Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
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POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	**Filing Date**

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 27310

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

☑ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

PIONEER HI-BRED INTERNATIONAL, INC.

☐ Inventor or Joint Inventor (title not required below)
☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)
☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)
☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	Marian T Flattery	Date (Optional)	2 April 2020
Name	MARIAN T. FLATTERY		
Title	ASSISTANT SECRETARY, PIONEER HI-BRED INTERNATIONAL, INC.		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ Total of forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Inari Exhibit 1002
Inari v. Pioneer

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	8572-US-NP
	Application Number	
Title of Invention	MAIZE INBRED 1PFHC43	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	**Given Name**	**Middle Name**	**Family Name**	**Suffix**
	MICHIEL	CB	COETZEE	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	INDIANAPOLIS	**State/Province**	IN	**Country of Residence**	US

Mailing Address of Inventor:

Address 1	7250 NW 62ND AVENUE		
Address 2	PO BOX 552		
City	JOHNSTON	**State/Province**	IA
Postal Code	50131-0552	**Country** i	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	27310
Email Address	Add Email Remove Email

Application Information:

Title of the Invention	MAIZE INBRED 1PFHC43		
Attorney Docket Number	8572-US-NP	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)		**Suggested Figure for Publication (if any)**	

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	8572-US-NP
	Application Number	
Title of Invention	MAIZE INBRED 1PFHC43	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☒ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	27310		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	8572-US-NP
	Application Number	
Title of Invention	MAIZE INBRED 1PFHC43	

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	8572-US-NP
	Application Number	
Title of Invention	MAIZE INBRED 1PFHC43	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	8572-US-NP
	Application Number	
Title of Invention	MAIZE INBRED 1PFHC43	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
● Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	PIONEER HI-BRED INTERNATIONAL, INC.		
Mailing Address Information For Applicant:			
Address 1	7100 NW 62ND AVENUE		
Address 2	PO BOX 1014		
City	JOHNSTON	**State/Province**	IA
Country	US	Postal Code	50131-1014
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	8572-US-NP
	Application Number	
Title of Invention	MAIZE INBRED 1PFHC43	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☒

Organization Name	PIONEER HI-BRED INTERNATIONAL, INC.

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	7100 NW 62ND AVENUE		
Address 2	PO BOX 1014		
City	JOHNSTON	**State/Province**	IA
Country i	US	Postal Code	50131-1014
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/lmfitzpatrick/			Date (YYYY-MM-DD)	2021-07-02
First Name	LYNDA	Last Name	FITZPATRICK	Registration Number	60,901

Additional Signature may be generated within this form by selecting the Add button. Add

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	8572-US-NP
	Application Number	

Title of Invention	MAIZE INBRED 1PFHC43

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

(VIA EFS-WEB)

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	
Filing Date	
First Named Inventor	Coetzee, Michiel CB
Title	MAIZE INBRED 1PFHC43
Art Unit	
Examiner Name	
Attorney Docket Number	8572-US-NP
Confirmation Number	

SIGNATURE of Applicant or Patent Practitioner

Signature	/lmfitzpatrick/	Date (Optional)	
Name	LYNDA M. FITZPATRICK	Registration Number	60,901
Title (if Applicant is a juristic entity)	PATENT PRACTITIONER FOR APPLICANT		
Applicant Name (if Applicant is a juristic entity)	PIONEER HI-BRED INTERNATIONAL, INC.		

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ *Total of ____________ forms are submitted.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	MAIZE INBRED 1PFHC43
First Named Inventor/Applicant Name:	MICHIEL CB COETZEE
Filer:	Lynda M. Fitzpatrick/Brian Smith
Attorney Docket Number:	8572-US-NP

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	320	320
UTILITY SEARCH FEE	1111	1	700	700
UTILITY EXAMINATION FEE	1311	1	800	800
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		1820

Electronic Acknowledgement Receipt

EFS ID:	43103596
Application Number:	17366059
International Application Number:	
Confirmation Number:	1295
Title of Invention:	MAIZE INBRED 1PFHC43
First Named Inventor/Applicant Name:	MICHIEL CB COETZEE
Customer Number:	27310
Filer:	Lynda M. Fitzpatrick/Brian Smith
Filer Authorized By:	Lynda M. Fitzpatrick
Attorney Docket Number:	8572-US-NP
Receipt Date:	02-JUL-2021
Filing Date:	
Time Stamp:	07:14:04
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$1820
RAM confirmation Number	E202172814560174
Deposit Account	161852
Authorized User	Brian Smith

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		20210702_8572-US-NP_1PFHC43_APPLICATION.pdf	503889 e1c4cd5cfdcac112459b8bbf3ec637deecba5c27	yes	66
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Abstract		66	66	
	Claims		63	65	
	Specification		1	62	
Warnings:					
Information:					
2	Oath or Declaration filed	20210702_8572-US-NP_1PFHC43_Exec_Declaration.pdf	106340 4785082992ba409c534da880fc26125920f1a3ce	no	1
Warnings:					
Information:					
3	Power of Attorney	20210702_8572-US-NP_1PFHC43_POA_by_Applicant_PHI.pdf	284419 800461c330038a4e00cb265b2485ea41dd46880d	no	1
Warnings:					
Information:					
4	Application Data Sheet	20210702_8572-US-NP_1PFHC43_ADS.pdf	1255868 48a01d2306c202e4b6db13597e5ccd48d9919f72	no	8
Warnings:					
Information:					
5	Power of Attorney	20210702_8572-US-NP_1PFHC43_POA_Transmittal.pdf	190352 7e2509a64b8d5b1f78e5ef37b3832c98451e6af4	no	1

Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	35102 8255aa20f6cb33a488e42a2ddf98a01319b468c2	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	2375970		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

ABSTRACT

A novel maize variety designated 1PFHC43 and seed, plants and plant parts thereof are provided. Methods for producing a maize plant comprise crossing maize variety 1PFHC43 with another maize plant are provided. Methods for producing a maize plant containing in its genetic material one or more traits introgressed into 1PFHC43 through backcross conversion and/or transformation, and to the maize seed, plant and plant part produced thereby are provided. Hybrid maize seed, plants or plant parts are produced by crossing the variety 1PFHC43 or a locus conversion of 1PFHC43 with another maize variety.

What is claimed is:

1. A seed, plant, plant part, or plant cell of inbred maize variety 1PFHC43, representative seed of the variety having been deposited under NCMA accession number XXXX.

2. The plant part of claim 1, wherein the plant part is an ovule or pollen.

3. An F1 hybrid maize seed produced by crossing the plant or plant part of claim 1 with a different maize plant.

4. An F1 hybrid maize plant or plant part produced by growing the maize seed of claim 3, wherein the plant part comprises at least one cell of the F1 hybrid maize plant.

5. A method for producing a second maize plant, the method comprising applying plant breeding techniques to the F1 plant or plant part of claim 4 to produce the second maize plant.

6. A method for producing a second maize plant or plant part, the method comprising doubling haploid seed generated from a cross of the plant or plant part of claim 4 with an inducer variety, thereby producing the second maize plant or plant part.

7. A method of making a commodity plant product comprising silage, starch, fat, syrup or protein, the method comprising producing the commodity plant product from the maize plant or plant part of claim 4.

8. A method of producing a maize seed derived from the variety 1PFHC43, comprising:
    a) crossing the plant of claim 1 with itself or a second plant to produce progeny seed; and
    b) growing the progeny seed to produce a progeny plant and crossing the progeny plant with itself or a different plant to produce maize seed derived from the variety 1PFHC43.

9. A method for producing nucleic acids, the method comprising isolating nucleic acids from the seed, plant, plant part, or plant cell of claim 1.

10. A converted seed, plant, plant part or plant cell of inbred maize variety 1PFHC43, representative seed of the maize variety 1PFHC43 having been deposited under NCMA accession number XXXX, wherein the converted seed, plant, plant part or

plant cell comprises a locus conversion, and wherein the plant or a plant grown from the converted seed, plant part or plant cell comprises the locus conversion and otherwise comprises the physiological and morphological characteristics of maize variety 1PFHC43 when grown under the same environmental conditions.

11. The converted seed, plant, plant part or plant cell of claim 10, wherein the locus conversion confers a property selected from the group consisting of male sterility, site-specific recombination, abiotic stress tolerance, altered phosphate, altered antioxidants, altered fatty acids, altered essential amino acids, altered carbohydrates, herbicide tolerance, insect resistance and disease resistance.

12. A maize seed produced by crossing the plant or plant part of claim 10 with a different maize plant.

13. A hybrid maize plant or plant part produced by growing the seed of claim 12, wherein the plant part comprises at least one cell of the hybrid maize plant.

14. A method for producing a second maize plant, the method comprising applying plant breeding techniques to the plant or plant part of claim 13 to produce the second maize plant.

15. A method for producing a second maize plant or plant part, the method comprising doubling haploid seed generated from a cross of the plant or plant part of claim 13 with an inducer variety, thereby producing the second maize plant or plant part.

16. A method of making a commodity plant product comprising silage, starch, fat, syrup or protein, the method comprising producing the commodity plant product from the maize plant or plant part of claim 13.

