
  - After reclassification: 1000+ disaggregate series
- 2004: Seasonal Control System (SCS) developed to facilitate review of series
  - Series of SAS/AF® screens
  - Reads, processes, and organizes files
- Present-day:
  - Files are processed through SCS (stage 1 review)
  - Staff review spec files for eligible series (stage 2 review)

# VIP Seasonal Adjustment Process: Review Preparation

- Organize SCS and staff review folders
- Pull not seasonally adjusted (NSA) datasets from repository
- Pull specification files from repository
  - Production specification files that were finalized during previous year's review
- Ensure all reviewers are using the latest version and build of X-13ARIMA-SEATS

# VIP Seasonal Adjustment Process: Preliminary Review

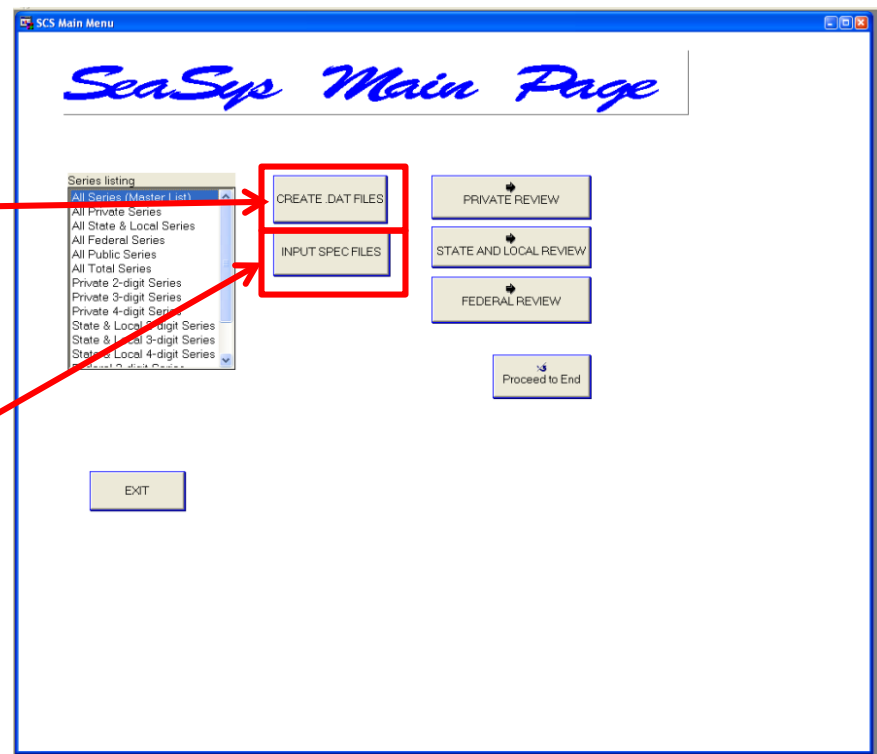
- Begin on the first business day of April
- 7 groups of series to review
  - Private: 4-digit, 3-digit, 2-digit
  - State & Local: 4-digit, 3-digit, 2-digit
  - Federal: 2-digit
- 1 week for each group's review

# VIP Seasonal Adjustment Process: Preliminary Review - SCS

- Process all files through SCS

Converts SAS datasets to  
.dat files

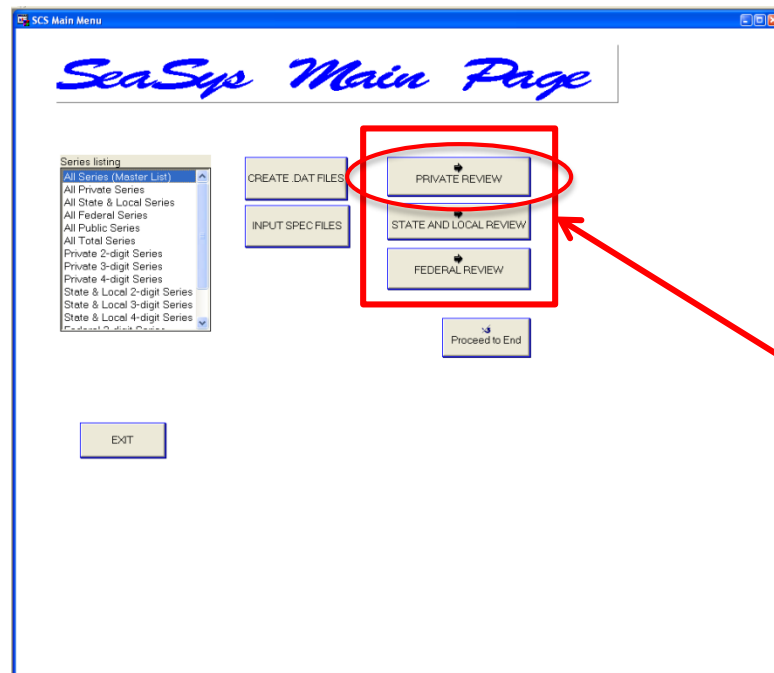
Reads and converts spec  
files into format for use  
by SCS





