



IHS Markit™

PENNVEST Nutrient Credit Trading: Spot Auction Participation Phase

IHS Markit / New York / October 2018

Company Overview – IHS Markit

IHS Markit's Role in Nutrient Credit Trading:

- Offer Enrollment & Eligibility services through our Markit Counterparty Manager (MCM) system
- Provide auction services, including training on Submitting Bids and Offers using the Markit Environmental Registry

Company Overview - PENNVEST

PENNVEST's Role in Nutrient Credit Trading:

- Provide public operated treatment works and regulated point sources with a cost-effective alternative to meeting their nutrient discharge permit requirements
- Reduce risk perceived by credit sellers and buyers that may inhibit growth of the nutrient credit market

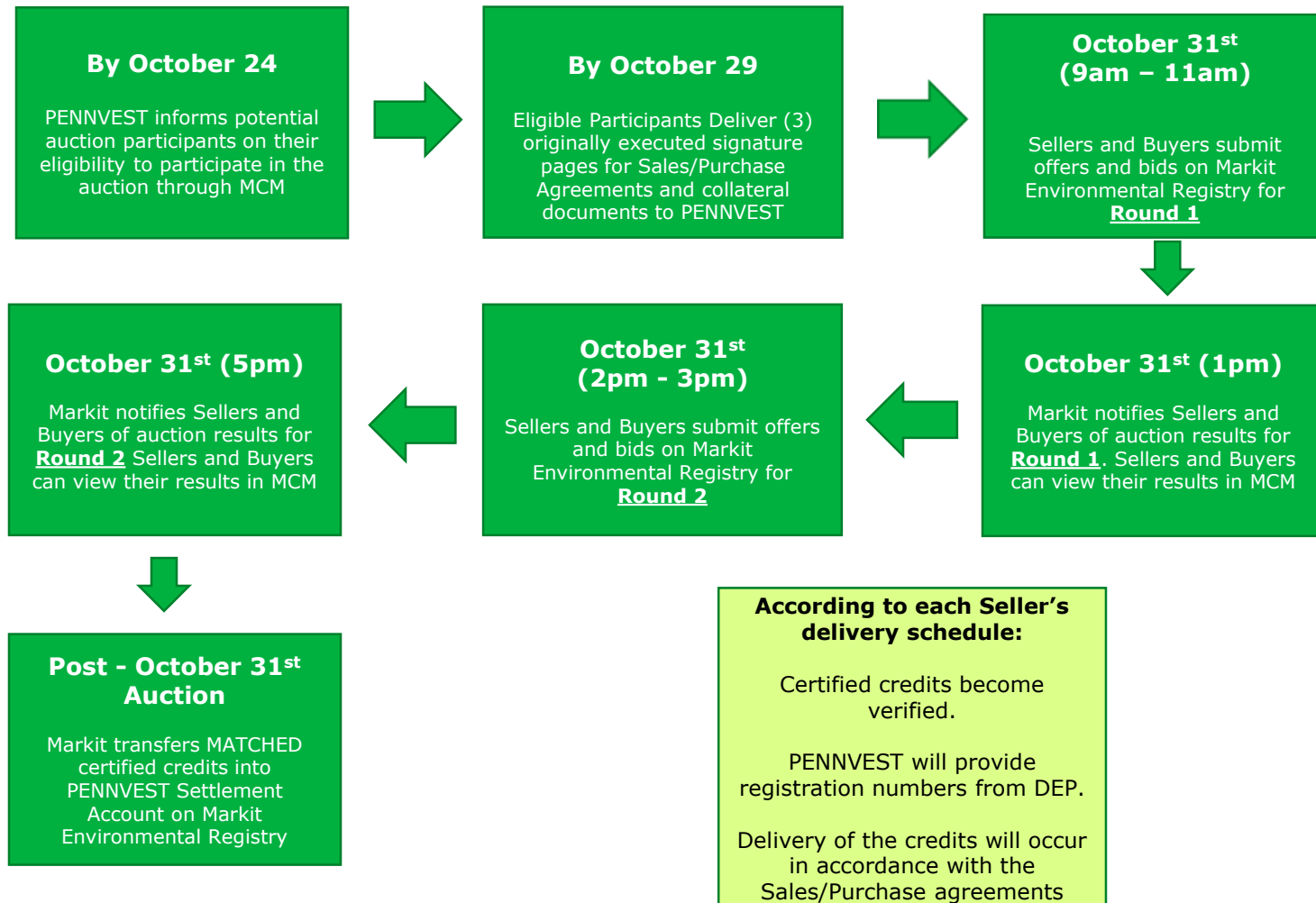


Presentation Outline

- 1. Markit Environmental Spot Auction Participation Process Overview**
- 2. 2-Round Auction Guidelines**
- 3. Logging into Markit Environmental Registry**
- 4. Sellers**
 - Accept certified credit transfers into their Registry accounts
 - Submit single-year offers on Markit Environmental Registry
 - Update offers on Markit Environmental Registry
- 5. Buyers**
 - Submit single-year bids on Markit Environmental Registry
 - Update bids on Markit Environmental Registry
- 6. Participants view auction results**
- 7. Settlement Cycle**

PENNVEST Spot Auction Participation Process Overview

PENNVEST Spot Auction Participation Process Overview



PENNVEST Spot Auction Participation Process Overview

- 1. On or before October 29** – Deadline to deliver (3) originally executed signature pages for Sales/Purchase Agreements and Collateral documents (if applicable) to PENNVEST (Forum Building - Room 434, 607 South Drive, Harrisburg, PA 17120, Attn: Heather Myers). Note: You cannot submit bids/offers until executed signature pages are received.
2. Once Agreements and Collateral documents are signed by PENNVEST, a PDF version will be uploaded into MCM and accessible for printing.
3. Once credits become verified and registered, PENNVEST will provide registration numbers for payments made on the delivery dates set forth in the agreement.
- 4. For questions regarding this process, contact Robert Boos @ 717-783-4493 or rboos@pa.gov**

2-Round Auction Guidelines

2-Round Auction Guidelines

Auction Style

- Auction will consist of two sealed bid and offer auction rounds
- Both Round 1 and Round 2 will result in settlement prices and transaction of credits
- In Auction Round 2, Buyers and Sellers can only bid or offer for the same combination of compliance year/watershed and nutrient type as Round 1

2-Round Auction Guidelines – Auction Participation Examples

Example 1:

- Buyer or Seller participated in Spot Auction Round 1
- Buyer or Seller submitted a 2018 PARTIAL Potomac Phosphorus bid or offer
- This participant can submit any combination of the following products in Spot Auction Round 2:
 - 2018 **PARTIAL** Potomac Phosphorus
 - 2018 All/NONE Potomac Phosphorus
- This participant will be allowed to change the quantity and price for their bid or offer

Example 2:

- Buyer or Seller participated in Spot Auction Round 1
- Buyer or Seller submitted a 2018 ALL/NONE Potomac Phosphorus bid or offer
- This participant can submit any combination of the following products in Spot Auction Round 2:
 - 2018 PARTIAL Potomac Phosphorus
 - 2018 All/NONE Potomac Phosphorus
- This participant will be allowed to change the quantity and price for their bid or offer

2-round Auction Guidelines – Auction Participation Examples

Example 3:

- Buyer or Seller didn't participate in Spot Auction Round 1
- This buyer or seller cannot participate in Spot Auction Round 2

Example 4:

- Buyer or Seller participated in Spot Auction Round 1
- This buyer or seller can choose to participate or not in Spot Auction Round 2

2-Round Auction Guidelines

Basic Auction Guidelines:

- The goal of the auction is to maximize fills.
- Suggestion to participants: *Partial bids and offers will increase the likelihood of your auction success.*
- If an individual is participating in the auction as both a buyer and a seller, he/she cannot submit bids and offers for the same product type/water year (watershed/nutrient type/water year). E.g. if a participant submits a bid and offer from his/her account for Susquehanna Nitrogen credits for water year 2018, both the bid and the offer will be discarded.
- Buyers can only bid up to the dollar amount limit established in their eligibility letter.
- Sellers can only offer credits up to the credit limit established in their eligibility letter.
- For further details on auction rules, please consult the PENNVEST Nutrient Credit Clearinghouse Rulebook which can be found at:

http://www.pennvest.pa.gov/SiteCollectionDocuments/NCT_Documents/PENNVEST_Nutrient_Credit_Clearinghouse_Rulebook_Version_8_Clean.pdf