17. A method for producing nucleic acids, the method comprising isolating nucleic acids from the seed, plant, plant part, or plant cell of claim 10.

18. An F1 hybrid seed produced by crossing a plant or plant part of inbred maize variety 1PFHC43, representative seed of the variety having been deposited under NCMA accession number XXXX with a different maize plant, wherein inbred maize variety 1PFHC43 further comprises a transgene that is inherited by the seed,

wherein the transgene was introduced into inbred maize variety 1PFHC43 by backcrossing or genetic transformation.

19. A method of producing progeny seed, the method comprising crossing a plant grown from the seed of claim 18 with itself or a second plant to produce progeny seed.

20. A method of making a commodity plant product comprising silage, starch, fat, syrup or protein, the method comprising producing the commodity plant product from the maize plant or plant part of claim 18.

MAIZE INBRED 1PFHC43

BACKGROUND

[001] There are numerous steps in the development of any novel, desirable maize variety. Plant breeding begins with the analysis and definition of problems and weaknesses of the current germplasm, the establishment of program goals, and the definition of specific breeding objectives. The next step is selection of germplasm that possess the traits to meet the program goals. The breeder's goal is to combine in a single variety or hybrid, various desirable traits. For field crops, these traits may include resistance to diseases and insects, resistance to heat and drought, reducing the time to crop maturity, greater yield, altered fatty acid profile, abiotic stress tolerance, improvements in compositional traits, and better agronomic characteristics and quality.

[002] These product development processes, which lead to the final step of marketing and distribution, can take from six to twelve years from the time the first cross is made until the finished seed is delivered to the farmer for planting. Therefore, development of new varieties and hybrids is a time-consuming process. A continuing goal of maize breeders is to develop stable, high yielding maize varieties and hybrids that are agronomically sound with maximal yield over one or more different conditions and environments.

SUMMARY

[003] Provided is a novel maize, *Zea mays L.*, variety, designated 1PFHC43 and processes for making 1PFHC43. Seed of maize variety 1PFHC43, plants of maize variety 1PFHC43, plant parts and cells of maize variety 1PFHC43, and to processes for making a maize plant that comprise crossing maize variety 1PFHC43 with another maize plant are provided. Also provided are maize plants having all the physiological and morphological characteristics of the inbred maize variety 1PFHC43.

[004] Processes are provided for making a maize plant containing in its genetic material one or more traits introgressed into 1PFHC43 through one or more of backcross conversion, genetic manipulation and transformation, and to the maize seed,

plant and plant parts produced thereby. Hybrid maize seed, plants or plant parts produced by crossing the variety 1PFHC43 or a locus conversion of 1PFHC43 with another maize variety are also provided.

[005] The inbred maize plant may further comprise a cytoplasmic or nuclear factor capable of conferring male sterility or otherwise preventing self-pollination, such as by self-incompatibility. Parts of the maize plant described herein are also provided, for example, pollen obtained from an inbred plant and an ovule of the inbred plant.

[006] Seed of the inbred maize variety 1PFHC43 is provided. The inbred maize seed may be an essentially homogeneous population of inbred maize seed of the variety designated 1PFHC43. Essentially homogeneous populations of inbred seed are generally free from substantial numbers of other seed. Therefore, inbred seed generally forms at least about 97% of the total seed. The population of inbred maize seed may be particularly defined as being essentially free from hybrid seed. The inbred seed population may be separately grown to provide an essentially homogeneous population of inbred maize plants designated 1PFHC43.

[007] Compositions are provided comprising a seed of maize variety 1PFHC43 comprised in plant seed growth media. In certain embodiments, the plant seed growth media is a soil or synthetic cultivation medium. In specific embodiments, the growth medium may be comprised in a container or may, for example, be soil in a field.

[008] Maize variety 1PFHC43 comprising an added heritable trait is provided. The heritable trait may comprise a genetic locus that is a dominant or recessive allele. In certain embodiments, a plant of maize variety 1PFHC43 comprising a single locus conversion is provided. The locus conversion may be one which confers one or more traits such as, for example, male sterility, herbicide tolerance, insect resistance, disease resistance (including, for example) bacterial, fungal, nematode or viral disease, waxy starch, modified fatty acid metabolism, modified phytic acid metabolism, modified carbohydrate metabolism and modified protein metabolism is provided. The trait may be, for example, conferred by a naturally occurring maize gene introduced into the genome of the variety by backcrossing, a natural or induced mutation, or a transgene introduced through genetic transformation techniques. When introduced through

transformation, a genetic locus may comprise one or more transgenes integrated at a single chromosomal location.

[009] An inbred maize plant of the variety designated 1PFHC43 is provided, wherein a cytoplasmically-inherited trait has been introduced into the inbred plant. Such cytoplasmically-inherited traits are passed to progeny through the female parent in a particular cross. An exemplary cytoplasmically-inherited trait is the male sterility trait. Cytoplasmic-male sterility (CMS) is a pollen abortion phenomenon determined by the interaction between the genes in the cytoplasm and the nucleus. Alteration in the mitochondrial genome and the lack of restorer genes in the nucleus will lead to pollen abortion. With either a normal cytoplasm or the presence of restorer gene(s) in the nucleus, the plant will produce pollen normally. A CMS plant can be pollinated by a maintainer version of the same variety, which has a normal cytoplasm but lacks the restorer gene(s) in the nucleus and continues to be male sterile in the next generation. The male fertility of a CMS plant can be restored by a restorer version of the same variety, which has the restorer gene(s) in the nucleus. With the restorer gene(s) in the nucleus, the offspring of the male-sterile plant can produce normal pollen grains and propagate. A cytoplasmically inherited trait may be a naturally occurring maize trait or a trait introduced through genetic transformation techniques.

[010] A tissue culture of regenerable cells of a plant of variety 1PFHC43 is provided. The tissue culture can be capable of regenerating plants capable of expressing all of the physiological and morphological or phenotypic characteristics of the variety, and of regenerating plants having substantially the same genotype as other plants of the variety. Examples of some of the physiological and morphological characteristics that may be assessed include characteristics related to yield, maturity, and kernel quality. The regenerable cells in such tissue cultures can be derived, for example, from embryos, meristematic cells, immature tassels, microspores, pollen, leaves, anthers, roots, root tips, silk, flowers, kernels, ears, cobs, husks, or stalks, or from callus or protoplasts derived from those tissues. Maize plants regenerated from the tissue cultures, and plants having all the physiological and morphological characteristics of variety 1PFHC43 are also provided.

[011] Processes are provided for producing maize seeds or plants, which processes generally comprise crossing a first parent maize plant as a male or female parent with a second parent maize plant, wherein at least one of the first or second parent maize plants is a plant of the variety designated 1PFHC43. These processes may be further exemplified as processes for preparing hybrid maize seed or plants, wherein a first inbred maize plant is crossed with a second maize plant of a different, distinct variety to provide a hybrid that has, as one of its parents, the inbred maize plant variety 1PFHC43. In these processes, crossing will result in the production of seed. The seed production occurs regardless of whether the seed is collected or not.

[012] In some embodiments, the first step in "crossing" comprises planting, such as in pollinating proximity, seeds of a first and second parent maize plant, and preferably, seeds of a first inbred maize plant and a second, distinct inbred maize plant. Where the plants are not in pollinating proximity, pollination can be achieved by transferring a pollen or tassel bag from one plant to the other as described below.

[013] A second step comprises cultivating or growing the seeds of said first and second parent maize plants into plants that bear flowers -male flowers (tassels) and female flowers (silks).

[014] A third step comprises preventing self-pollination of the plants, i.e., preventing the silks of a plant from being fertilized by any plant of the same variety, including the same plant. This can be done by emasculating the male flowers of the first or second parent maize plant, (i.e., treating or manipulating the tassels so as to prevent pollen production, to produce an emasculated parent maize plant). Self-incompatibility systems may also be used in some hybrid crops for the same purpose. Self-incompatible plants still shed viable pollen and can pollinate plants of other varieties but are incapable of pollinating themselves or other plants of the same variety.

[015] A fourth step may comprise allowing cross-pollination to occur between the first and second parent maize plants. When the plants are not in pollinating proximity, this is done by placing a bag, usually paper or glassine, over the tassels of the first plant and another bag over the silks of the incipient ear on the second plant. The bags are left in place for at least 24 hours. Since pollen is viable for less than 24 hours, this assures that the silks are not pollinated from other pollen sources, that any stray pollen on the

tassels of the first plant is dead, and that the only pollen transferred comes from the first plant. The pollen bag over the tassel of the first plant is then shaken vigorously to enhance release of pollen from the tassels, and the shoot bag is removed from the silks of the incipient ear on the second plant. Finally, the pollen bag is removed from the tassel of the first plant and is placed over the silks of the incipient ear of the second plant, shaken again and left in place. Yet another step comprises harvesting the seeds from at least one of the parent maize plants. The harvested seed can be grown to produce a maize plant or hybrid maize plant.