# VIP Seasonal Adjustment Process: Preliminary Review - SCS

- Begin individual ownership processing
  - Order of ownership does not matter
  - Order of digit level within ownership type matters



Begin the review  
by selecting one  
of the ownership  
buttons

# VIP Seasonal Adjustment Process: Preliminary Review - SCS

- Private 4-digit review in SCS

The screenshot shows a web form titled "Private VIP 4-digit: Data". At the top left is a "BACK" button. The form contains several input fields and buttons:

- A "Seasonal review year (yyy)" input field, highlighted with a red box and an arrow pointing to it from a text box that says "Type in the current review year".
- A "Continue?" section with radio buttons for "Yes" and "No".
- A "PROCESS DATA" button, circled in red.
- Two large empty rectangular areas labeled "Series with one or more zeros" and "Series with no zeros", which are highlighted with a red box and an arrow pointing to it from a text box that says "Populates with series names".
- Two input fields on the right side, one labeled "View time series: values (example: N0001UNA)" and another labeled "View time series: graph (example: N0001UNA)".
- A "CONTINUE" button at the bottom right.

# VIP Seasonal Adjustment Process: Preliminary Review - SCS

- Private 4-digit review in SCS

*Private VIP 4-digit: Setup for stage 1 review*

BACK

No review needed (series with zeros)	Batch run with default settings	Batch run with last year's settings	No seasonal review required	Not Published at disaggregate level(s)

Process Spec Files

CONTINUE

Runs spec files with X-13A-S

# VIP Seasonal Adjustment Process: Preliminary Review - SCS

- Private 4-digit review in SCS

The screenshot shows a web-based interface for the 'Private VIP 4-digit: Stage 1, series not seasonally adjusted last year' review process. The interface includes a 'command ==>' header, a 'BACK' button, and a red 'REMINDER: Must run batch file with default settings before continuing with this page!!'. The main content area is divided into three columns: 'Not seasonally adjusted last year', 'Further review needed in stage 2', and 'Will not seasonally adjust this year'. Arrows indicate a flow from the first column to the second, and from the second to the third. A red box highlights the 'Not seasonally adjusted last year' column, which contains a list of series and a 'View batch run report' button. A red oval highlights the 'Move series (example: N0001UNA)' section, which includes a text input field and two radio button options: 'FROM further review list TO will not adjust list' and 'FROM will not adjust list TO further review list'. A red arrow points to the 'Export final spec files' button in the third column. A 'CONTINUE' button is located at the bottom right. A red box with the text 'Series not adjusted last year are split into 2 categories' points to the 'View batch run report' button.

Private VIP 4-digit: Stage 1, series not seasonally adjusted last year

command ==>

BACK

REMINDER: Must run batch file with default settings before continuing with this page!!

Not seasonally adjusted last year

Further review needed in stage 2

Will not seasonally adjust this year

Export final spec files

CONTINUE

Move series (example: N0001UNA)

Stage 2 review?

☐ FROM further review list TO will not adjust list

☐ FROM will not adjust list TO further review list

View batch run report

Series not adjusted last year are split into 2 categories

# VIP Seasonal Adjustment Process: Preliminary Review - SCS

- Private 4-digit review

Command --->

*Private VIP 4-digit: Stage 1, series that were seasonally adjusted last year*

BACK

REMINDER: Must run batch file with last year's settings before continuing with this page!!!

Seasonally adjusted last year

View comparisons report

Further review needed in stage 2

View diagnostics for last year vs. current year using the same spec file (example: X0021UNA)

Move series (example: X0021UNA)

Stage 2 review?

☐ FROM further review TO no review

☐ FROM no review TO further review

No review needed in stage 2

Export spec files

CONTINUE

Series that were adjusted last year are listed here

# VIP Seasonal Adjustment Process: Preliminary Review - SCS

- Private 4-digit review

Private VIP 4-digit: Stage 2 review

BACK

**STOP** Must first review these spec files before continuing with this page!!!

Series for stage 2 review

series
series

Export spec files

CONTINUE

All series that will be reviewed by staff are listed here

# VIP Seasonal Adjustment Process: Preliminary Review – Staff Review

- Staff members receive spec files with last year's finalized settings and corresponding data files
- Before running the spec files:
  - Add an end date to the span (e.g. span=(2002.1,YYYY.12), where YYYY = previous calendar year
  - Uncomment sliding spans and history specs
  - Change file directory to reflect where reviewer is storing their data files

# VIP Seasonal Adjustment Process: Preliminary Review – Staff Review

- During the review:
  - Try running the spec file with the current production settings
  - Refer to notes from previous years for help with model settings
  - Do not hard code end of series outliers
  - Avoid using mixed models
  - Avoid high number of AR ( $\leq 3$ ) and MA ( $\leq 4$ ) terms
  - Do not skip more than 2 lags in MA; do not skip any lags in AR