Logging into the Markit Environmental Registry

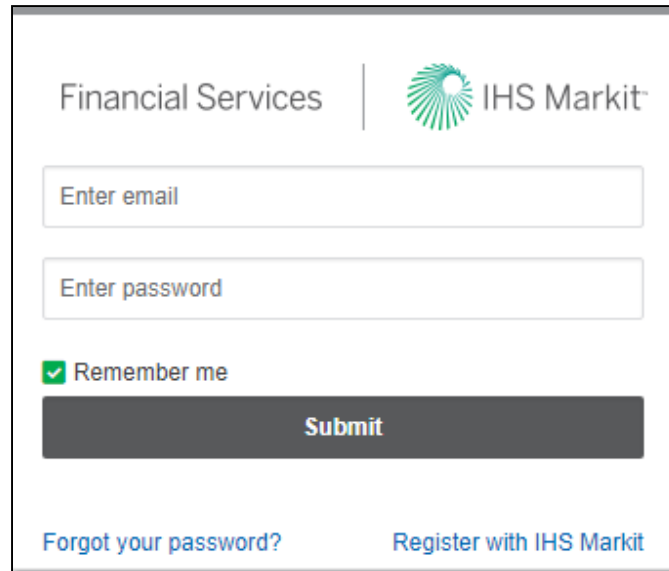
Logging into Markit Registry

1. Navigate to <https://ihsmarkit.com/index.html>
2. Click on the green box labeled: "LOG IN".

The screenshot shows the IHS Markit website homepage. The top navigation bar includes links for Purchase Standards, Contact Us, Newsroom, Investor Relations, and a green 'LOG IN' button with a dropdown arrow, which is highlighted with a red box. Below the navigation bar, the main content area features a large banner with the headline 'IHS Markit named #1 influential tech analyst firm in 2018'. The banner text states: 'Enterprise Management 360° has ranked IHS Markit first in its list of the top 10 most influential tech analyst firms in 2018. The publication's editors cited the following as deciding factors: IHS Markit's huge range of software, its ability to build custom applications for clients, and its simple and immediately useful presentations.' A 'READ ARTICLE' button is located below the banner. Below the banner, there is a 'Financial Services' section with a dropdown arrow and a 'VIEW ALL FINANCIAL SERVICES SOLUTIONS' button. The page also features three featured content cards: 'PMI® Commentary and Analysis' with a 'READ BLOG POST' button, 'Curious about alternative data, data science and blockchain?' with a 'LEARN MORE' button, and 'TradeTech 2018: Top five highlights from Lance Uggla on how to supercharge your market data capabilities' with a 'VIEW INSIGHT' button and a share icon.

Logging into Markit Registry

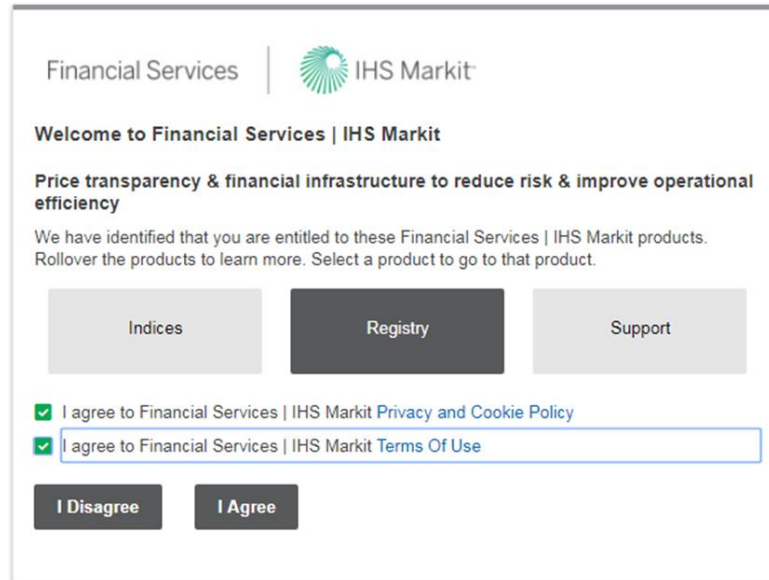
3. This will call up a Login screen. Insert your email address and password and press the "Login" box.




The screenshot shows the login interface for IHS Markit. At the top left, it says "Financial Services" followed by a vertical line and the IHS Markit logo. Below this are two input fields: "Enter email" and "Enter password". There is a checked checkbox labeled "Remember me". A dark grey "Submit" button is centered below the input fields. At the bottom, there are two links: "Forgot your password?" and "Register with IHS Markit".

Logging into Markit Registry

4. After logging in, you will be prompted to select your Markit Product. Select "Registry" and then "Click."



Financial Services |  IHS Markit

Welcome to Financial Services | IHS Markit

Price transparency & financial infrastructure to reduce risk & improve operational efficiency

We have identified that you are entitled to these Financial Services | IHS Markit products. Rollover the products to learn more. Select a product to go to that product.

I agree to Financial Services | IHS Markit Privacy and Cookie Policy

I agree to Financial Services | IHS Markit Terms Of Use

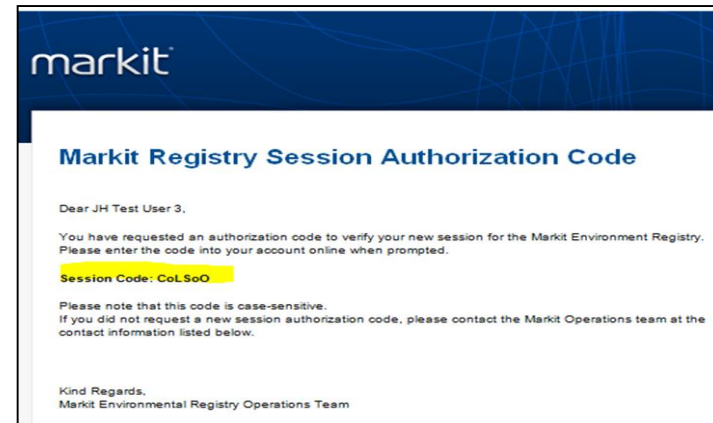
Logging into Markit Registry


5. For security purposes, you will be prompted to enter a unique session code by clicking 'Generate Session Code'



Logging into Markit Registry

- You will be emailed a session code that you will then enter in the "Enter Session Code" field on the landing page; then click the "Verify" button



Financial Services |  IHS Markit | Registry |

MY ACCOUNT SUMMARY | MANAGE MY UNITS | MY PROJECTS AND ISSUANCES | RFI | AUCTIONS | USER ADMIN | **REPORTS** | ACTIVITY LOG | ADMIN

Authorization Code

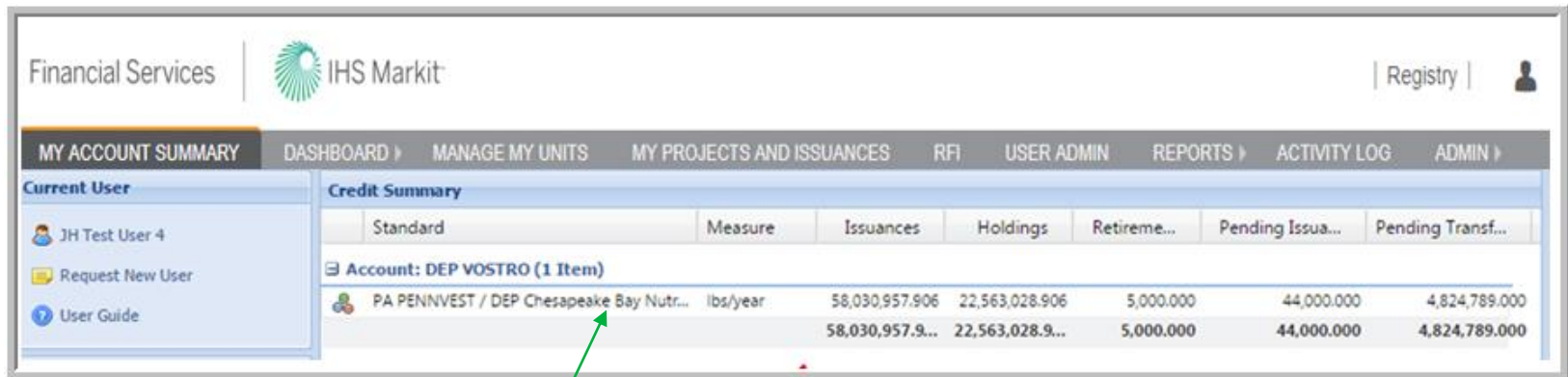
Sending your session code
Email has been sent.

Please enter session code that you've received. Please note that session code will expire after '3' minutes. If code is not used within '3' minutes, a new code will need to be generated.

Enter Session Code:

Logging into Markit Registry

- Once you are successfully logged into IHS Markit, you will be presented with the Registry landing screen.



The screenshot shows the IHS Markit Registry landing screen. The top navigation bar includes 'Financial Services', the IHS Markit logo, and a 'Registry' link with a user icon. Below this is a menu with options: 'MY ACCOUNT SUMMARY', 'DASHBOARD', 'MANAGE MY UNITS', 'MY PROJECTS AND ISSUANCES', 'RFI', 'USER ADMIN', 'REPORTS', 'ACTIVITY LOG', and 'ADMIN'. A 'Current User' dropdown menu is open, showing 'JH Test User 4', 'Request New User', and 'User Guide'. The main content area displays a 'Credit Summary' table with columns: Standard, Measure, Issuances, Holdings, Retirement, Pending Issuances, and Pending Transfers. A table entry is shown for 'Account: DEP VOSTRO (1 Item)' with a sub-entry 'PA PENNVEST / DEP Chesapeake Bay Nutr...'.


Standard	Measure	Issuances	Holdings	Retirement	Pending Issuances	Pending Transfers
Account: DEP VOSTRO (1 Item)						
PA PENNVEST / DEP Chesapeake Bay Nutr...	lbs/year	58,030,957.906	22,563,028.906	5,000.000	44,000.000	4,824,789.000
		58,030,957.9...	22,563,028.9...	5,000.000	44,000.000	4,824,789.000


Note: Only Sellers will have populated fields in the credit summary field

Sellers accept credit transfers into their registry accounts

Sellers accept credit transfers into their registry accounts

1. Sellers' credits will be staged in Markit Registry approx. 2 to 3 days prior to the auction
2. Amount of credits that will be posted into seller's registry account will equal the amount that was confirmed by DEP and approved by PENNVEST in accordance with the enrollment eligibility letter
3. Once credits are posted, they will be transferred into Seller's registry account
4. Seller will receive an email notification of the incoming transfer. See sample email



 IHS Markit

CUSTOMER SUPPORT

Transfer Pending Notification

Dear JH Test User 4,

Thank you for your request to Transfer credits on the Markit Environmental Registry.