[016] Also provided are maize seed and plants produced by a process that comprises crossing a first parent maize plant with a second parent maize plant, wherein at least one of the first or second parent maize plants is a plant of the variety designated 1PFHC43. In one embodiment, maize seed and plants produced by the process are first generation (F1) hybrid maize seed and plants produced by crossing an inbred with another, distinct plant such as another inbred. Seed of an F1 hybrid maize plant and an F1 hybrid maize plant and seed thereof are provided.

[017] The genetic complement of the maize plant variety designated 1PFHC43 is provided. The phrase "genetic complement" is used to refer to the aggregate of nucleotide sequences, the expression of which sequences defines the phenotype of, in the present case, a maize plant, or a cell or tissue of that plant. A genetic complement thus represents the genetic make-up of an inbred cell, tissue or plant, and a hybrid genetic complement represents the genetic make-up of a hybrid cell, tissue or plant. Maize plant cells that have a genetic complement in accordance with the inbred maize plant cells disclosed herein, and plants, seeds and diploid plants containing such cells are provided.

[018] Plant genetic complements may be assessed by genetic marker profiles, and by the expression of phenotypic traits that are characteristic of the expression of the genetic complement, e.g., isozyme typing profiles. It is understood that variety 1PFHC43 could be identified by any of the many well-known techniques used for genetic profiling disclosed herein.

[019] In another aspect, hybrid genetic complements are provided, as represented by maize plant cells, tissues, plants, and seeds, formed by the combination of a haploid

genetic complement of an inbred maize plant disclosed herein with a haploid genetic complement of a second maize plant, such as, another, distinct inbred maize plant. In another aspect, a maize plant regenerated from a tissue culture that comprises a hybrid genetic complement of the inbred maize plant disclosed herein.

[020] Methods of producing an inbred maize plant derived from the maize variety 1PFHC43 are provided, the method comprising the steps of: (a) preparing a progeny plant derived from maize variety 1PFHC43, wherein said preparing comprises crossing a plant of the maize variety 1PFHC43 with a second maize plant; (b) crossing the progeny plant with itself or a second plant to produce a seed of a progeny plant of a subsequent generation; (c) repeating steps (a) and (b) with sufficient inbreeding until a seed of an inbred maize plant derived from the variety 1PFHC43 is produced. In the method, it may be desirable to select particular plants resulting from step (c) for continued crossing according to steps (b) and (c). By selecting plants having one or more desirable traits, an inbred maize plant derived from the maize variety 1PFHC43 is obtained which possesses some of the desirable traits of maize variety 1PFHC43 as well as potentially other selected traits.

DETAILED DESCRIPTION

[021] A new and distinctive maize inbred variety designated 1PFHC43, which has been the result of years of careful breeding and selection in a comprehensive maize breeding program is provided.

[022] Definitions

[023] Maize (*Zea mays*) can be referred to as maize or corn. Certain definitions used in the specification are provided below. In order to provide a clear and consistent understanding of the specification and claims, including the scope to be given such terms, the following definitions are provided. NOTE: ABS is in absolute terms and %MN is percent of the mean for the experiments in which the inbred or hybrid was grown. PCT designates that the trait is calculated as a percentage. %NOT designates the percentage of plants that did not exhibit a trait. For example, STKLDG %NOT is the percentage of plants in a plot that were not stalk lodged. These designators will follow the descriptors to denote how the values are to be interpreted.

[024] ABIOTIC STRESS TOLERANCE: resistance to non-biological sources of stress conferred by traits such as nitrogen utilization efficiency, altered nitrogen responsiveness, drought resistance, cold, and salt resistance

[025] ABTSTK = ARTIFICIAL BRITTLE STALK: A count of the number of "snapped" plants per plot following machine snapping. A snapped plant has its stalk completely snapped at a node between the base of the plant and the node above the ear. Expressed as percent of plants that did not snap.

[026] ALLELE: Any of one or more alternative forms of a genetic sequence. In a diploid cell or organism, the two alleles of a given sequence typically occupy corresponding loci on a pair of homologous chromosomes.

[027] ANTHESIS: The time of a flower's opening.

[028] ANTIOXIDANT: A chemical compound or substance that inhibits oxidation, including but not limited to tocopherol or tocotrienols.

[029] ANT ROT = ANTHRACNOSE STALK ROT (*Colletotrichum graminicola*): A 1 to 9 visual rating indicating the resistance to Anthracnose Stalk Rot. A higher score indicates a higher resistance. Data are collected only when sufficient selection pressure exists.

[030] BACKCROSSING: Process in which a breeder crosses a hybrid progeny variety back to one of the parental genotypes one or more times.

[031] BACKCROSS PROGENY: Progeny plants produced by crossing one maize line (recurrent parent) with plants of another maize line (donor) that comprise a desired trait or locus, selecting progeny plants that comprise the desired trait or locus, and crossing them with the recurrent parent one or more times to produce backcross progeny plants that comprise said trait or locus.

[032] BARPLT = BARREN PLANTS: The percent of plants per plot that were not barren (lack ears).

[033] BORBMN = ARTIFICIAL BRITTLE STALK MEAN: The mean percent of plants not "snapped" in a plot following artificial selection pressure. A snapped plant has its stalk completely snapped at a node between the base of the plant and the node above the ear. Expressed as percent of plants that did not snap. A higher number indicates better tolerance to brittle snapping.

[034] BREEDING CROSS: A cross to introduce new genetic material into a plant for the development of a new variety. For example, one could cross plant A with plant B, wherein plant B would be genetically different from plant A. After the breeding cross, the resulting F1 plants could then be selfed or sibbed for one, two, three or more times (F1, F2, F3, etc.) until a new inbred variety is developed.

[035] CELL: Cell as used herein includes a plant cell, whether isolated, in tissue culture or incorporated in a plant or plant part.

[036] CLDTST = COLD TEST: The percent of plants that germinate under cold test conditions.

[037] CLN = CORN LETHAL NECROSIS: Synergistic interaction of maize chlorotic mottle virus (MCMV) in combination with either maize dwarf mosaic virus (MDMV-A or MDMV-B) or wheat streak mosaic virus (WSMV). A 1 to 9 visual rating indicating the resistance to Corn Lethal Necrosis. A higher score indicates a higher resistance. Data are collected only when sufficient selection pressure exists.

[038] CMSMT = COMMON SMUT: This is the percentage of plants not infected with Common Smut. Data are collected only when sufficient selection pressure exists.

[039] COMRST = COMMON RUST (*Puccinia sorghi*): A 1 to 9 visual rating indicating the resistance to Common Rust. A higher score indicates a higher resistance. Data are collected only when sufficient selection pressure exists.

[040] CROSS POLLINATION: Fertilization by the union of two gametes from different plants.

[041] CROSSING: The combination of genetic material by traditional methods such as a breeding cross or backcross, but also including protoplast fusion and other molecular biology methods of combining genetic material from two sources.

[042] D/D = DRYDOWN: This represents the relative rate at which a hybrid will reach acceptable harvest moisture compared to other hybrids on a 1 to 9 rating scale. A high score indicates a hybrid that dries relatively fast while a low score indicates a hybrid that dries slowly.

[043] DIPERS = DIPLODIA EAR MOLD SCORES (*Diplodia maydis and Diplodia macrospora*): A 1 to 9 visual rating indicating the resistance to Diplodia Ear Mold. A

higher score indicates a higher resistance. Data are collected only when sufficient selection pressure exists.

[044] DIPLOID PLANT PART: Refers to a plant part or cell that has a same diploid genotype.

[045] DIPROT = DIPLODIA STALK ROT SCORE: Score of stalk rot severity due to Diplodia (*Diplodia maydis*). Expressed as a 1 to 9 score with 9 being highly resistant. Data are collected only when sufficient selection pressure exists.

[046] D/T = DROUGHT TOLERANCE: This represents a 1 to 9 rating for drought tolerance, and is based on data obtained under stress conditions. A high score indicates good drought tolerance and a low score indicates poor drought tolerance. Data are collected only when sufficient selection pressure exists.

[047] EARMLD = GENERAL EAR MOLD: Visual rating (1 to 9 score) where a 1 is very susceptible and a 9 is very resistant. This is based on overall rating for ear mold of mature ears without determining the specific mold organism and may not be predictive for a specific ear mold. Data are collected only when sufficient selection pressure exists.

[048] EARHT = EDEARHT = EAR HEIGHT: The ear height is a measure from the ground to the highest placed developed ear node attachment and is measured in inches (EARHT) or cm (EDEARHT).

[049] EARSZ = EAR SIZE: A 1 to 9 visual rating of ear size. The higher the rating the larger the ear size.

[050] EDANTCOLs = ANTHER COLOR: Rated on a 1 to 7 scale where 1 is green, 2 is yellow, 3 is pink, 5 is red, and 7 is purple.

[051] EDANTANTS = ANTHER ANTHOCYANIN COLOR INTENSITY: A measure of anther anthocyanin color intensity rated on a 1 to 9 scale where 1 is absent or very weak, 3 is weak, 5 is medium, 7 is strong, and 9 is very strong. Observed in the middle third of the main branch on fresh anthers.