# VIP Seasonal Adjustment Process: Preliminary Review – Staff Review

- After finalizing spec file settings:
  - Ensure that your diagnostics reflect most, if not all, of the following:
    - No seasonal spectrum peaks
    - No first frequency TD spectrum peaks
    - Few to no “bad” LBQs (i.e. LBQs at low lags or at lag 12)
    - Sliding spans diagnostics are good
  - Update the VIP spec file documentation with the new spec settings and notes
  - Return the following files to the lead reviewer:
    - D11 (seasonally adjusted data file)
    - OUT (output file)
    - SPC (spec file)
    - UDG (united diagnostics file)

# VIP Seasonal Adjustment Process: Preliminary Review – Staff Review

VIP\_private [Compatibility Mode] - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Add-Ins HP ALM JMP Acrobat SAS SA

Clipboard Font Alignment Number Styles Cell Styles Cells Editing

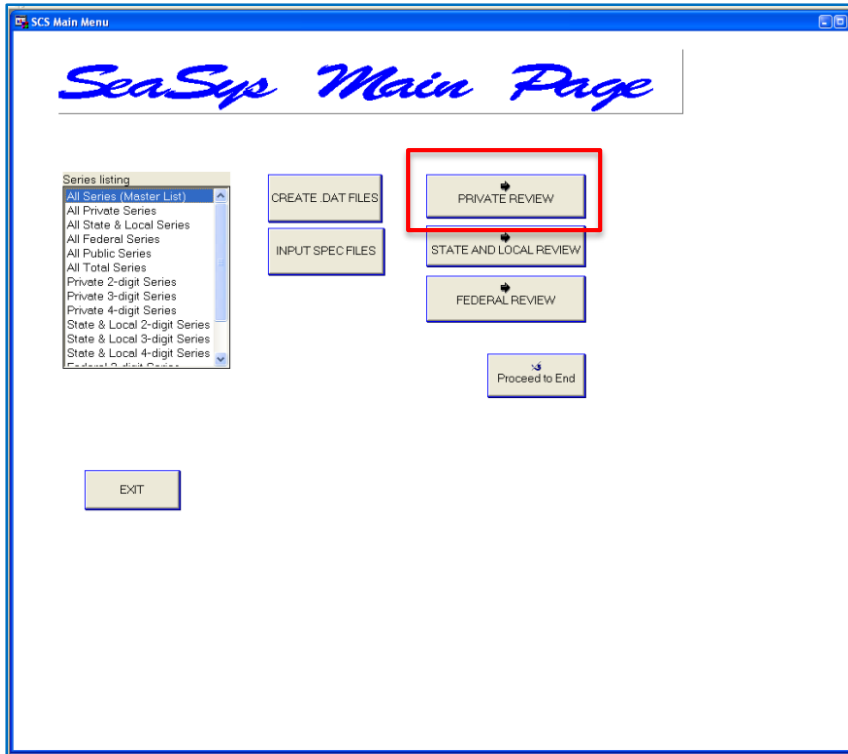
EA1

	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ
1	Private VIP 4-digit									
2										
3	Seasonal review year -- 2016 (All series spans now begin at 2002.1)									
4	Series	Reviewer	Model span	Regression spec outlier	other	Arima spec	Forecast spec	X11 spec signalim	seasonalma	CSSMB Comments -- Preliminary Data
5										CSSMB comments -- Final Data
6	N0211UNA									10/01/15 is the start date for end of series outliers identification
7	General Offices									
8										
9										
10	N0312UNA									
11	Auto Service/Parts									
12										
13										
14										
15	N0313UNA									
16	Auto Parking									
17										
18										
19	N0321UNA									
20	Food									
21										
22										
23	N0322UNA									
24	Dining/drinking									
25										
26										
27	N0331UNA									
28	General Merchandise									
29										
30										
31										
32	N0332UNA									
33	Shopping Center									
34										
35										
36										
37	N0333UNA									
38	Shopping Mall									
39										
40										
41	N0341UNA									
42	Other stores									
43										
44										
45	N0348UNA									
46	Bldg supplies									
47										
48										
49										
50										
51	N0351UNA									
52	General warehouse									
53										
54										