The following is a copy of the transfer details:

Common Transfer Details:

Target Account ID: 100000000047774
 Target Account Name: MER2.9 Auctions
 Transfer Date: 2015-05-22 17:41:45
 Comments:

Transfer Details:

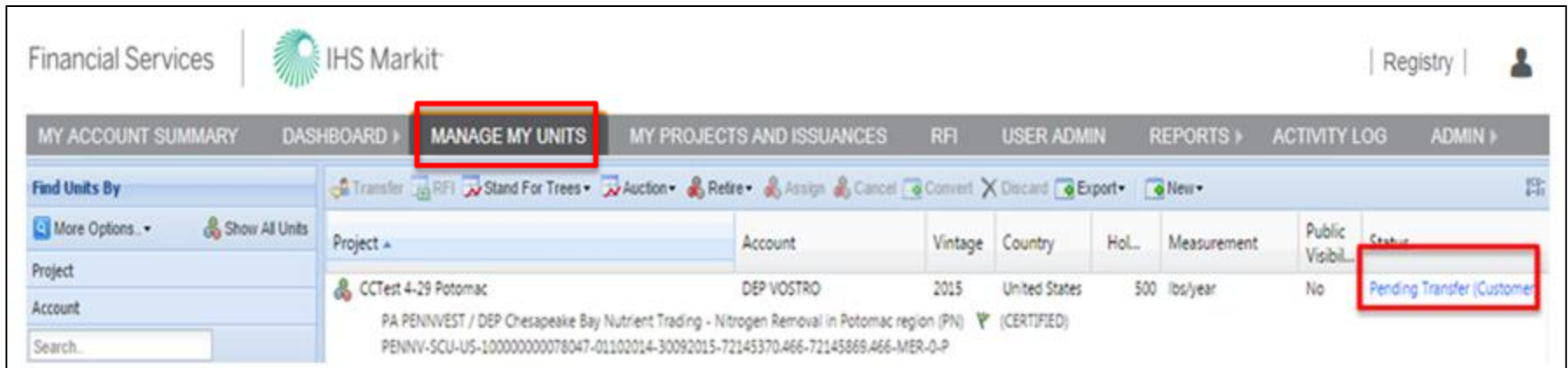
Source Account ID: 100000000001953
 Source Account Name: DEP VOSTRO
 Project Name: CCTest 4-29 Potomac
 Standard Name: PA PENNVEST / DEP Chesapeake Bay Nutrient Trading
 Vintage Year: 2015
 Quantity: 500
 Credit Type: lbs/year
 Serial number: PENNV-SCU-US-100000000078047-01102014-30092015-72145370.466-72145869.466-MER-0-P
 Unit Class: CERTIFIED


Additional Information:

Nutrient Type : Nitrogen
 Watershed : Potomac

Sellers accept credit transfers into their registry accounts

5. To accept transfer, log into Markit Registry
6. Navigate to 'Manage My Units' Page
7. Click on 'Pending Transfer (Customer)' button



Financial Services | IHS Markit | Registry | 

MY ACCOUNT SUMMARY | DASHBOARD > | **MANAGE MY UNITS** | MY PROJECTS AND ISSUANCES | RFI | USER ADMIN | REPORTS > | ACTIVITY LOG | ADMIN >

Find Units By

More Options... Show All Units

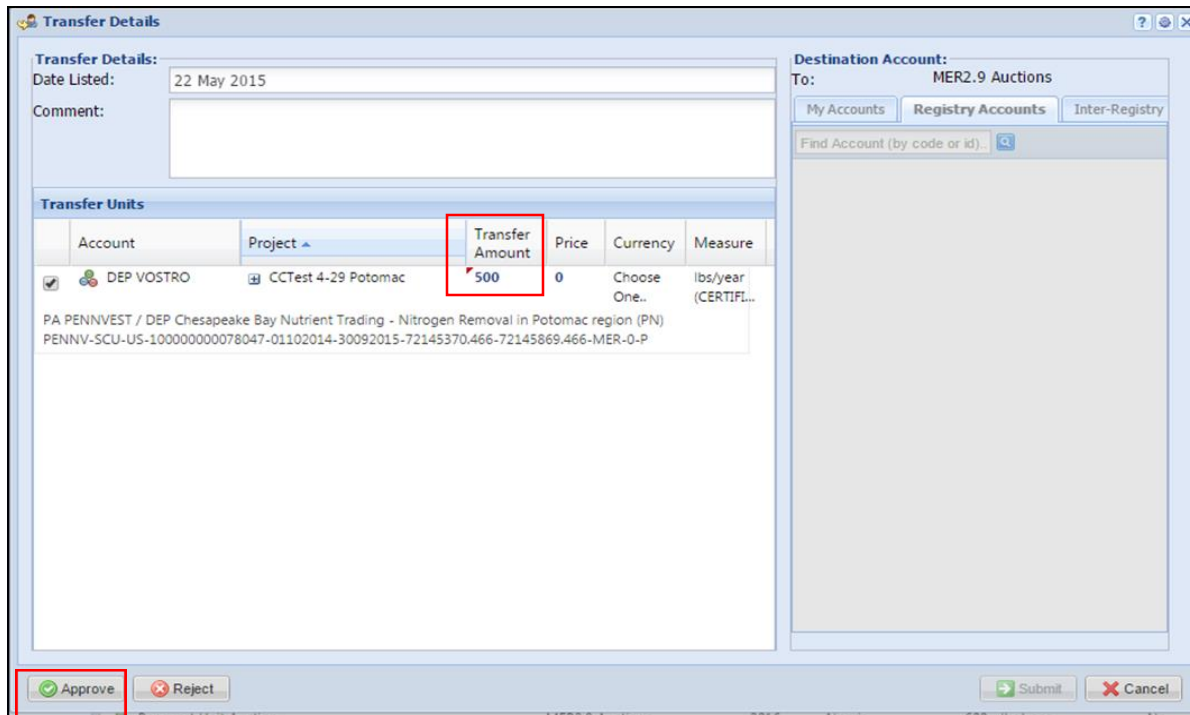
Project Account Vintage Country HoL... Measurement Public Visibil... Status

Project	Account	Vintage	Country	HoL...	Measurement	Public Visibil...	Status
CCTest 4-29 Potomac	DEP VOSTRO	2015	United States	500	lbs/year	No	Pending Transfer (Customer)

PA PENNVEST / DEP Chesapeake Bay Nutrient Trading - Nitrogen Removal in Potomac region (PN) (CERTIFIED)
 PENNV-SCU-US-100000000078047-01102014-30092015-72145370.466-72145869.466-MER-0-P

Sellers accept credit transfers into their registry accounts

8. The following form will display
9. Confirm Transfer amount and click on the 'Approve' button



Transfer Details

Date Listed: 22 May 2015

Comment:

Transfer Units

Account	Project	Transfer Amount	Price	Currency	Measure
DEP VOSTRO	CCTest 4-29 Potomac	500	0	Choose One..	lbs/year (CERTIFI...

PA PENNVEST / DEP Chesapeake Bay Nutrient Trading - Nitrogen Removal in Potomac region (PN)
 PENNV-SCU-US-100000000078047-01102014-30092015-72145370.466-72145869.466-MER-0-P

Destination Account:
 To: MER2.9 Auctions


My Accounts Registry Accounts Inter-Registry

Find Account (by code or id):

Approve Reject Submit Cancel

Sellers accept credit transfers into their registry accounts

10. Credits will become active in your account
11. Please note that you will have separate credit blocks for different combinations of Watershed/Nutrient Type that were verified by DEP.

Financial Services |  IHS Markit | Registry |

MY ACCOUNT SUMMARY | DASHBOARD | MANAGE MY UNITS | MY PROJECTS AND ISSUANCES | RFI | USER ADMIN | **REPORTS** | ACTIVITY LOG | ADMIN

Find Units By

More Options... | Show All Units

Transfer | RFI | Stand For Trees | Auction | Retire | Assign | Cancel | Convert | Discard | Export | New

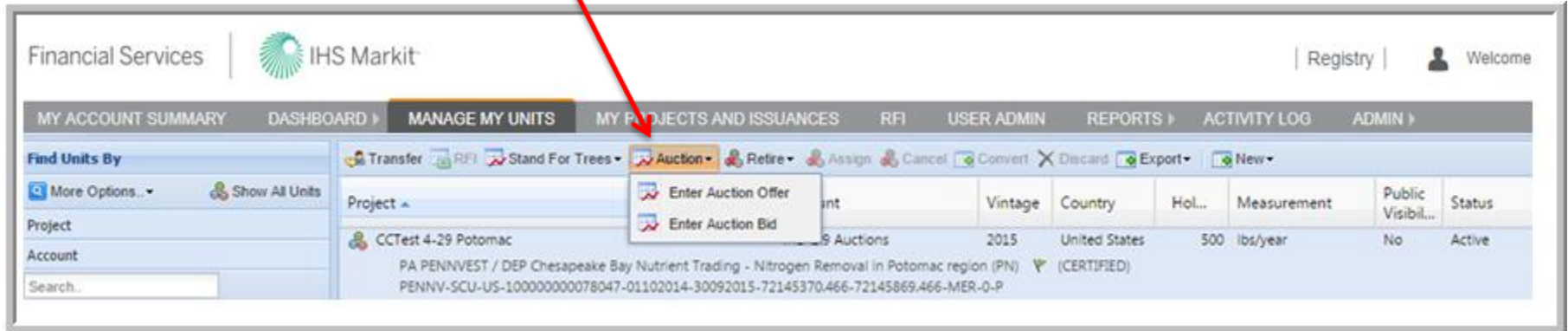
Project	Account	Vintage	Country	Hol...	Measurement	Public Visibil...	Status
CCTest 4-29 Potomac	MER2.0 Auctions	2015	United States		500 lbs/year	No	Active
PA PENNVEST / DEP Chesapeake Bay Nutrient Trading - Nitrogen Removal in Potomac region (PN) (CERTIFIED)							
PENNV-SCU-US-100000000078047-01102014-30092015-72145370.466-72145869.466-MER-0-P							

Search...