[052] EDBARANTS = GLUME ANTHOCYANIN COLORATION AT BASE (WHOLE PLANT, EAR INSERTION LEVEL): A measure of the color intensity at the base of the glume, rated on a 1 to 9 scale where 1 is absent or very weak, 3 is weak, 5 is medium,

7 is strong, and 9 is very strong. Observed in the middle third of the main branch of the tassel.

[053] EDBARCOLs = BAR GLUME COLOR INTENSITY: A measure of the bar glume color intensity. Bar glume is a dark purple band that may occur on the bottom of a glume. Bar glume color intensity is measured on a scale of 1 to 7 where 1 is absent, 2 is weak, 3 is medium, 5 is strong, and 7 is very strong.

[054] EDBRROANTs = BRACE ROOTS ANTHOCYANIN COLORATION: A measure of the color intensity of the brace roots rated on a 1 to 9 scale where 1 is absent or very weak, 3 is weak, 5 is medium, 7 is strong, and 9 is very strong. Observed when well developed and fresh brace roots are present on 50% of plants.

[055] EDCOBAINTs = COB GLUME ANTHOCYANIN COLOR INTENSITY: Rated on a 1 to 9 scale where 1 is absent or very weak, 3 is weak, 5 is medium, 7 is strong, and 9 is very strong. Anthocyanin coloration should be observed on the middle third of the uppermost cob, after the removal of some of the grains.

[056] EDCOBCOLs = COB COLOR: A measure of the intensity of pink or salmon coloration of the cob, rated on a 1 to 9 scale where 1 is absent or white, 2 is light pink, 3 is pink, 4 is medium red, 5 is red, 6 is medium red, 7 is dark red, 8 is dark to very dark red, and 9 is present.

[057] EDCOBDIA = COB DIAMETER: Measured in mm.

[058] EDCOBICAs = COB ANTHOCYANIN COLOR INTENSITY: A measure of the intensity of pink or salmon coloration of the cob, rated on a 1 to 9 scale where 1 is very weak, 3 is weak, 5 is medium, 7 is strong, and 9 is very strong.

[059] EDEARDIA = EAR DIAMETER: Measured in mm.

[060] EDEARHULs = EAR HUSK LENGTH: A measure of ear husk length rated on a 1 to 9 scale where 1 is very short, 3 is short, 5 is medium, 7 is long, and 9 is very long.

[061] EDEARLNG = EAR LENGTH: Measured in mm.

[062] EDEARROW = NUMBER OF ROWS OF GRAIN ON EAR.

[063] EDEARSHAs = EAR SHAPE (TAPER): Rated on a 1 to 3 scale where 1 is conical, 2 is conico-cylindrical, and 3 is cylindrical.

[064] EDEARSHLs = EAR SHANK LENGTH SCALE: A measure of the length of the ear shank or peduncle, rated on a 1 to 9 scale where 1 is very short, 3 is short, 5 is medium, 7 is long, 9 is very long.

[065] EDFILEANs = SHEATH ANTHOCYANIN COLOR INTENSITY AT FIRST LEAF STAGE: A measure of the anthocyanin color intensity of the sheath of the first leaf, rated on a 1 to 9 scale where 1 is absent or very weak, 3 is weak, 5 is medium, 7 is strong, and 9 is very strong.

[066] EDFILECOs = FOLIAGE INTENSITY OF GREEN COLOR: A measure of the green coloration intensity in the leaves, rated on a 1 to 3 scale where 1 is light, 2 is medium, and 3 is dark.

[067] EDFILESHs = LEAF TIP SHAPE: An indication of the shape of the apex of the first leaf, rated on a 1 to 5 scale where 1 is pointed, 2 is pointed to rounded, 3 is rounded, 4 is rounded to spatulate, and 5 is spatulate.

[068] EDGLUANTs = GLUME ANTHOCYANIN COLOR EXCLUDING BASE: A measure of the color intensity of the glume excluding the base, rated on a 1 to 9 scale where 1 is absent or very weak, 3 is weak, 5 is medium, 7 is strong, and 9 is very strong. Observed in the middle third of the main branch of the tassel.

[069] EDGLUCOLs = GLUME COLOR: Rated on a 1 to 7 scale where 1 is green, 2 is yellow, 3 is pink, 5 is red, and 7 is purple.

[070] EDKERDOCs = DORSAL SIDE OF GRAIN COLOR: Rated on a 1 to 10 scale where 1 is white, 2 is yellowish white, 3 is yellow, 4 is yellow orange, 5 is orange, 6 is red orange, 7 is red, 8 is purple, 9 is brownish, and 10 is blue black. Observed in the middle third of the uppermost ear when well developed.

[071] EDKERSHAs = KERNEL SHAPE: Rated on a 1 to 3 scale where 1 is round, 2 is kidney-shaped, and 3 is cuneiform.

[072] EDKERTCOs = TOP OF GRAIN COLOR: Rated on a 1 to 10 scale where 1 is white, 2 is yellowish white, 3 is yellow, 4 is yellow orange, 5 is orange, 6 is red orange, 7 is red, 8 is purple, 9 is brownish, and 10 is blue black. Observed in the middle third of the uppermost ear when well developed.

[073] EDLEAANGs = LEAF ANGLE BETWEEN BLADE AND STEM: A measure of the angle formed between stem and leaf, rated on a 1 to 9 scale where 1 is very small (< 5

degrees), 3 is small (6 to 37 degrees), 5 is medium (38 to 62 degrees), 7 is large (63 to 90 degrees), and 9 is very large (> 90 degrees). Observed on the leaf just above the upper ear.

[074] EDLEAATTs = LEAF ATTITUDE OF ENTIRE PLANT: A measure of leaf curvature or attitude, rated on a 1 to 9 scale where 1 is absent or very slightly recurved, 3 is slightly recurved, 5 is moderately recurved, 7 is strongly recurved, and 9 is very strongly recurved. Observed on the leaf just above the upper ear.

[075] EDLEALNGs = LEAF LENGTH SCORE: A measure of leaf length rated on a 1 to 9 scale where 1 indicates < 0.70 m, 3 indicates 0.70 m to 0.80 m, 5 indicates 0.80 m to 0.90 m, 7 indicates 0.90 m to 1 m, and 9 indicates > 1.00 m.

[076] EDLEAWID = LEAF WIDTH OF BLADE: A measure of the average leaf width in cm.

[077] EDLELIANTs = LEAF LIMB ANTHOCYANIN COLOR INTENSITY OF ENTIRE PLANT: A measure of the leaf limb anthocyanin coloration, rated on a 1 to 9 scale with 1 being absent or very weak, 3 being weak, 5 being medium, 7 being strong, and 9 being very strong.

[078] EDNODANTS = NODES ANTHOCYANIN COLOR INTENSITY: A measure of the anthocyanin coloration of nodes, rated on a 1 to 9 scale where 1 is absent or very weak, 3 is weak, 5 is medium, 7 is strong, and 9 is very strong.

[079] EDRATIOEP = RATIO HEIGHT OF INSERTION OF PEDUNCLE OF UPPER EAR TO PLANT LENGTH.

[080] EDSHEAHAs = LEAF SHEATH HAIRNESS SCALE: Rated on a 1 to 6 scale where 1 indicates none and 6 indicates fuzzy.

[081] EDSHEAANTs = SHEATH ANTHOCYANIN COLOR INTENSITY: Rated on a 1 to 9 scale where 1 is absent or very weak, 3 is weak, 5 is medium, 7 is strong, and 9 is very strong.

[082] EDSLKAINTs = SILK ANTHOCYANIN COLOR INTENSITY: A measure of the color intensity of the silks, rated on a 1 to 9 scale where 1 is absent or very weak, 3 is weak, 5 is medium, 7 is strong, and 9 is very strong.

[083] EDSTLANTs = INTERNODE ANTHOCYANIN COLOR INTENSITY: A measure of anthocyanin coloration of nodes, rated on a 1 to 9 scale where 1 is absent or very

weak, 3 is weak, 5 is medium, 7 is strong, and 9 is very strong. Observed just above the insertion point of the peduncle of the upper ear.

[084] EDTA1RYATs = TASSEL LATERAL BRANCH CURVATURE: Rated on a 1 to 9 scale where 1 indicates absent or very slightly recurved (< 5 degrees), 3 indicates slightly recurved (6 to 37 degrees), 5 indicates moderately recurved (38 to 62 degrees), 7 indicates strongly recurved (63 to 90 degrees), and 9 indicates very strongly recurved (> 90 degrees). Observed on the second branch from the bottom of the tassel.

[085] EDTA1RYBRs = NUMBER OF PRIMARY LATERAL TASSEL BRANCHES: Rated on a 1 to 9 scale where 1 indicates absent or very few (< 4 branches), 3 indicates few (4 to 10), 5 indicates medium (11 to 15), 7 indicates many (16 to 20), and 9 indicates very many (> 20).

[086] EDTASAHB = LENGTH OF MAIN AXIS ABOVE HIGHEST LATERAL BRANCH: Length of the tassel's main axis above the highest lateral branch in cm.