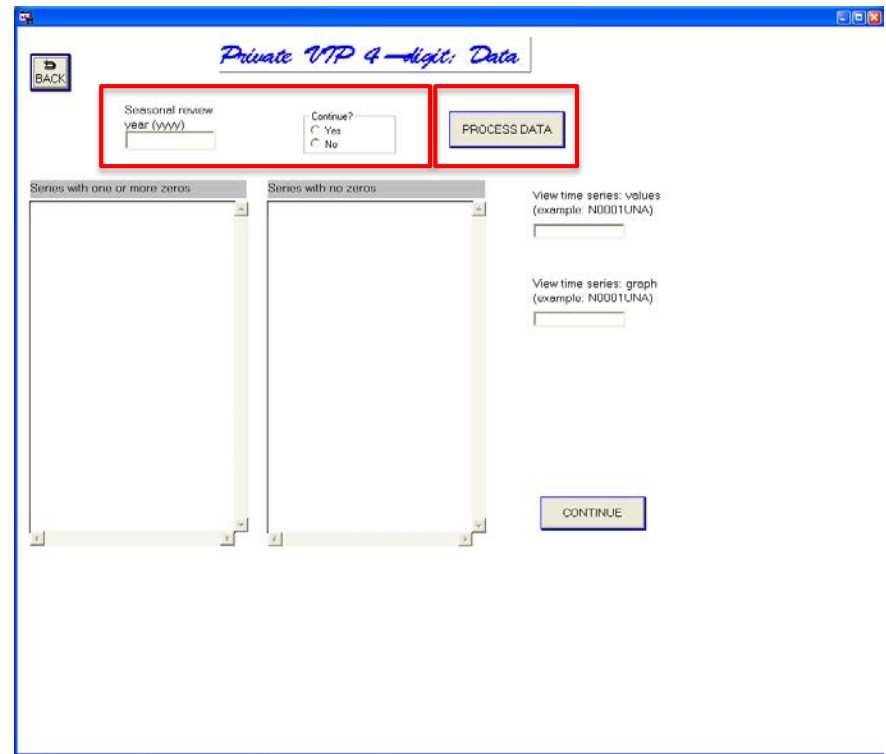
Ready 4-digit 3-digit 2-digit 85%

# VIP Seasonal Adjustment Process: Preliminary Review - SCS

- Private 4-digit transition to Private 3-digit



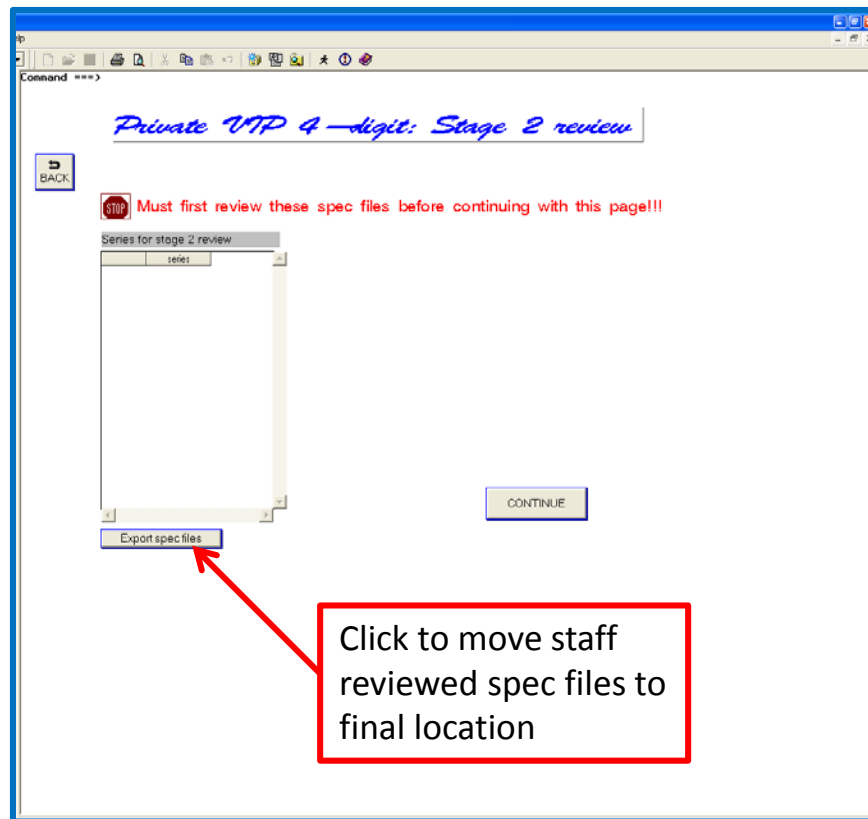
The screenshot shows the 'SeaSys Main Page' window. On the left is a 'Series listing' dropdown menu with options like 'All Series (Master List)', 'All Private Series', 'All State & Local Series', 'All Federal Series', 'All Public Series', 'All Total Series', 'Private 2-digit Series', 'Private 3-digit Series', 'Private 4-digit Series', 'State & Local 2-digit Series', 'State & Local 3-digit Series', and 'State & Local 4-digit Series'. In the center, a flowchart shows buttons for 'CREATE .DAT FILES', 'INPUT SPEC FILES', 'PRIVATE REVIEW' (highlighted with a red box), 'STATE AND LOCAL REVIEW', 'FEDERAL REVIEW', and 'Proceed to End'. An 'EXIT' button is at the bottom left.



The screenshot shows the 'Private VIP 4-digit Data' window. At the top left is a 'BACK' button. Below it, a 'Seasonal review year (yyy)' input field is next to a 'Continue?' section with radio buttons for 'Yes' and 'No'. A 'PROCESS DATA' button is to the right of the 'Continue?' section. Below these are two large empty boxes labeled 'Series with one or more zeros' and 'Series with no zeros'. On the right side, there are two input fields for 'View time series: values (example: N0001UNA)' and 'View time series: graph (example: N0001UNA)'. A 'CONTINUE' button is at the bottom right.