Sellers submit offers on Markit Registry

Sellers submit offers on Markit Registry

1. Log into Markit Registry
2. Click on 'Manage My Units' Page
3. Select block of credits that you want to offer on the auction by highlighting the row
4. Select 'Auction' icon from the sub-menu bar
5. Select 'Enter Auction Offer'



The screenshot displays the IHS Markit Markit Registry interface. The top navigation bar includes 'Financial Services', the IHS Markit logo, and a 'Registry | Welcome' user indicator. Below this is a secondary navigation bar with tabs: 'MY ACCOUNT SUMMARY', 'DASHBOARD', 'MANAGE MY UNITS' (highlighted), 'MY PROJECTS AND ISSUANCES', 'RFI', 'USER ADMIN', 'REPORTS', 'ACTIVITY LOG', and 'ADMIN'. A sub-menu bar above the table contains icons for 'Transfer', 'RFI', 'Stand For Trees', 'Auction', 'Retire', 'Assign', 'Cancel', 'Convert', 'Discard', 'Export', and 'New'. A red arrow points to the 'Auction' icon. The table below shows a list of units with columns for Project, Vintage, Country, Hol..., Measurement, Public Visibil..., and Status. The first row is highlighted and shows 'CCTest 4-29 Potomac' with a status of 'Active'. A dropdown menu is open over the 'Auction' icon, showing 'Enter Auction Offer' and 'Enter Auction Bid' options.

Project	Vintage	Country	Hol...	Measurement	Public Visibil...	Status
CCTest 4-29 Potomac	2015	United States		500 lbs/year	No	Active

Sellers submit offers on Markit Registry

6. The following form will display
7. Populate all fields marked with an asterisk
8. Enter Auction name from the drop-down list
9. Enter quantity of credits and offer price (Note: You do not have to offer all of available credits)
10. Select "Partial" or 'All or None'.
11. Agree to the "Auctions Terms of Use"; click on 'OK' button

Auction Offer

Auction *: CCTest 4-29

Account Name: MER2.9 Auctions

Environmental Category: Water Quality

Standard: PA PENNVEST / DEP Chesapeake Bay Nutrient Trading

Project Type: Nitrogen Removal in Potomac region (PN)

Unit Class: CERTIFIED

Unit Measurement: lbs/year

Country: United States

Vintage year or range: 2015

Quantity of credits *: 100

Offer price per credit (does not include auction fee) *: 1.5 US Dollar

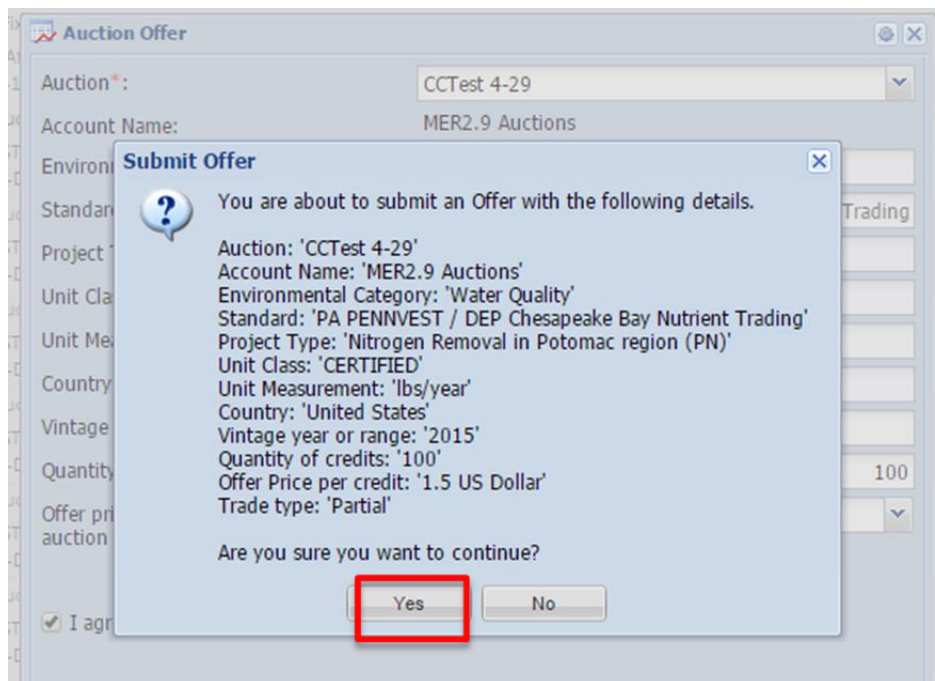
Partial All or None

I agree to the following [Auctions Terms Of Use](#)

Ok Cancel


Sellers submit offers on Markit Registry

12. A confirmation offer form will display. Review and confirm details; then click "Yes" button – the offer is now submitted.



Sellers submit offers on Markit Registry

13. Navigate to the "Auctions" menu to view your submitted offer
14. Click on "Choose Auction" drop-down to select the auction name
15. 'Delta' column will indicate how much of the pre-qualified quantity amount remains, based on the submitted offer amounts

Financial Services |  | Registry |

MY ACCOUNT SUMMARY MANAGE MY UNITS MY PROJECTS AND ISSUANCES RFI **AUCTIONS** USER ADMIN **REPORTS** ACTIVITY LOG ADMIN

Un-list Export to Excel Export to PDF JH Test_May 28 1st Round Search Auction Item

ID	Status	Account Name	Listed Date	Product Name	Vintage	Bid or Offer	Partial or All or None	Auctioned Quantity	Auctioned Price	Final Quantity	Final Price	Pre-qualified purchase amount limit	Pre-qualified quantity limit	Delta
100000000012233	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 08:43:34 PM	SU-N-15	2015	Offer	Partial	45	2.00				500	355
100000000012232	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 08:42:40 PM	SU-P-15	2015	Offer	Partial	35	0.50				500	405
100000000012231	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 06:53:31 PM	SU-N-15	2015	Offer	Partial	100	0.75				500	355
100000000012230	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 06:52:46 PM	SU-P-15	2015	Offer	Partial	60	0.50				500	405
100000000012229	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 06:49:53 PM	PO-N-15	2015	Offer	Partial	75	1.00				500	375

Sellers submit offers on Markit Registry – What is the Product Name?

- The Product Name provides information about the credit that is being offered at the auction. Product Name captures the watershed, nutrient type and vintage year. See matrix below of abbreviations.

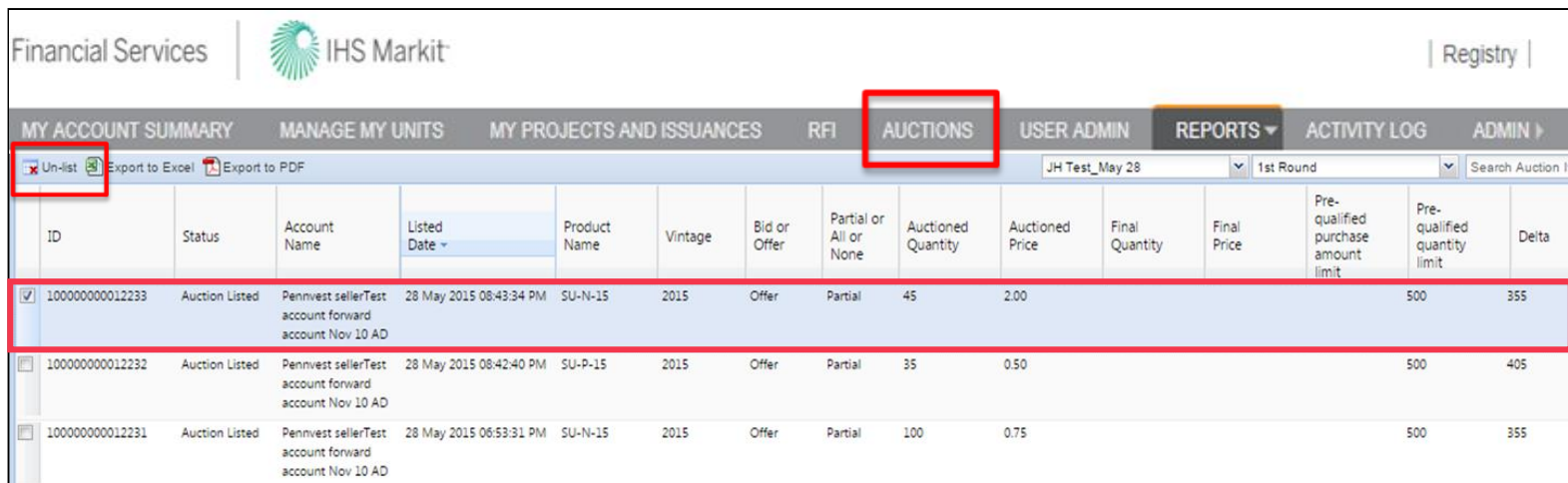
ID	Status	Account Name	Listed Date	Product Name	Vintage
100000000012233	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 08:43:34 PM	SU-N-15	2015
100000000012232	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 08:42:40 PM	SU-P-15	2015
100000000012231	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 06:53:31 PM	SU-N-15	2015
100000000012230	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 06:52:46 PM	SU-P-15	2015
100000000012229	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 06:49:53 PM	PO-N-15	2015
100000000012228	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 06:48:55 PM	PO-N-15	2015