[087] EDTASANGs = TASSEL ANGLE BETWEEN MAIN AXIS AND LATERAL BRANCHES: Rated on a 1 to 9 scale where 1 is very small (< 5 degrees), 3 is small (6 to 37 degrees), 5 is medium (38 to 62 degrees), 7 is large (63 to 90 degrees), and 9 is very large (> 90 degrees). Observed on second branch from bottom of tassel.

[088] EDTASEBRs = SECONDARY TASSEL BRANCHES (NUMBER): The number of secondary tassel branches, rated on a 1 to 7 scale where 1 indicates 0 to 3 branches, 2 indicates 4 to 10, 3 indicates 11 to15, 5 indicates 16 to 20, and 7 indicates > 20.

[089] EDTASLPBRs = PRIMARY TASSEL BRANCH LENGTH: A measure of the length of the primary or lateral tassel branch, rated on a 1 to 9 scale where 1 is very short, 3 is short, 5 is medium, 7 is long, 9 is very long. Observed on the second branch from the bottom of the tassel.

[090] EDTASULB = LENGTH OF MAIN AXIS ABOVE LOWEST LATERAL BRANCH: The length of the tassel's main axis above the lowest lateral branch in cm.

[091] EDZIGZAGs = DEGREE OF STEM ZIG-ZAG: Rated on a scale of 1 to 3 where 1 is absent or very slight, 2 is slight, and 3 is strong.

[092] EGRWTH = EARLY GROWTH: This is a measure of the relative height and size of a corn seedling at the 2-4 leaf stage of growth. This is a visual rating (1 to 9), with 1 being weak or slow growth, 5 being average growth and 9 being strong growth. Taller

plants, wider leaves, more green mass and darker color constitute higher score. Data are collected only when sufficient selection pressure exists.

[093] ERTLPN = EARLY ROOT LODGING: An estimate of the percentage of plants that do not root lodge prior to or around anthesis; plants that lean from the vertical axis at an approximately 30° angle or greater would be considered as root lodged. Data are collected only when sufficient selection pressure exists.

[094] ERTLSC = EARLY ROOT LODGING SCORE: Score for severity of plants that lean from a vertical axis at an approximate 30° angle or greater which typically results from strong winds prior to or around flowering recorded within 2 weeks of a wind event. Expressed as a 1 to 9 score with 9 being no lodging. Data are collected only when sufficient selection pressure exists.

[095] ESTCNT = EARLY STAND COUNT: This is a measure of the stand establishment in the spring and represents the number of plants that emerge on per plot basis for the inbred or hybrid.

[096] EYESPT = EYE SPOT (*Kabatiella zeae or Aureobasidium zeae*): A 1 to 9 visual rating indicating the resistance to Eye Spot. A higher score indicates a higher resistance. Data are collected only when sufficient selection pressure exists.

[097] F1 PROGENY: A progeny plant produced by crossing a plant of one maize line with a plant of another maize line.

[098] FUSERS = FUSARIUM EAR ROT SCORE (*Fusarium moniliforme or Fusarium subglutinans*): A 1 to 9 visual rating indicating the resistance to Fusarium Ear Rot. A higher score indicates a higher resistance. Data are collected only when sufficient selection pressure exists.

[099] GDU = GROWING DEGREE UNITS: Using the Barger Heat Unit Theory, which assumes that maize growth occurs in the temperature range 50°F – 86°F and that temperatures outside this range slow down growth; the maximum daily heat unit accumulation is 36 and the minimum daily heat unit accumulation is 0. The seasonal accumulation of GDU is a major factor in determining maturity zones.

[100] GDUSHD = EDDAYSH = GDU TO SHED: The number of growing degree units (GDUs) or heat units required for an inbred variety or hybrid to have approximately 50 percent of the plants shedding pollen and is measured from the time of planting.

Growing degree units are calculated by the Barger Method, where the heat units for a 24-hour period are:

$$GDU = \frac{(\text{Max. temp.} + \text{Min. temp.})}{2} - 50$$

[101] The units determined by the Barger Method are then divided by 10. The highest maximum temperature used is 86°F and the lowest minimum temperature used is 50°F. For each inbred or hybrid, it takes a certain number of GDUs to reach various stages of plant development.

[102] GDUSLK = EDDAYSLK = GDU TO SILK: The number of growing degree units required for an inbred variety or hybrid to have approximately 50 percent of the plants with silk emergence from time of planting. Growing degree units are calculated by the Barger Method as given in GDUSHD definition and then divided by 10.

[103] GIBERS = GIBBERELLA EAR ROT (PINK MOLD) (*Gibberella zeae*): A 1 to 9 visual rating indicating the resistance to Gibberella Ear Rot. A higher score indicates a higher resistance. Data are collected only when sufficient selection pressure exists.

[104] GIBROT = GIBBERELLA STALK ROT SCORE: Score of stalk rot severity due to Gibberella (*Gibberella zeae).* Expressed as a 1 to 9 score with 9 being highly resistant. Data are collected only when sufficient selection pressure exists.

[105] GLFSPT = GRAY LEAF SPOT (*Cercospora zeae-maydis*): A 1 to 9 visual rating indicating the resistance to Gray Leaf Spot. A higher score indicates a higher resistance. Data are collected only when sufficient selection pressure exists.

[106] GOSWLT = GOSS' WILT (*Corynebacterium nebraskense*): A 1 to 9 visual rating indicating the resistance to Goss' Wilt. A higher score indicates a higher resistance. Data are collected only when sufficient selection pressure exists.

[107] GRAIN TEXTURE: A visual rating used to indicate the appearance of mature grain observed in the middle third of the uppermost ear when well developed. Grain or seed with a hard grain texture is indicated as flint; grain or seed with a soft grain texture is indicted as dent. Medium grain or seed texture may be indicated as flint-dent or intermediate. Other grain textures include flint-like, dent-like, sweet, pop, waxy and flour.

[108] GRNAPP = GRAIN APPEARANCE: This is a 1 to 9 rating for the general appearance of the shelled grain as it is harvested based on such factors as the color of harvested grain, any mold on the grain, and any cracked grain. Higher scores indicate better grain visual quality.

[109] HAPLOID PLANT PART: A plant part or cell having a haploid genotype.

[110] HCBLT = HELMINTHOSPORIUM CARBONUM LEAF BLIGHT (*Helminthosporium carbonum*): A 1 to 9 visual rating indicating the resistance to Helminthosporium infection. A higher score indicates a higher resistance. Data are collected only when sufficient selection pressure exists.

[111] HD SMT = HEAD SMUT (*Sphacelotheca reiliana*): This indicates the percentage of plants not infected. Data are collected only when sufficient selection pressure exists.

[112] HSKCVR = HUSK COVER: A 1 to 9 score based on performance relative to key checks, with a score of 1 indicating very short husks, tip of ear and kernels showing; 5 is intermediate coverage of the ear under most conditions, sometimes with thin husk; and a 9 has husks extending and closed beyond the tip of the ear. Scoring can best be done near physiological maturity stage or any time during dry down until harvested.

[113] HYBRID VARIETY: A substantially heterozygous hybrid line and minor genetic modifications thereof that retain the overall genetics of the hybrid line.

[114] INBRED: A variety developed through inbreeding or doubled haploidy that preferably comprises homozygous alleles at about 95% or more of its loci. An inbred can be reproduced by selfing or growing in isolation so that the plants can only pollinate with the same inbred variety.

[115] INTROGRESSION: The process of transferring genetic material from one genotype to another.

[116] KERNEL PERICARP COLOR is scored when kernels have dried down and is taken at or about 65 days after 50% silk. Score codes are: Colorless = 1; Red with white crown = 2; Tan = 3; Bronze = 4; Brown = 5; Light red = 6; Cherry red = 7.

[117] KER_WT = KERNEL NUMBER PER UNIT WEIGHT (Pounds or Kilograms): The number of kernels in a specific measured weight; determined after removal of extremely small and large kernels.

[118] LINKAGE: Refers to a phenomenon wherein alleles on the same chromosome tend to segregate together more often than expected by chance if their transmission was independent.

[119] LINKAGE DISEQUILIBRIUM: Refers to a phenomenon wherein alleles tend to remain together in linkage groups when segregating from parents to offspring, with a greater frequency than expected from their individual frequencies.

[120] LOCUS: A specific location on a chromosome.

[121] LOCUS CONVERSION (Also called TRAIT CONVERSION): A locus conversion refers to plants within a variety that have been modified in a manner that retains the overall genetics of the variety and further comprises one or more loci with a specific desired trait, such as male sterility, insect resistance, disease resistance or herbicide tolerance or resistance. Examples of single locus conversions include mutant genes, transgenes and native traits finely mapped to a single locus. One or more locus conversion traits may be introduced into a single corn variety.

[122] L/POP = YIELD AT LOW DENSITY: Yield ability at relatively low plant densities on a 1 to 9 relative system with a higher number indicating the hybrid responds well to low plant densities for yield relative to other hybrids. A 1, 5, and 9 would represent very poor, average, and very good yield response, respectively, to low plant density.

[123] LRTLPN = LATE ROOT LODGING: An estimate of the percentage of plants that do not root lodge after anthesis through harvest; plants that lean from the vertical axis at an approximately 30° angle or greater would be considered as root lodged. Data are collected only when sufficient selection pressure exists.