# VIP Seasonal Adjustment Process: Preliminary Review - SCS

- Private 4-digit transition to Private 3-digit



# VIP Seasonal Adjustment Process: Preliminary Review - SCS

- Private 3-digit review

Click "No" if  
this is the  
first time in  
this section,  
click "Yes" if  
returning

Command ==>

*Private VIP 3-digit: Data*

BACK

Continue?  
☐ Yes  
☐ No

PROCESS DATA

Series with one or more zeros

Series with no zeros

View time series: values  
(example: V082XUNA)

View time series: graph  
(example: V082XUNA)

CONTINUE

# VIP Seasonal Adjustment Process: Preliminary Review - SCS

- Private 3-digit review screens proceed in similar fashion
  - Process spec files screen
  - Series that were not seasonally adjusted
  - Series that were directly adjusted last year
- One major difference between 4-digit screens and 3-digit screens

# VIP Seasonal Adjustment Process: Preliminary Review - SCS

- Private 3-digit review

Command ==> |

*Private VIP 3 -digit: Stage 1, series that were indirectly adjusted last year*

[BACK](#)

REMINDER: Must run meta files for indirect adjustment before continuing with this page!!!

Indirectly adjusted last year

[View comparisons report](#)

View diagnostics for last year vs. current year using the same spec files (example: VN35X1JNA)

Move series (example: V035XUNA)

Stage 2 review?

☐ FROM further review TO no review

☐ FROM no review TO further review

Further review needed in stage 2

[Export default spec files](#)

No review needed in stage 2


[CONTINUE](#)


# VIP Seasonal Adjustment Process: Preliminary Review - SCS

- Private 3-digit review

Command ==> |

*Private VIP 3-digit: Stage 2 review*

 BACK

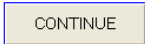
 Must first review these series before continuing with this page!!!



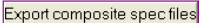
Direct vs. indirect adjustment

type	series
------	--------

Change series  
(example:  
V041XUNA)

Change Adjustment Type  
☐ FROM direct TO indirect  
☐ FROM indirect TO direct

 CONTINUE

 Export spec files  
 Export meta files  
 Export composite spec files



# VIP Seasonal Adjustment Process: Preliminary Review – Staff Review

- Private 3-digit review
  - Directly adjusted series are disseminated to reviewers
    - Same review process as the 4-digit series
    - Update spec file settings spreadsheet
    - Return D11, OUT, SPC, and UDG files to lead reviewer
  - Indirectly adjusted series are run using metafiles
    - Consists of spec files from the 4-digit review and for non-adjusted 4-digit series
    - If no seasonal or TD1 spectrum peaks in the INDSA or INDIRR then indirect series is OK
    - Keep OUT, SPC, UDG, D11, and ISA files (indirectly seasonally adjusted data) for all associated series

# VIP Seasonal Adjustment Process: Preliminary Review - SCS

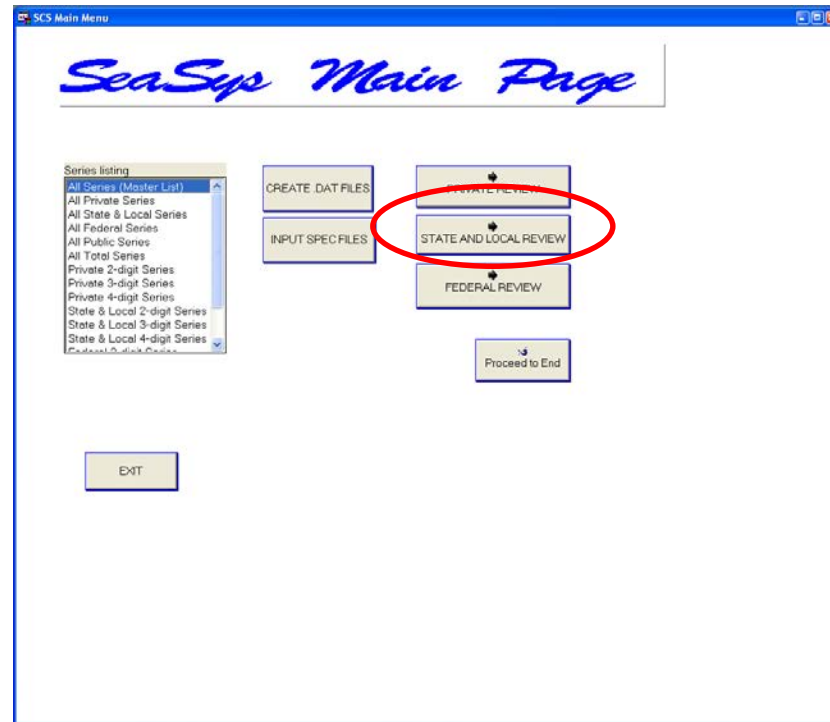
- Private 2-digit review
  - SCS screens are the same as for the 3-digit
    - Process data screen to separate series with no zeros
    - Process spec files screen to perform batch run through X-13A-S
    - Not adjusted last year screen to assess whether or not currently unadjusted series should be adjusted
    - Indirectly adjusted screen to assess whether or not there are issues with the 2-digit indirect series
    - Directly adjusted last year screen to assess whether changes to spec files are necessary
    - Stop sign screen at which point series are sent out for staff review