Product Name	Description
SU-N-18	Susquehanna Nitrogen 2018
SU-P-18	Susquehanna Phosphorus 2018
PO-N-18	Potomac Nitrogen 2018
PO-P-18	Potomac Phosphorus 2018

Sellers update offers on Markit Registry

Sellers update offers on Markit Registry

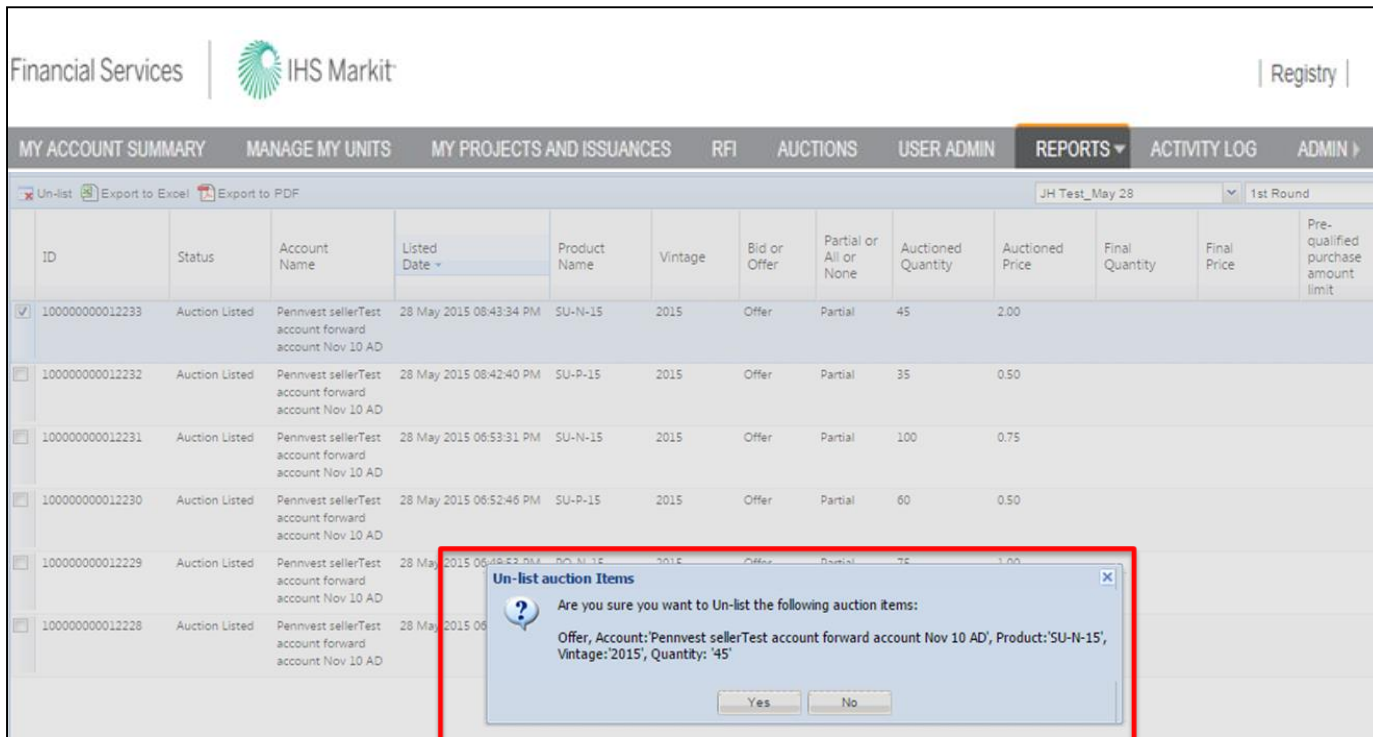
1. Please note that **Sellers are able to change their offers, while auction window is open (October 31st: Round 1 from 9am – 11am; Round 2 from 2pm – 3pm)**
2. In order to change your offer, you must first “un-list” it from the auction and then create a new one
3. To un-list an offer, navigate to ‘Auctions’ menu
4. Identify the offer that you wish to un-list and check the box. Click on the “Un-list” button



ID	Status	Account Name	Listed Date	Product Name	Vintage	Bid or Offer	Partial or All or None	Auctioned Quantity	Auctioned Price	Final Quantity	Final Price	Pre-qualified purchase amount limit	Pre-qualified quantity limit	Delta
<input checked="" type="checkbox"/>	Auction Listed	Pennvest sellerTest account forward account Nov.10 AD	28 May 2015 08:43:34 PM	SU-N-15	2015	Offer	Partial	45	2.00			500	355	
<input type="checkbox"/>	Auction Listed	Pennvest sellerTest account forward account Nov.10 AD	28 May 2015 08:42:40 PM	SU-P-15	2015	Offer	Partial	35	0.50			500	405	
<input type="checkbox"/>	Auction Listed	Pennvest sellerTest account forward account Nov.10 AD	28 May 2015 06:53:31 PM	SU-N-15	2015	Offer	Partial	100	0.75			500	355	

Sellers update offers on Markit Registry

- The following form will display; click on the "Yes" button once you have confirmed
- Navigate back to 'Manage My Units' Page to list a different offer (if applicable)



The screenshot shows the 'Auctions' section of the Markit Registry. A table lists several auction items. A dialog box titled 'Un-list auction Items' is overlaid on the table, asking for confirmation to un-list a specific item.

ID	Status	Account Name	Listed Date	Product Name	Vintage	Bid or Offer	Partial or All or None	Auctioned Quantity	Auctioned Price	Final Quantity	Final Price	Pre-qualified purchase amount limit
<input checked="" type="checkbox"/> 100000000012233	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 08:43:34 PM	SU-N-15	2015	Offer	Partial	45	2.00			
<input type="checkbox"/> 100000000012232	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 08:42:40 PM	SU-P-15	2015	Offer	Partial	35	0.50			
<input type="checkbox"/> 100000000012231	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 06:53:31 PM	SU-N-15	2015	Offer	Partial	100	0.75			
<input type="checkbox"/> 100000000012230	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 06:52:46 PM	SU-P-15	2015	Offer	Partial	60	0.50			
<input type="checkbox"/> 100000000012229	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 06:52:04 PM	SU-N-15	2015	Offer	Partial	75	1.00			
<input type="checkbox"/> 100000000012228	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 06:51:22 PM	SU-N-15	2015	Offer	Partial	45	2.00			

Un-list auction Items

Are you sure you want to Un-list the following auction items:

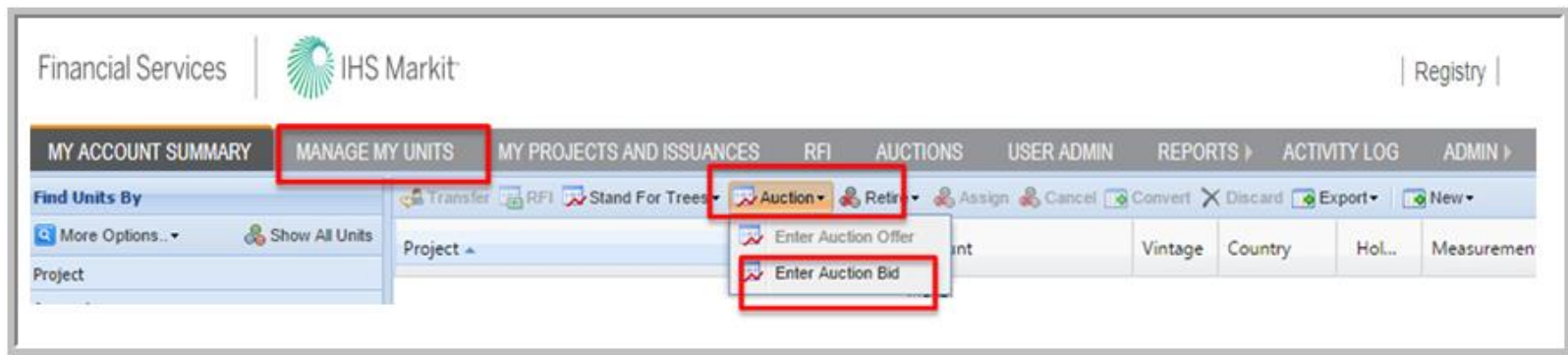
Offer, Account:'Pennvest sellerTest account forward account Nov 10 AD', Product:'SU-N-15', Vintage:'2015', Quantity:'45'

Yes No

Buyers submit bids on Markit Registry

Buyers submit bids on Markit Registry

1. Log into the Markit Registry
2. Click on 'Manage My Units' Page
3. Hover over 'Auction' on the sub-menu bar
4. Click on 'Enter Auction Bid' menu item