[124] LRTLSC = LATE ROOT LODGING SCORE: Score for severity of plants that lean from a vertical axis at an approximate 30° angle or greater which typically results from strong winds after flowering. Recorded prior to harvest when a root-lodging event has occurred. This lodging results in plants that are leaned or “lodged” over at the base of the plant and do not straighten or “goose-neck” back to a vertical position. Expressed as a 1 to 9 score with 9 being no lodging. Data are collected only when sufficient selection pressure exists.

[125] MALE STERILITY: A male sterile plant is one which produces no viable pollen no (pollen that is able to fertilize the egg to produce a viable seed). Male sterility

prevents self pollination. These male sterile plants are therefore useful in hybrid plant production.

[126] MDMCPX = MAIZE DWARF MOSAIC COMPLEX (MDMV = Maize Dwarf Mosaic Virus and MCDV = Maize Chlorotic Dwarf Virus): A 1 to 9 visual rating indicating the resistance to Maize Dwarf Mosaic Complex. A higher score indicates a higher resistance. Data are collected only when sufficient selection pressure exists.

[127] MILKLN = percent milk in mature grain.

[128] MST = HARVEST MOISTURE: The moisture is the actual percentage moisture of the grain at harvest.

[129] NEI DISTANCE: A quantitative measure of percent similarity between two varieties. Nei's distance between varieties A and B can be defined as 1 - (2*number alleles in common / (number alleles in A + number alleles in B). For example, if varieties A and B are the same for 95 out of 100 alleles, the Nei distance would be 0.05. If varieties A and B are the same for 98 out of 100 alleles, the Nei distance would be 0.02. Free software for calculating Nei distance is available on the internet at multiple locations. See Nei, Proc Natl Acad Sci, 76:5269-5273 (1979).

[130] NLFBLT = NORTHERN LEAF BLIGHT (*Helminthosporium turcicum* or *Exserohilum turcicum*): A 1 to 9 visual rating indicating the resistance to Northern Leaf Blight. A higher score indicates a higher resistance. Data are collected only when sufficient selection pressure exists.

[131] OILT = GRAIN OIL: Absolute value of oil content of the kernel as predicted by Near-Infrared Transmittance and expressed as a percent of dry matter.

[132] PERCENT IDENTITY: Percent identity as used herein refers to the comparison of the alleles present in two varieties. For example, when comparing two inbred plants to each other, each inbred plant will have the same allele (and therefore be homozygous) at almost all of their loci. Percent identity is determined by comparing a statistically significant number of the homozygous alleles of two varieties. For example, a percent identity of 90% between 1PFHC43 and other variety means that the two varieties have the same homozygous alleles at 90% of their loci.

[133] PLANT: As used herein, the term "plant" includes reference to an immature or mature whole plant, including a plant that has been detasseled or from which seed or

grain has been removed. Seed or embryo that will produce the plant is also considered to be the plant.

[134] PLANT PART: As used herein, the term "plant part" includes leaves, stems, roots, seed, grain, embryo, pollen, ovules, flowers, ears, cobs, husks, stalks, root tips, anthers, pericarp, silk, tissue, cells and the like. In some embodiments, the plant part contains at least one cell of inbred maize variety 1PFHC43 (or a locus conversion thereof) or a hybrid produced from inbred variety 1PFHC43 (or a locus conversion thereof).

[135] PLATFORM indicates the variety with the base genetics and the variety with the base genetics comprising locus conversion(s). There can be a platform for the inbred maize variety and the hybrid maize variety.

[136] PLTHT = EDPLTHWT = PLANT HEIGHT: This is a measure of the height of the plant from the ground to the tip of the tassel in inches (PLTHT) or cm.

[137] POLSC = POLLEN SCORE: A 0 to 9 visual rating indicating the amount of pollen shed. The higher the score the more pollen shed.

[138] RM = RELATIVE MATURITY: This is a predicted relative maturity, based on the harvest moisture of the grain. The relative maturity rating is based on a known set of checks and utilizes standard linear regression analyses and is also referred to as the Comparative Relative Maturity Rating System that is similar to the Minnesota Relative Maturity Rating System.

[139] PROT = GRAIN PROTEIN: Absolute value of protein content of the kernel as predicted by Near-Infrared Transmittance and expressed as a percent of dry matter.

[140] RESISTANCE: Synonymous with tolerance. The ability of a plant to withstand exposure to an insect, disease, herbicide or other condition. A resistant plant variety will have a level of resistance higher than a comparable wild-type variety.

[141] RTLDG = ROOT LODGING: Root lodging is the percentage of plants that do not root lodge; plants that lean from the vertical axis at an approximately 30° angle or greater would be counted as root lodged. Data are collected only when sufficient selection pressure exists.

[142] SEED: Fertilized and ripened ovule, consisting of the plant embryo, stored food material, and a protective outer seed coat. Synonymous with grain.

[143] SELF POLLINATION: A plant is self-pollinated if pollen from one flower is transferred to the same or another flower of the same plant.

[144] SIB POLLINATION: A plant is sib-pollinated when individuals within the same family or variety are used for pollination.

[145] SITE SPECIFIC INTEGRATION: Genes that create a site for site specific DNA integration. This includes the introduction of FRT sites that may be used in the FLP/FRT system and/or Lox sites that may be used in the Cre/Loxp system. For example, see Lyznik, et al., Site-Specific Recombination for Genetic Engineering in Plants, Plant Cell Rep (2003) 21:925-932 and WO 99/25821.

[146] SLFBLT = SOUTHERN LEAF BLIGHT (*Helminthosporium maydis* or *Bipolaris maydis*): A 1 to 9 visual rating indicating the resistance to Southern Leaf Blight. A higher score indicates a higher resistance. Data are collected only when sufficient selection pressure exists.

[147] SNP=SINGLE-NUCLEOTIDE POLYMORPHISM: is a DNA sequence variation occurring when a single nucleotide in the genome differs between individual plant or plant varieties. The differences can be equated with different alleles, and indicate polymorphisms. A number of SNP markers can be used to determine a molecular profile of an individual plant or plant variety and can be used to compare similarities and differences among plants and plant varieties.

[148] SOURST = SOUTHERN RUST (*Puccinia polysora*): A 1 to 9 visual rating indicating the resistance to Southern Rust. A higher score indicates a higher resistance. Data are collected only when sufficient selection pressure exists.

[149] SPKDSC = EDTASAFDs = TASSEL SPIKELET DENSITY SCORE: The visual rating of how dense spikelets are on the middle to middle third of tassel branches. A higher score on a 1-9 scale indicates higher spikelet density (SPKDSC). On a 3 to 7 scale, 3 is moderately lax, 5 is medium, and 7 is moderately dense.

[150] STAGRN = STAY GREEN: Stay green is the measure of plant health near the time of black layer formation (physiological maturity). A high score indicates better late-season plant health.

[151] STKLDS = STALK LODGING SCORE: A plant is considered as stalk lodged if the stalk is broken or crimped between the ear and the ground. This can be caused by

any or a combination of the following: strong winds late in the season, disease pressure within the stalks, ECB damage or genetically weak stalks. This trait should be taken just prior to or at harvest. Expressed on a 1 to 9 scale with 9 being no lodging. Data are collected only when sufficient selection pressure exists.

[152] STLLPN = LATE STALK LODGING: This is the percent of plants that did not stalk lodge (stalk breakage or crimping) at or around late season harvest (when grain moisture is below 20%) as measured by either natural lodging or pushing the stalks and determining the percentage of plants that break or crimp below the ear. Data are collected only when sufficient selection pressure exists.

[153] STLPCN = STALK LODGING REGULAR: This is an estimate of the percentage of plants that did not stalk lodge (stalk breakage) at regular harvest (when grain moisture is between about 20% and 30%) as measured by either natural lodging or pushing the stalks and determining the percentage of plants that break below the ear. Data are collected only when sufficient selection pressure exists.

[154] STWWLT = Stewart's Wilt (*Erwinia stewartii*): A 1 to 9 visual rating indicating the resistance to Stewart's Wilt. A higher score indicates a higher resistance. Data are collected only when sufficient selection pressure exists.

[155] SSRs: Genetic markers based on polymorphisms in repeated nucleotide sequences, such as microsatellites. A marker system based on SSRs can be informative in linkage analysis relative to other marker systems in that multiple alleles may be present.

[156] TASBRN = TASSEL BRANCH NUMBER: The number of tassel branches, with anthers originating from the central spike.

[157] TASSZ = TASSEL SIZE: A 1 to 9 visual rating was used to indicate the relative size of the tassel. A higher rating means a larger tassel.

[158] TAS WT = TASSEL WEIGHT: This is the average weight of a tassel (grams) just prior to pollen shed.

[159] TILLER = TILLERS: A count of the number of tillers per plot that could possibly shed pollen was taken. Data are given as a percentage of tillers: number of tillers per plot divided by number of plants per plot. A tiller is defined as a secondary shoot that has developed as a tassel capable of shedding pollen.

[160] TSTWT = TEST WEIGHT (ADJUSTED): The measure of the weight of grain in pounds for a given volume (bushel), adjusted for MST less than or equal to 22%.