# VIP Seasonal Adjustment Process: Preliminary Review – Staff Review

- Private 2-digit review
  - Directly adjusted series are disseminated to reviewers
    - Same review process as the 4 and 3-digit series
    - Update spec file settings spreadsheet
    - Return D11, OUT, SPC, and UDG files to lead reviewer
  - Indirectly adjusted series are run using metafiles
    - Consists of spec files from the 4-digit and 3-digit review and spec files for non-adjusted 4-digit and 3-digit series
    - If no seasonal or TD1 spectrum peaks in the INDSA or INDIRR then indirect series is OK
    - Keep OUT, SPC, UDG, D11, and ISA files for all associated series

# VIP Seasonal Adjustment Process: Preliminary Review – State & Local

- The State & Local SCS review process is the same as the Private SCS review



# VIP Seasonal Adjustment Process: Preliminary Review - Federal

- Federal SCS review slightly different – only have 2-digit directly adjusted series

The screenshot shows the 'Federal VIP 4-digit: Data' interface. At the top left is a 'BACK' button. Below it, a red box highlights the 'Seasonal review year (YYYY)' input field and the 'PROCESS DATA' button. The main area contains two scrollable lists: 'No seasonal review required' and 'Not Published or disaggregate level(s)'. Below these lists is a section for 'Add/Remove series (example: N0001UNA)' with radio buttons for 'REMOVE from list above' and 'ADD to list above'. At the bottom left, another red box highlights the 'Export final spec files' button. A 'CONTINUE' button is located at the bottom right.

The screenshot shows the 'Federal VIP 2-digit: Data' interface. At the top left is a 'BACK' button. Below it, a red box highlights the 'Continue?' radio button group (with 'Yes' and 'No' options) and the 'PROCESS DATA' button. The main area contains two scrollable lists: 'Series with one or more zeros' and 'Series with no zeros'. To the right of these lists are two input fields for 'View time series: values (example: V03:00UNA)' and 'View time series: graph (example: V03:00UNA)'. A 'CONTINUE' button is located at the bottom right.

# VIP Seasonal Adjustment Process: Preliminary Review - Federal

- Same “Process Spec Files”, “Not Adjusted Last Year”, and “Directly Adjusted Last Year” SCS screens
- Continue through to stop sign screen where staff reviewed spec files are exported

Only need  
to click  
“Export  
spec files”

Command ==>

*Federal VIP 2 - digit: Stage 2 review*

Must first review these series before continuing with this page!!!

Direct vs. indirect adjustment

type	series
------	--------

Change series  
(example: VD413LJRA)

Change Adjustment Type  
☐ FROM direct TO indirect  
☐ FROM indirect TO direct

# VIP Seasonal Adjustment Process: Preliminary Review

- Staff review for other ownership categories are the same as Private
- Separate spec file settings spreadsheets for State & Local and Federal
- Return/Keep all D11, ISA, OUT, SPC, UDG files
- Allow 1 week for each group of series to be reviewed
- For 2016 we reviewed 120 directly adjusted series

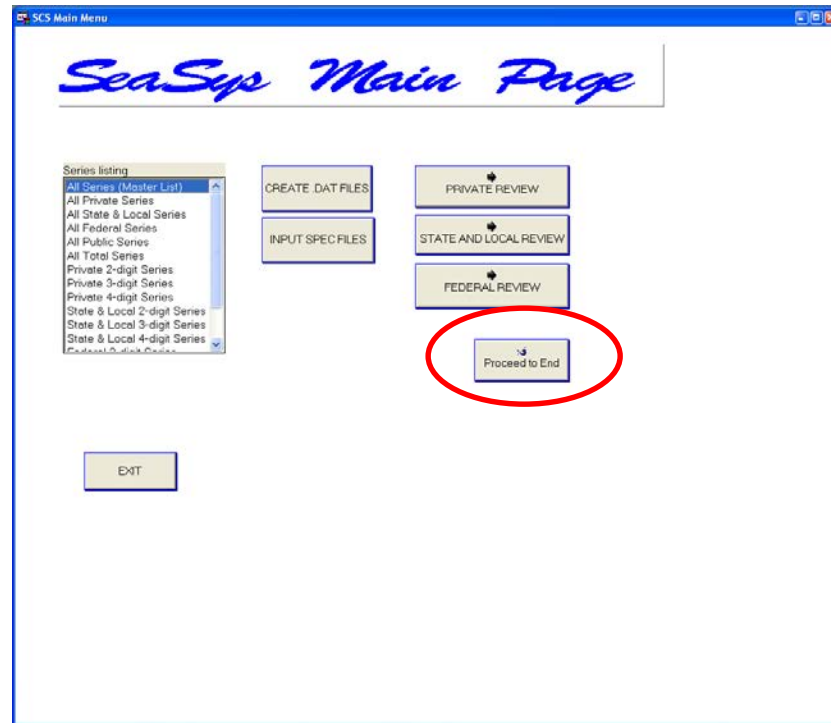
# VIP Seasonal Adjustment Process: Preliminary Review – Wrap Up