Buyers submit bids on Markit Registry

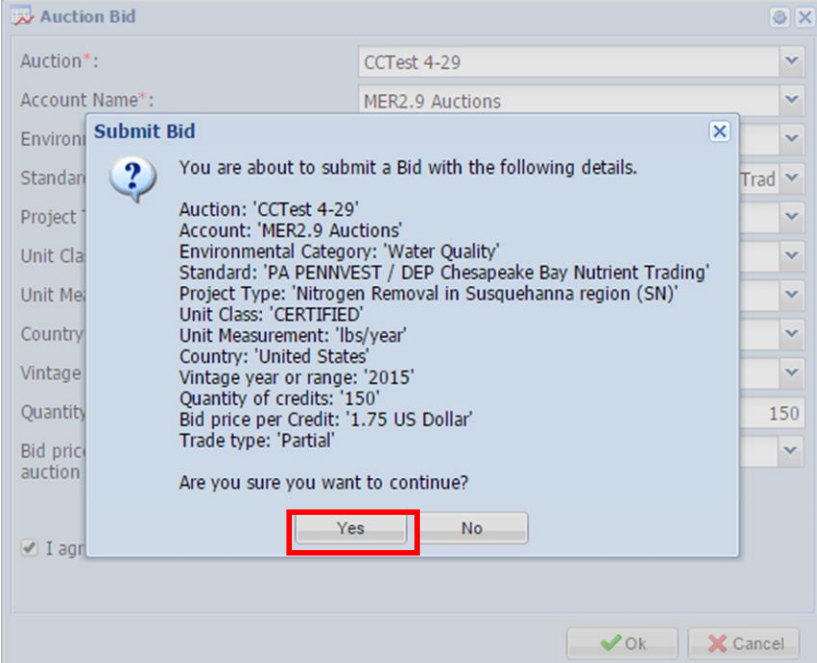
5. The following form will display.
6. All fields marked with an asterisk must be populated.
7. Indicate whether the bid is 'Partial' or 'All or None'
8. Agree to the "Auctions Terms of Use"
9. Click on the 'OK' button

The screenshot shows the 'Auction Bid' form with the following fields and values:

Auction*	CCTest 4-29
Account Name*	MER2.9 Auctions
Environmental Category*	Water Quality
Standard*	PA PENNVEST / DEP Chesapeake Bay Nutrient Trad
Project Type*	Nitrogen Removal in Susquehanna region (SN)
Unit Class*	CERTIFIED
Unit Measurement*	lbs/year
Country*	United States
Vintage year or range*	2015
Quantity of credits*	150
Bid price per credit (does not include auction fee)*	1.75 US Dollar
	<input checked="" type="radio"/> Partial <input type="radio"/> All or None
	<input checked="" type="checkbox"/> I agree to the following Auctions Terms Of Use
	<input checked="" type="button" value="Ok"/> <input type="button" value="Cancel"/>

Buyers submit bids on Markit Registry

10. A confirmation submit bid form will display
11. Confirm details and click "Yes" button. The bid is now submitted



The screenshot shows a web application window titled "Auction Bid". The main form contains several dropdown menus and input fields. A modal dialog box titled "Submit Bid" is overlaid on top of the main form. The dialog box contains a question mark icon and the text: "You are about to submit a Bid with the following details." Below this, the following details are listed: Auction: 'CCTest 4-29', Account: 'MER2.9 Auctions', Environmental Category: 'Water Quality', Standard: 'PA PENNVEST / DEP Chesapeake Bay Nutrient Trading', Project Type: 'Nitrogen Removal in Susquehanna region (SN)', Unit Class: 'CERTIFIED', Unit Measurement: 'lbs/year', Country: 'United States', Vintage year or range: '2015', Quantity of credits: '150', Bid price per Credit: '1.75 US Dollar', and Trade type: 'Partial'. At the bottom of the dialog box, there is a question: "Are you sure you want to continue?" and two buttons: "Yes" and "No". The "Yes" button is highlighted with a red rectangle. At the bottom of the main form, there are "Ok" and "Cancel" buttons.

Auction*: CCTest 4-29
Account Name*: MER2.9 Auctions
Environment: [dropdown]
Standard: [dropdown]
Project: [dropdown]
Unit Class: [dropdown]
Unit Measurement: [dropdown]
Country: [dropdown]
Vintage year or range: [dropdown]
Quantity of credits: 150
Bid price per Credit: [dropdown]
Trade type: [dropdown]

Submit Bid

You are about to submit a Bid with the following details.

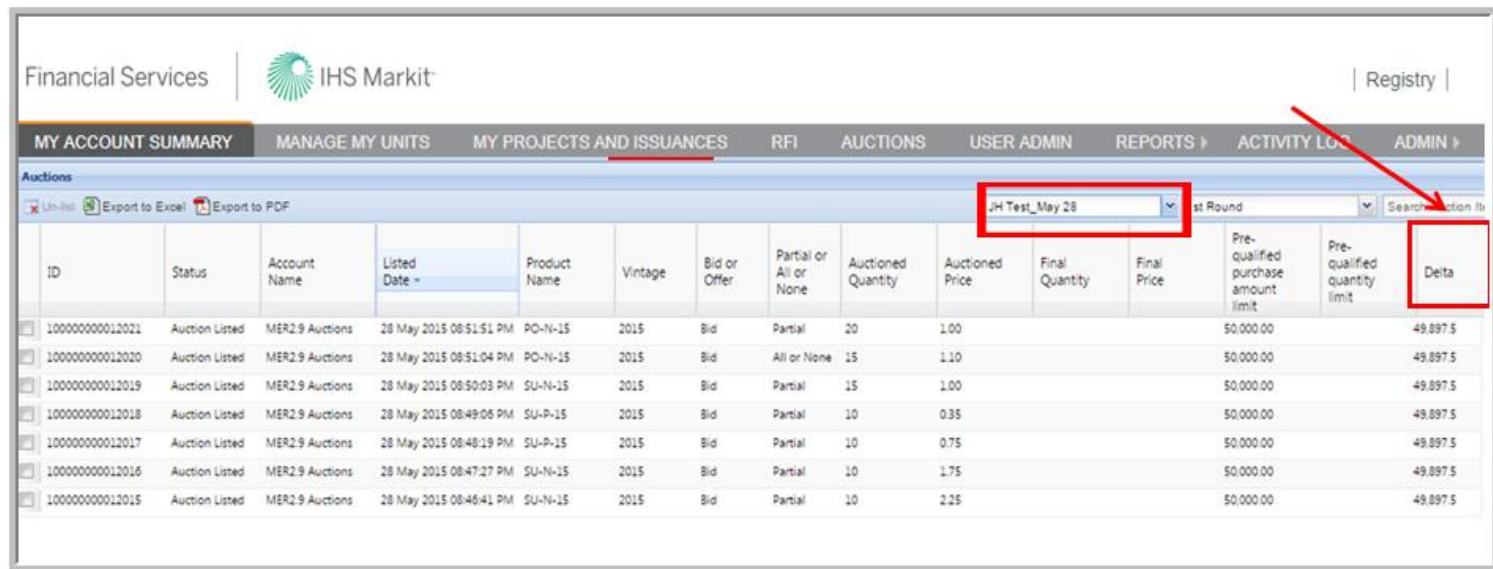
Auction: 'CCTest 4-29'
Account: 'MER2.9 Auctions'
Environmental Category: 'Water Quality'
Standard: 'PA PENNVEST / DEP Chesapeake Bay Nutrient Trading'
Project Type: 'Nitrogen Removal in Susquehanna region (SN)'
Unit Class: 'CERTIFIED'
Unit Measurement: 'lbs/year'
Country: 'United States'
Vintage year or range: '2015'
Quantity of credits: '150'
Bid price per Credit: '1.75 US Dollar'
Trade type: 'Partial'

Are you sure you want to continue?

I agree

Buyers submit bids on Markit Registry

12. Bid will be visible on Auctions page
13. Select the auction from the 'Choose Auction' drop-down
14. 'Delta' column will indicate how much of the pre-qualified dollar amount remains, based on the submitted bid amounts and bid prices



The screenshot shows the 'Auctions' page in the IHS Markit system. The page includes a navigation bar with 'Financial Services' and 'IHS Markit' logos, and a 'Registry' link. Below the navigation bar are tabs for 'MY ACCOUNT SUMMARY', 'MANAGE MY UNITS', 'MY PROJECTS AND ISSUANCES', 'RFI', 'AUCTIONS', 'USER ADMIN', 'REPORTS', 'ACTIVITY LOG', and 'ADMIN'. The 'AUCTIONS' tab is selected. The main content area shows a table of auction listings with columns for ID, Status, Account Name, Listed Date, Product Name, Vintage, Bid or Offer, Partial or All or None, Auctioned Quantity, Auctioned Price, Final Quantity, Final Price, Pre-qualified purchase amount limit, Pre-qualified quantity limit, and Delta. A red box highlights the 'Delta' column, and another red box highlights the 'Choose Auction' dropdown menu, with a red arrow pointing to it.

ID	Status	Account Name	Listed Date	Product Name	Vintage	Bid or Offer	Partial or All or None	Auctioned Quantity	Auctioned Price	Final Quantity	Final Price	Pre-qualified purchase amount limit	Pre-qualified quantity limit	Delta
100000000012021	Auction Listed	MER2.9 Auctions	28 May 2015 08:51:51 PM	PO-N-15	2015	Bid	Partial	20	1.00			50,000.00		49,897.5
100000000012020	Auction Listed	MER2.9 Auctions	28 May 2015 08:51:04 PM	PO-N-15	2015	Bid	All or None	15	1.10			50,000.00		49,897.5
100000000012019	Auction Listed	MER2.9 Auctions	28 May 2015 08:50:03 PM	SU-N-15	2015	Bid	Partial	15	1.00			50,000.00		49,897.5
100000000012018	Auction Listed	MER2.9 Auctions	28 May 2015 08:49:06 PM	SU-P-15	2015	Bid	Partial	10	0.35			50,000.00		49,897.5
100000000012017	Auction Listed	MER2.9 Auctions	28 May 2015 08:48:19 PM	SU-P-15	2015	Bid	Partial	10	0.75			50,000.00		49,897.5
100000000012016	Auction Listed	MER2.9 Auctions	28 May 2015 08:47:27 PM	SU-N-15	2015	Bid	Partial	10	1.75			50,000.00		49,897.5
100000000012015	Auction Listed	MER2.9 Auctions	28 May 2015 08:46:41 PM	SU-N-15	2015	Bid	Partial	10	2.25			50,000.00		49,897.5

Buyers submit offers on Markit Registry – What is the Product Name?