[161] TSTWTN = TEST WEIGHT (UNADJUSTED): The measure of the weight of the grain in pounds for a given volume (bushel).

[162] VARIETY: A maize line and minor genetic modifications thereof that retain the overall genetics of the line including but not limited to a locus conversion, a mutation, or a somoclonal variant.

[163] YIELD BU/A = YIELD (BUSHELS/ACRE): Yield of the grain at harvest by weight or volume (bushels) per unit area (acre) adjusted to 15% moisture.

[164] YLDADV = YIELD ADVANTAGE: The yield advantage of variety #1 over variety #2 as calculated by: YIELD of variety #1 - YIELD variety #2 = YIELD ADVANTAGE of variety #1.

[165] YIELDMST = YIELD/MOISTURE RATIO.

[166] YLDSC = YIELD SCORE: A 1 to 9 visual rating was used to give a relative rating for yield based on plot ear piles. The higher the rating the greater visual yield appearance.

[167] YIELDS = Silage Dry Matter Yield (tons/ acre @ 100%DM)

[168] MLKYLD = Estimated pounds of milk produced per ton of dry matter fed and is based on utilizing nutrient content and fiber digestibility

[169] ADJMLK = Estimated pounds of milk produced per acre of silage dry matter based on an equation and is MLKYLD divided by YIELDS.

[170] SLGPRM = Silage Predicted Relative Maturity

[171] SY30DM = Silage Yield (Tonnage) Adjusted to 30% Dry Matter

[172] PCTMST = Silage Harvest Moisture %

[173] NDFDR = Silage Fiber Digestibility Based on rumen fluid NIRS calibration

[174] NDFDC = Silage Fiber Digestibility Based on rumen fluid NIRS calibration

[175] Phenotypic Characteristics of 1PFHC43

[176] Inbred maize variety 1PFHC43 may be used as a male or female in the production of the first generation F1 hybrid. The variety has shown uniformity and stability within the limits of environmental influence for all the traits as described in the

Variety Description Information (Table 1, found at the end of the section). The variety has been self-pollinated and ear-rowed a sufficient number of generations with careful attention paid to uniformity of plant type to ensure sufficient homozygosity and phenotypic stability for use in commercial hybrid seed production. The variety has been increased both by hand and in isolated fields with continued observation for uniformity. No variant traits have been observed or are expected in 1PFHC43.

[177] Genotypic Characteristics of 1PFHC43

[178] In addition to phenotypic observations, a plant can be identified by its genotype. The genotype of a plant can be characterized through a genetic marker profile.

[179] 1PFHC43 is substantially homozygous. This homozygosity can be characterized at the loci shown in a marker profile. An F1 hybrid made with 1PFHC43 would substantially comprise the marker profile of 1PFHC43. This is because an F1 hybrid is the sum of its inbred parents, e.g., if one inbred parent is homozygous for allele x at a particular locus, and the other inbred parent is homozygous for allele y at that locus, the F1 hybrid will be xy (heterozygous) at that locus. A genetic marker profile can therefore be used to identify hybrids comprising 1PFHC43 as a parent, since such hybrids will comprise two sets of alleles, one set of which will be from 1PFHC43. The determination of the male set of alleles and the female set of alleles may be made by profiling the hybrid and the pericarp of the hybrid seed, which is composed of maternal parent cells. One way to obtain the paternal parent profile is to subtract the pericarp profile from the hybrid profile.

[180] Subsequent generations of progeny produced by selection and breeding are expected to be of genotype xx (homozygous), yy (homozygous), or xy (heterozygous) for these locus positions. When the F1 plant is used to produce an inbred, the resulting inbred should be either x or y for that allele.

[181] Therefore, in accordance with the above, an embodiment is a 1PFHC43 progeny maize plant or plant part that is a first generation (F1) hybrid maize plant comprising two sets of alleles, wherein one set of the alleles is the same as 1PFHC43 at substantially all loci. A maize cell wherein one set of the alleles is the same as 1PFHC43 at

substantially all loci is also provided. This maize cell may be a part of a hybrid seed, plant or plant part produced by crossing 1PFHC43 with another maize plant.

[182] Genetic marker profiles can be obtained by techniques such as Restriction Fragment Length Polymorphisms (RFLPs), Randomly Amplified Polymorphic DNAs (RAPDs), Arbitrarily Primed Polymerase Chain Reaction (AP-PCR), DNA Amplification Fingerprinting (DAF), Sequence Characterized Amplified Regions (SCARs), Amplified Fragment Length Polymorphisms (AFLPs), Simple Sequence Repeats (SSRs) which are also referred to as Microsatellites, and Single Nucleotide Polymorphisms (SNPs).

[183] Particular markers used for these purposes may include any type of marker and marker profile which provides a means of distinguishing varieties. A genetic marker profile can be used, for example, to identify plants of the same variety or related varieties or to determine or validate a pedigree. In addition to being used for identification of maize variety 1PFHC43, a hybrid produced through the use of 1PFHC43, and the identification or verification of pedigree for progeny plants produced through the use of 1PFHC43, a genetic marker profile is also useful in developing a locus conversion of 1PFHC43.

[184] Methods of isolating nucleic acids from maize plants and methods for performing genetic marker profiles using SNP and SSR polymorphisms are well known in the art. SNPs are genetic markers based on a polymorphism in a single nucleotide. A marker system based on SNPs can be highly informative in linkage analysis relative to other marker systems in that multiple alleles may be present.

[185] A method comprising isolating nucleic acids, such as DNA, from a plant, a plant part, plant cell or a seed of the maize plants disclosed herein is provided. The method can include mechanical, electrical and/or chemical disruption of the plant, plant part, plant cell or seed, contacting the disrupted plant, plant part, plant cell or seed with a buffer or solvent, to produce a solution or suspension comprising nucleic acids, optionally contacting the nucleic acids with a precipitating agent to precipitate the nucleic acids, optionally extracting the nucleic acids, and optionally separating the nucleic acids such as by centrifugation or by binding to beads or a column, with subsequent elution, or a combination thereof. If DNA is being isolated, an RNase can be included in one or more of the method steps. The nucleic acids isolated can

comprise all or substantially all of the genomic DNA sequence, all or substantially all of the chromosomal DNA sequence or all or substantially all of the coding sequences (cDNA) of the plant, plant part, or plant cell from which they were isolated. The amount and type of nucleic acids isolated may be sufficient to permit whole genome sequencing of the plant from which they were isolated or chromosomal marker analysis of the plant from which they were isolated.

[186] The methods can be used to produce nucleic acids from the plant, plant part, seed or cell, which nucleic acids can be, for example, analyzed to produce data. The data can be recorded. The nucleic acids from the disrupted cell, the disrupted plant, plant part, plant cell or seed or the nucleic acids following isolation or separation can be contacted with primers and nucleotide bases, and/or a polymerase to facilitate PCR sequencing or marker analysis of the nucleic acids. In some examples, the nucleic acids produced can be sequenced or contacted with markers to produce a genetic profile, a molecular profile, a marker profile, a haplotype, or any combination thereof. In some examples, the genetic profile or nucleotide sequence is recorded on a computer readable medium. In other examples, the methods may further comprise using the nucleic acids produced from plants, plant parts, plant cells or seeds in a plant breeding program, for example in making crosses, selection and/or advancement decisions in a breeding program. Crossing includes any type of plant breeding crossing method, including but not limited to crosses to produce hybrids, outcrossing, selfing, backcrossing, locus conversion, introgression and the like.

[187] Favorable genotypes and or marker profiles, optionally associated with a trait of interest, may be identified by one or more methodologies. In some examples one or more markers are used, including but not limited to AFLPs, RFLPs, ASH, SSRs, SNPs, indels, padlock probes, molecular inversion probes, microarrays, sequencing, and the like. In some methods, a target nucleic acid is amplified prior to hybridization with a probe. In other cases, the target nucleic acid is not amplified prior to hybridization, such as methods using molecular inversion probes (see, for example Hardenbol et al. (2003) Nat Biotech 21:673-678). In some examples, the genotype related to a specific trait is monitored, while in other examples, a genome-wide evaluation including but not limited to one or more of marker panels, library screens, association studies, microarrays, gene

chips, expression studies, or sequencing such as whole-genome resequencing and genotyping-by-sequencing (GBS) may be used. In some examples, no target-specific probe is needed, for example by using sequencing technologies, including but not limited to next-generation sequencing methods (see, for example, Metzker (2010) Nat Rev Genet 11:31-46; and, Egan et al. (2012) Am J Bot 99:175-185) such as sequencing by synthesis (e.g., Roche 454 pyrosequencing, Illumina Genome Analyzer, and Ion Torrent PGM or Proton systems), sequencing by ligation (e.g., SOLiD from Applied Biosystems, and Polnator system from Azco Biotech), and single molecule sequencing (SMS or third-generation sequencing) which eliminate template amplification (e.g., Helicos system, and PacBio RS system from Pacific BioSciences). Further technologies include optical sequencing systems (e.g., Starlight from Life Technologies), and nanopore sequencing (e.g., GridION from Oxford Nanopore Technologies). Each of these may be coupled with one or more enrichment strategies for organellar or nuclear genomes in order to reduce the complexity of the genome under investigation via PCR, hybridization, restriction enzyme and expression methods. In some examples, no reference genome sequence is needed in order to complete the analysis. 1PFHC43 and its plant parts can be identified through a molecular marker profile. Such plant parts may be either diploid or haploid. The plant part includes at least one cell of the plant from which it was obtained, such as a diploid cell, a haploid cell or a somatic cell. Also provided are plants and plant parts substantially benefiting from the use of variety 1PFHC43 in their development, such as variety 1PFHC43 comprising a locus conversion.