- Documentation and Reports
  - Update VIP “cheat sheet” to send to Construction Expenditures Branch (CEB)
  - Create revisions spreadsheet
    - Store D11 & ISA files from preliminary review in \YYYY\Revision folder where YYYY is the current year
    - Run all of last year’s finalized spec files on current year’s data and store the D11 & ISA files in \YYYY\Revision folder where YYYY is the previous year



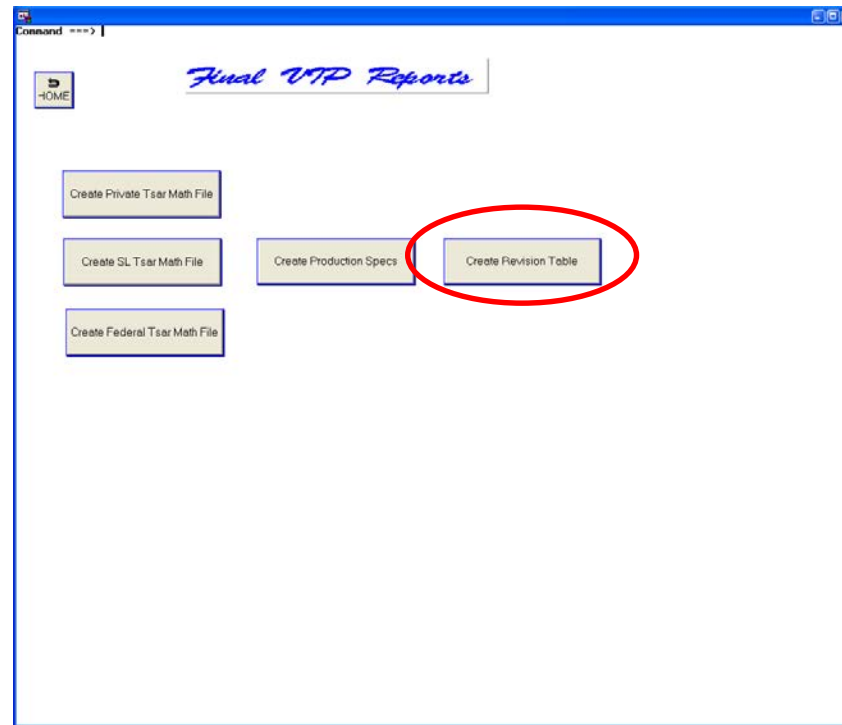
# VIP Seasonal Adjustment Process: Preliminary Review – Wrap Up

- Create revisions spreadsheet
  - Open SCS and click on “Proceed to End”



# VIP Seasonal Adjustment Process: Preliminary Review – Wrap Up

- Create revisions spreadsheet
  - Click on “Create Revision Table”



# VIP Seasonal Adjustment Process: Preliminary Review – Wrap Up

- Create revisions spreadsheet
  - SCS outputs a SAS® dataset consisting of the percent difference between last year's spec files and the spec files finalized during preliminary review
  - After formatting, the spreadsheet is sent to CEB
- Final Review Preparation
  - Move finalized spec files from preliminary review to SCS spec file folder

# VIP Seasonal Adjustment Process: Final Review

- Usually conducted during the 2<sup>nd</sup> week of June
- Email notification from programmer about the availability of data
- Approximately one week to conduct entire review
- Process is the same as the preliminary review

# VIP Seasonal Adjustment Process: Final Review

- Proceed through each ownership's SCS review and staff review in the same manner as the preliminary review
- Staff have 1 business day to complete review
- During staff review:
  - Do NOT include end date in span statement
  - Run the spec file as it is delivered (may need to recode outliers from preliminary review)
  - If diagnostics are OK, leave the settings as they are and move on
  - Note any changes to spec files in the spreadsheet

# VIP Seasonal Adjustment Process: Final Review

- Once spec files are finalized, update the settings spreadsheet and return the D11, SPC, OUT, and UDG files
- For 2016, we seasonally adjusted 117 series
- Next step is to prepare files for programmers to put into production