The Product Name provides information about the credit that is being offered at the auction. Product Name captures the watershed, nutrient type and vintage year. See matrix below of abbreviations.


ID	Status	Account Name	Listed Date	Product Name	Vintage
100000000012233	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 08:43:34 PM	SU-N-15	2015
100000000012232	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 08:42:40 PM	SU-P-15	2015
100000000012231	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 06:53:31 PM	SU-N-15	2015
100000000012230	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 06:52:46 PM	SU-P-15	2015
100000000012229	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 06:49:53 PM	PO-N-15	2015
100000000012228	Auction Listed	Pennvest sellerTest account forward account Nov 10 AD	28 May 2015 06:48:55 PM	PO-N-15	2015

Product Name	Description
SU-N-18	Susquehanna Nitrogen 2018
SU-P-18	Susquehanna Phosphorus 2018
PO-N-18	Potomac Nitrogen 2018
PO-P-18	Potomac Phosphorus 2018

Buyers update bids on Markit Registry

Buyers update bids on Markit Registry

1. Please note that **Buyers are able to change their bids, while auction window is open (October 31st: Round 1 from 9am – 11am; Round 2 from 2pm - 3pm)**
2. In order to change your bid, you must first “un-list” it from the auction and then create a new one
3. To un-list a bid, navigate to the “Auctions’ menu
4. Identify the bid that you wish to un-list and click on the “Un-list” box on the sub-menu bar

Financial Services |  | Registry |

MY ACCOUNT SUMMARY | MANAGE MY UNITS | MY PROJECTS AND ISSUANCES | RFI | **AUCTIONS** | USER ADMIN | REPORTS ▾ | ACTIVITY LOG | ADMIN ▾

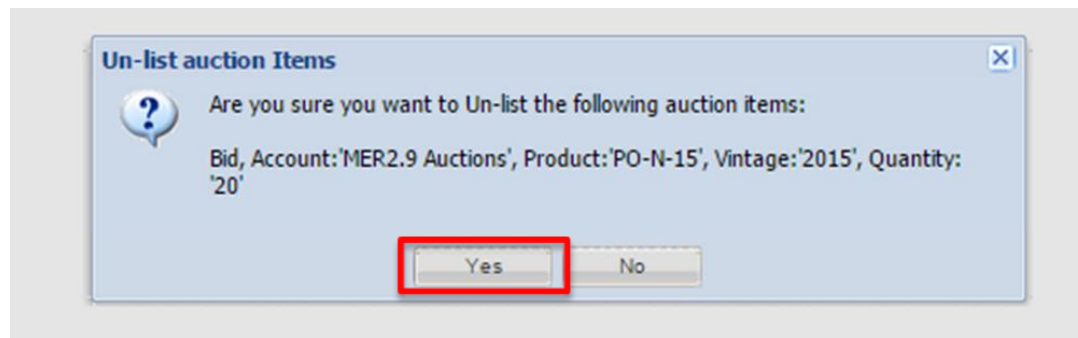
Auctions

Un-list | Export to Excel | Export to PDF | JH Test_May 28 | 1st Round

ID	Status	Account Name	Listed Date ▾	Product Name	Vintage	Bid or Offer	Partial or All or None	Auctioned Quantity	Auctioned Price	Final Quantity	Final Price	Pre-qualified purchase amount limit
<input checked="" type="checkbox"/> 100000000012021	Auction Listed	MER2.9 Auctions	28 May 2015 08:51:51 PM	PO-N-15	2015	Bid	Partial	20	1.00			50,000.00
<input type="checkbox"/> 100000000012020	Auction Listed	MER2.9 Auctions	28 May 2015 08:51:04 PM	PO-N-15	2015	Bid	All or None	15	1.10			50,000.00
<input type="checkbox"/> 100000000012019	Auction Listed	MER2.9 Auctions	28 May 2015 08:50:03 PM	SU-N-15	2015	Bid	Partial	15	1.00			50,000.00
<input type="checkbox"/> 100000000012018	Auction Listed	MER2.9 Auctions	28 May 2015 08:49:06 PM	SU-P-15	2015	Bid	Partial	10	0.35			50,000.00

Buyers update bids on Markit Registry

5. The following form will display
6. Click on 'Yes' button to un-list your bid.
7. Navigate back to 'Manage My Units' Page to list a different bid (if applicable)



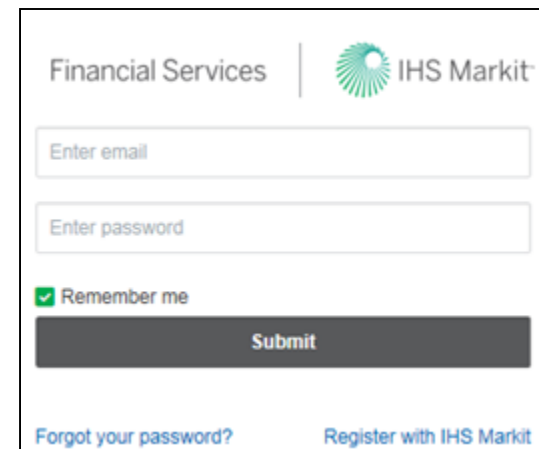
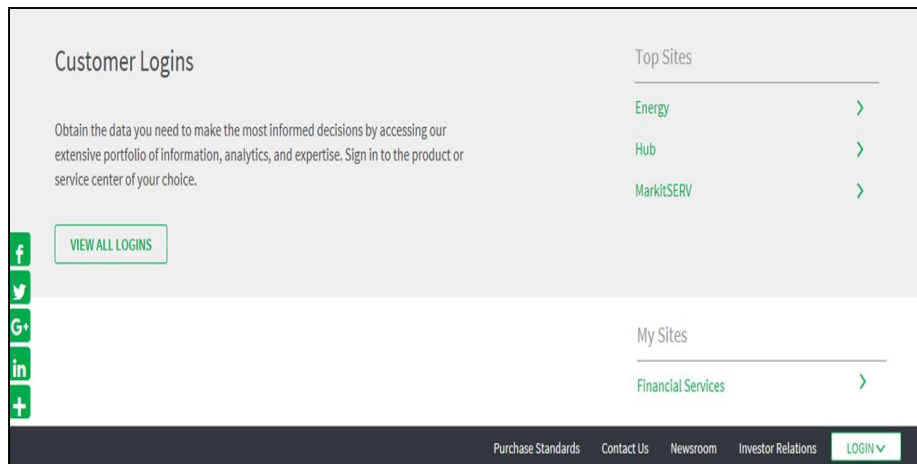
Participants view auctions results

Participants view auctions results

1. After each auction round is completed, Markit will notify all auction participants via email that their results are available in their 'My Counterparty Documents' folder on Markit Counterparty Manager (MCM)
2. **Round 1:** Expect to receive notification on **October 31st** at approx. **1:00pm**
3. **Round 2:** Expect to receive notification on **October 31st** at approx. **5:00pm**

Participants view auctions results

4. To view your auction results, navigate to [Registry](#) website
5. Insert your email address and password.
6. Click on the green "LOG IN" box



Participants view auctions results

- After logging in, you will be prompted to select your Markit Product. Select on "Counterparty Manager" and "Click"



Financial Services | IHS Markit

Counterparty Manager

Create Manage View KYC Services Tax Request For Amendment ISDA Amend Outreach 360 Tools

Counterparty Manager

Quicklinks

Entities 17/Jan/2018 00:00

59 Total Entities 57 Active Entities 2 Inactive Entities

17 Entities with no Documents

Pending Tasks New!
Click on task number to view pending task / action

Regulatory 17/Jan/2018 00:07

0 ISDAAmend 2.0 - Self Disclosure

0 ISDAAmend 2.0 - Variation Margin

Ne

Dividend Forecasting

Indices

PMI

Sys Price Viewer

Sys Pricing Data - CDS

Out Reference Data - CDS

Note for first time users, you will be prompted to agree to the MCM Terms of use ONLY. There's no need to check the Terms of Use for KYC Services

Agree to all Terms of use

By checking this box, you are agreeing with the Terms of use for [KYC Services](#) and acknowledge receipt of the [Fair Processor Notice](#) and [Australia Privacy Collection Statement](#).

By checking this box, you are agreeing with the Terms of use for [Markit Counterparty Manager](#) **(Required)**

Participants view auctions results

8. Hover over 'View'
9. Navigate to 'Counterparty Documents' page
10. Click on 'all document(s)' hyperlink
11. Look for the document type: "Auction Results (Private)"
12. Click on the document's icon

To view all counterparty documents click on the **all document(s)** link
 Summary of Top 20 Accounts By Document Count

Account Name	Entity Count	Document Count
Pennsylvania Infrastructure Investment Authority Company	1	7
Market Group Limited	1	2

Counterparty Documents

Apply Reset

Account:

Fund Name:

★ All Documents +

View Invite a User Download Download to FTP Download All to FTP

Account Name	Fund Name	Category	Document Type	Description	View	Upload Date	Umbrella
<input type="checkbox"/> Market Group Li...	Market Group L...	Stand...	Auction Results (Private)	Your Auction...		19-Oct-2011	Market Group L...

Participants view auctions results

13. If successful, Seller's Auction results document will look like this:

Winning offers									
Credit: SU-N-17	Offer Price (\$)	Offer Quantity	Offer Type	Final Price (\$)	Quantity Sold	Amount	Fee Per credit	Total Fee	Total Amount Owed from Pennvest (\$)
	2.49	5,000	PARTIAL	5.00	5,000	25,000.00	0.025	125.00	24,875.00
									Amount=Quantity Won*Final Price
									Total Fee= Quantity Won*Fee per credit
									Amount Owed By Pennvest= Amount - Total Fee

14. If successful, Buyer's Auction results document will look like this:

Winning bids									
Credit: SU-N-17	Bid Price (\$)	Bid Quantity	Bid Type	Final Price (\$)	Quantity Won	Amount	Fee Per credit	Total Fee	Total Amount Owed to Pennvest (\$)
	4.00	10,000	PARTIAL	2.50	10,000	25,000.00	0.025	250.00	25,250.00
									Amount=Quantity Won*Final Price
									Total Fee= Quantity Won*Fee per credit
									Amount Owed To Pennvest= Amount + Total Fee

Participants view auctions results

15. Please note that results will show “0” in the fields highlighted below for sellers and buyers who did not win any offers or bids:

Winning offers									
Credit: SU-N-17									
	Offer Price (\$)	Offer Quantity	Offer Type	Final Price (\$)	Quantity Sold	Amount	Fee Per credit	Total Fee	Total Amount Owed from Pennvest (\$)
	2.49	5,000	PARTIAL	0.00	0	0.00	0.025	0.00	0.00
									Amount=Quantity Won*Final Price
									Total Fee= Quantity Won*Fee per credit
									Amount Owed By Pennvest= Amount - Total Fee

Winning bids									
Credit: SU-N-17									
	Bid Price (\$)	Bid Quantity	Bid Type	Final Price (\$)	Quantity Won	Amount	Fee Per credit	Total Fee	Total Amount Owed to Pennvest (\$)
	4.00	5,365	PARTIAL	0.00	0	0.00	0.025	0.00	0.00
									Amount=Quantity Won*Final Price
									Total Fee= Quantity Won*Fee per credit
									Amount Owed By Pennvest= Amount + Total Fee

Settlement Process

Settlement Process

Definition: Auction Settlement Price

The PENNVEST Nutrient Credit Clearinghouse Rulebook (Version 8, p.43) defines the settlement price to be:

- The **weighted average**, rounded to the nearest whole cent, between the **lowest bid** and **highest offer prices** that either **cross or touch** in the auction that are successful, with weights of these two last match prices equal to the corresponding bid and offer quantities of the last successful bids and offers.
- When the dollar limit for a bidder or offeror is exceeded, the number of credits won for that particular buyer or seller will be reduced and the auction methodology will be re-run taking into account the new set of credits won to calculate the new final price.
- The auction methodology will not be re-run unless the new auction settlement price causes another account to exceed its respective dollar limit.

Settlement Process

Determining winners and tie-breaking

1. The auction platform will determine the maximum possible cumulative traded quantity for the submitted bids and offers. This is done to ensure that the final auction fill is maximized. The following underlying restriction applies:
 - > The bids and offers picked should either cross or touch (which means that bid is more than or equal to the offer).

Settlement Process

Determining winners and tie-breaking

2. Once the maximum possible traded quantity has been determined (using the largest matching sets of bids and offers and the crossed market logic), it is required to determine the fills of the actual bids and offers.
 - In case where there are multiple combinations of bids (or offers) possible that will result in a maximum fill in the auction and not all of them can be used to match the corresponding offers (or bids), priorities are assigned to break ties using the following criteria:
 - Price (higher priced bid or lower priced offer gets higher priority),
 - Size (Higher quantity gets higher priority)
 - Type (all-or-none receives higher priority than partial bids/offers),
 - Time of submission (earlier submissions get higher priority).
 - These bids and offers will then be matched starting with the higher priority submissions to determine fills.

Settlement Examples

Settlement Examples

Auctions settlement price examples

Example 1:

Buyers	Bid Type	Bid price	Credit Quantity Sought	Quantity Purchased
Bid 1	Partial	\$4.00	3000	3,000
Bid 2	Partial	\$2.00	4,000	0
Bid 3	Partial	\$3.75	2,500	1,000
Bid 4	Partial	\$1.00	1,500	0

Sellers	Offer Type	Offer Price	Credit Quantity Offered	Quantity Sold
Offer 1	Partial	\$2.75	4,000	3,000
Offer 2	Partial	\$4.25	2,000	0
Offer 3	Partial	\$2.50	1,000	1,000

Step#1: Determine the maximum quantities that cross or touch (which means that a Bid is more than or equal to the Offer). The Bids/Offeres that cross or touch are highlighted in green.

Settlement Examples

Auctions settlement price examples

- **Step#2:** Using the Bids/Offers that cross or touch, determine the actual fill of the Bids and Offers using the priority criteria established in the rulebook for multiple combinations of Bids (or Offers).
 - **Price** (higher priced bid or lower priced offer gets higher priority),
 - **Size** (higher quantity gets higher priority)
 - **Type** (all-or-none receives higher priority than partial bids/offers),
 - **Time** of Submission (earlier submissions get higher priority).
- In this example, Bid 1 gets filled initially by Offer 3 (1,000) with the remaining demand coming from Offer 1 (2,000). Bid 3 can only be partially filled with the remaining 1,000 credits of Offer 1.
 - **Step#3:** Auction clearing price is the weighted average, rounded to the nearest whole cent, between the lowest bid and highest offer prices that either cross or touch in the auction **that are successful**, with weights of these two last match prices equal to the corresponding bid and offer quantities of the last successful bids and offers.

Settlement: $(\$3.75 \times 1,000 + \$2.75 \times 4,000) / 1,000 + 4,000 = \2.95

Lowest bid price

Lowest bid quantity

Highest offer price

Highest offer price quantity

Clearing Price = \$2.95 per credit

Settlement Examples

Auctions settlement price examples

Example 2:

Buyers	Bid Type	Bid price	Credit Quantity Sought	Quantity Bought
Bid 1	Partial	\$8.00	1,800	1,800
Bid 2	Partial	\$2.50	2,000	0
Bid 3	Partial	\$3.75	500	0

Sellers	Offer Type	Offer Price	Credit Quantity Offered	Quantity Sold
Offer 1	Partial	\$5.00	4,000	0
Offer 2	Partial	\$4.00	2,000	1,800

Step#1: Determine the maximum quantities that cross or touch (which means that a Bid is more than or equal to the Offer). The Bids/Offeres that cross or touch are highlighted in green.

Settlement Examples

- **Step#2:** Using the Bids/Offers that cross or touch, determine the actual fill of the Bids and Offers using the priority criteria established in the rulebook for multiple combinations of Bids (or Offers).
- **Price** (higher priced bid or lower priced offer gets higher priority),
- **Size** (higher quantity gets higher priority)
- **Type** (all-or-none receives higher priority than partial bids/offers),
- **Time** of Submission (earlier submissions get higher priority).
- In this example, Bid 1 gets filled by Offer 2. Because Offer 2 is able to completely fill the quantity for Bid 1, Offer 1 does not get to transact any credits even though its offer price crossed/touched and the offer price is lower than the clearing price as seen in Step#3 below.
- **Step#3:** Auction clearing price is the weighted average, rounded to the nearest whole cent, between the lowest bid and highest offer prices that either cross or touch in the auction **that are successful**, with weights of these two last match prices equal to the corresponding bid and offer quantities of the last successful bids and offers.

Settlement: $(\$8.00 \times 1,800 + \$4.00 \times 1,800) / 1,800 + 1,800 = \6.00

Lowest bid price

Lowest bid quantity

Highest offer price

Highest offer price quantity

Clearing Price = \$6.00 per credit

Settlement Cycle

Settlement Cycle

Post – October 31st Auction

Markit transfers MATCHED certified credits into PENNVEST Settlement Account on Markit Environmental Registry



According to each Seller's delivery schedule:

- Certified credits become verified.
- DEP will provide registration numbers and PENNVEST will deliver in accordance with the Sales/Purchase agreements

Frequently Asked Questions

Frequently Asked Questions

Q: *How much should I offer my credits for?*

A: While PENNVEST and Markit are unable to consult on pricing your credits, results from previous auctions are available on Markit's website:

<https://ihsmarkit.com/products/pennvest.html>

Q: *What is the difference between listing my credits as "ALL/NONE" or "PARTIAL"?*

A: The way you list your credits will determine how they are matched. Credits that are listed as "ALL/NONE" will only be sold or purchased if the entire quantity can be sold or purchased, while credits that are listed as "PARTIAL" will be matched up to the amount that is available.

Q: *How is it that my offer price was lower than the final settlement price but I wasn't successful?*

A: The final settlement price is the weighted average between the lowest bid and the highest offer. Therefore, it's possible your offer, while being below the settlement price, doesn't fit within the range calculated for the quantities matched based on bids submitted.

Useful Reference Information

Markit Counterparty Manager (MCM) and Markit Registry:

- <https://ihsmarkit.com/index.html>
- Click on “LOG IN” box in upper right-hand corner



PENNVEST Nutrient Credit Trading Program:

- For historical auction results, auction timeline, training material, please visit:
<https://ihsmarkit.com/products/pennvest.html>

IHS Markit Environmental Auctions Team:

- environmental.auctions@markit.com
- Telephone: 917-441-6668

Thank you.

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