# VIP Seasonal Adjustment Process: Final Review – End of Review

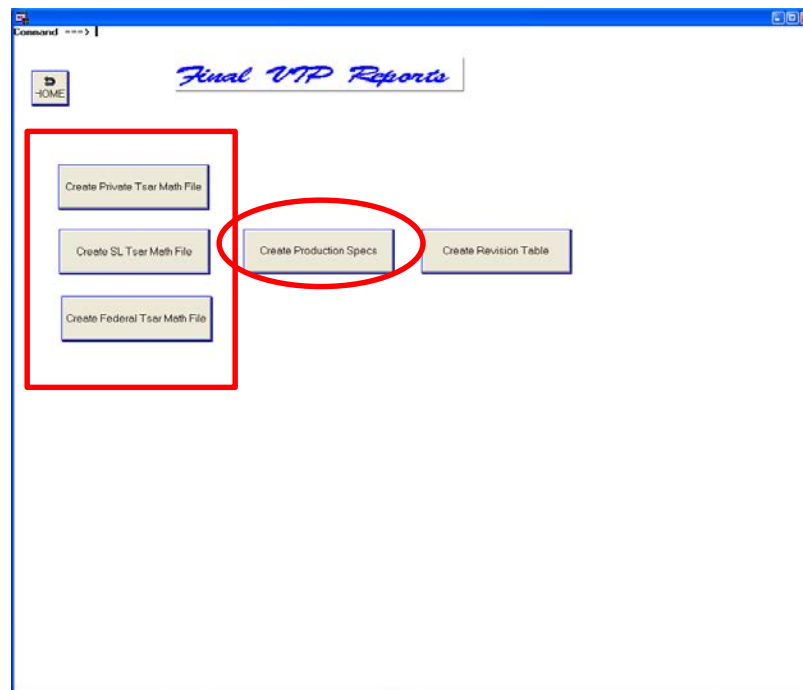
- Open SCS and click on “Proceed to End”



# VIP Seasonal Adjustment Process: Final Review – End of Review

- Create seasonal adjustment aggregation file for each ownership
- Create the production spec files for all directly adjusted series

All files created here are sent to our programmer and the CEB branch & section chiefs





# VIP Seasonal Adjustment Process:

## Final Review – End of Review

- Update “cheat sheet”, if necessary, and submit to Construction Expenditures Branch
- Summary measures for the VIP website are submitted approximately 1 week after the aggregation files and production spec files
  - Created by a SAS® software program outside of SCS
  - Pulls diagnostic information from the UDG files

# VIP Seasonal Adjustment Process: Final Review – End of Review

Name	Header	X-13 table	Description
Original Series	O	Table F2.A Span 1	The average month-to-month (quarter-to-quarter) percentage change, without regard to sign, of the original (not seasonally adjusted) series.
Seasonally adjusted series	CI	Table F2.A Span 1	The average month-to-month (quarter-to-quarter) percentage change, without regard to sign, of the seasonally adjusted series.
Irregular component		Table F2.A Span 1	The average month-to-month (quarter-to-quarter) percentage change of the irregular component. This component is obtained by dividing the trend-cycle component into the seasonally adjusted series.
Trend-cycle component	C	Table F2.A Span 1	The average month-to-month (quarter-to-quarter) percentage change of the trend-cycle component. This component is a smoothed version of the seasonally adjusted series obtained by means of a moving average.
Ratio of irregular to trend-cycle component	I/C	Table F2.A Span 1	The average month-to-month (quarter-to-quarter) percentage change of the trend-cycle component. This component is a smoothed version of the seasonally adjusted series obtained by means of a moving average.
Moving seasonality present relative to stable seasonality	M7	Table F3	A function of the F-test assessing the significance of stable seasonality and the F-test assessing the significance of moving seasonality. It is one of the 11 quality monitoring statistics that X-13ARIMA-SEATS produces. M7 may range from 0 to 3 with an acceptance range from 0 to 1.
Overall quality assessment statistic	Q	Table F3	A weighted average of M1, M11 (quality monitoring statistics from X-13ARIMA-SEATS). An indicator of the overall quality of the adjustment. Q has an acceptance range of 0 to 1. Values from 1.0 to 1.2 may be accepted if other diagnostics indicate suitable adjustment quality.
F-test statistic for stable seasonality	F	Table D8	An F-test measure of the presence of stable seasonality. It is the quotient of two variances: (1) the between-months (between-quarters) variance and (2) the residual variance.

Summary  
Measures from  
the VIP  
Website

# VIP Seasonal Adjustment Process: Review Wrap Up

- The following tasks are completed 1 week or more after the July press release of May VIP data:
  - Update documentation for external federal agencies (if requested)
  - Create versions of spec files suitable for release outside of Census
  - Clean up the SCS folders:
    - Move final output, spec, and data files to the appropriate subfolders within the current year YYYY folder
    - Delete unneeded files from the SCS active use folders
  - Update internal documentation with notes about specific VIP series (e.g. newly adjusted, dropped from adjustment, difficult)

# VIP Seasonal Adjustment Process: Review Wrap Up



# VIP Seasonal Adjustment Process: Contact Information

- Courtney Harris, Mathematical Statistician  
– Construction Surveys Statistical  
Methods Branch (CSSMB):  
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- Bonnie Kegan, Chief – CSSMB:  
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# THANK YOU!