[188] Comparing 1PFHC43 to Other Inbreds

[189] A breeder uses various methods to help determine which plants should be selected from segregating populations and ultimately which inbred varieties will be used to develop hybrids for commercialization. In addition to knowledge of the germplasm and plant genetics, a part of the selection process is dependent on experimental design coupled with the use of statistical analysis. Experimental design and statistical analysis are used to help determine which plants, which family of plants, and finally which inbred varieties and hybrid combinations are significantly better or different for one or more

traits of interest. Experimental design methods are used to assess error so that differences between two inbred varieties or two hybrid varieties can be more accurately evaluated. Statistical analysis includes the calculation of mean values, determination of the statistical significance of the sources of variation, and the calculation of the appropriate variance components. Either a five or a one percent significance level is customarily used to determine whether a difference that occurs for a given trait is real or due to the environment or experimental error. One of ordinary skill in the art of plant breeding would know how to evaluate the traits of two plant varieties to determine if there is a significant difference between the two traits expressed by those varieties. For example, see Fehr, Walt, Principles of Cultivar Development, p. 261-286 (1987). Mean trait values may be used to determine whether trait differences are significant. Trait values should preferably be measured on plants grown under the same environmental conditions, and environmental conditions should be appropriate for the traits or traits being evaluated. Sufficient selection pressure should be present for optimum measurement of traits of interest such as herbicide tolerance, insect or disease resistance. A locus conversion of 1PFHC43 for herbicide tolerance should be compared with an isogenic counterpart in the absence of the converted trait. In addition, a locus conversion for insect or disease resistance should be compared to the isogenic counterpart, in the absence of disease pressure or insect pressure.

[190] Development of Maize Hybrids using 1PFHC43

[191] A single cross maize hybrid results from the cross of two inbred varieties, each of which has a genotype that complements the genotype of the other. A hybrid progeny of the first generation is designated F1. In the development of commercial hybrids in a maize plant breeding program, only the F1 hybrid plants are sought. F1 hybrids are more vigorous than their inbred parents. This hybrid vigor, or heterosis, can be manifested in many polygenic traits, including increased vegetative growth and increased yield.

[192] 1PFHC43 may be used to produce hybrid maize. One such embodiment is the method of crossing maize variety 1PFHC43 with another maize plant, such as a different maize variety, to form a first generation F1 hybrid seed. The first generation F1

hybrid seed, plant and plant part produced by this method are provided. The first generation F1 seed, plant and plant part will comprise an essentially complete set of the alleles of variety 1PFHC43. One of ordinary skill in the art can utilize molecular methods to identify a particular F1 hybrid plant produced using variety 1PFHC43. Further, one of ordinary skill in the art may also produce F1 hybrids with transgenic, male sterile and/or locus conversions of variety 1PFHC43.

[193] The development of a maize hybrid in a maize plant breeding program involves three steps: (1) the selection of plants from various germplasm pools for initial breeding crosses; (2) the selfing of the selected plants from the breeding crosses for several generations to produce a series of varieties, such as 1PFHC43, which, although different from each other, breed true and are highly uniform; and (3) crossing the selected varieties with different varieties to produce the hybrids. During the inbreeding process in maize, the vigor of the varieties decreases, and so one would not be likely to use 1PFHC43 directly to produce grain. However, vigor is restored when 1PFHC43 is crossed to a different inbred variety to produce a commercial F1 hybrid. A consequence of the homozygosity and homogeneity of the inbred variety is that the hybrid between a defined pair of inbreds may be reproduced indefinitely as long as the homogeneity of the inbred parents is maintained.

[194] 1PFHC43 may be used to produce a single cross hybrid, a double cross hybrid, or a three-way hybrid. A single cross hybrid is produced when two inbred varieties are crossed to produce the F1 progeny. A double cross hybrid is produced from four inbred varieties crossed in pairs (A x B and C x D) and then the two F1 hybrids are crossed again (A x B) x (C x D). A three-way cross hybrid is produced from three inbred varieties where two of the inbred varieties are crossed (A x B) and then the resulting F1 hybrid is crossed with the third inbred (A x B) x C. In each case, pericarp tissue from the female parent will be a part of and protect the hybrid seed.

[195] Molecular data from 1PFHC43 may be used in a plant breeding process. Nucleic acids may be isolated from a seed of 1PFHC43 or from a plant, plant part, or cell produced by growing a seed of 1PFHC43,or from a seed of 1PFHC43 with a locus conversion, or from a plant, plant part, or cell of 1PFHC43 with a locus conversion. One or more polymorphisms may be isolated from the nucleic acids. A plant having one or

more of the identified polymorphisms may be selected and used in a plant breeding method to produce another plant.

[196] Combining Ability of 1PFHC43

[197] Combining ability of a variety, as well as the performance of the variety per se, is a factor in the selection of improved maize inbreds. Combining ability refers to a variety's contribution as a parent when crossed with other varieties to form hybrids. The hybrids formed for the purpose of selecting superior varieties may be referred to as test crosses, and include comparisons to other hybrid varieties grown in the same environment (same cross, location and time of planting). One way of measuring combining ability is by using values based in part on the overall mean of a number of test crosses weighted by number of experiment and location combinations in which the hybrid combinations occurs. The mean may be adjusted to remove environmental effects and known genetic relationships among the varieties.

[198] General combining ability provides an overall score for the inbred over a large number of test crosses. Specific combining ability provides information on hybrid combinations formed by 1PFHC43 and a specific inbred parent. A variety such as 1PFHC43 which exhibits good general combining ability may be used in a large number of hybrid combinations.

[199] Hybrid comparisons represent specific hybrid crosses with 1PFHC43 and a comparison of these specific hybrids with other hybrids with favorable characteristics. These comparisons illustrate the good specific combining ability of 1PFHC43. A specific hybrid for which 1PFHC43 is a parent is compared with other hybrids. Numerous species of the genus of F1 hybrids created with 1PFHC43 have been reduced to practice. These comparisons illustrate the good specific combining ability of 1PFHC43 or 1PFHC43 comprising locus conversions.

[200] Introduction of a new trait or locus into 1PFHC43

[201] Inbred 1PFHC43 represents a new base genetic variety into which a new locus or trait may be introduced or introgressed. Transformation and backcrossing represent two methods that can be used to accomplish such an introgression. The term locus conversion is used to designate the product of such an introgression.

[202] A backcross or locus conversion of 1PFHC43 occurs when DNA sequences are introduced through backcrossing, with 1PFHC43 utilized as the recurrent parent. Both naturally occurring, modified and transgenic DNA sequences may be introduced through backcrossing techniques. A backcross or locus conversion may produce a plant with a trait or locus conversion in at least one or more backcrosses, including at least 2 backcrosses, at least 3 backcrosses, at least 4 backcrosses, at least 5 backcrosses and the like. Molecular marker assisted breeding or selection may be utilized to reduce the number of backcrosses necessary to achieve the backcross conversion.

[203] The complexity of the backcross conversion method depends on the type of trait being transferred (a single gene or closely linked genes compared to unlinked genes), the level of expression of the trait, the type of inheritance (cytoplasmic or nuclear), dominant or recessive trait expression, and the types of parents included in the cross. It is understood by those of ordinary skill in the art that for single locus or gene traits that are relatively easy to classify, the backcross method is effective and relatively easy to manage. Desired traits that may be transferred through backcross conversion include, but are not limited to, waxy starch, sterility (nuclear and cytoplasmic), fertility restoration, grain color (white), nutritional enhancements, drought tolerance, nitrogen utilization, altered fatty acid profile, increased digestibility, low phytate, industrial enhancements, disease resistance (bacterial, fungal, or viral), insect resistance, and herbicide tolerance or resistance. A locus conversion, also called a trait conversion, can be a native trait or a transgenic trait. In addition, an recombination site itself, such as an FRT site, Lox site, or other site specific integration site may be inserted by backcrossing and utilized for direct insertion of one or more genes of interest into a specific plant variety. A single locus may contain several transgenes, such as a transgene for disease resistance that, in the same expression vector, also contains a transgene for herbicide tolerance or resistance. The gene for herbicide tolerance or resistance may be used as a selectable marker and/or as a phenotypic trait. A single locus conversion of a site specific integration system allows for the integration of multiple genes at a known recombination site in the genome. At least one, at least two or at least three and less than ten, less

than nine, less than eight, less than seven, less than six, less than five or less than four locus conversions may be introduced into the plant by backcrossing, introgression or transformation to express the desired trait, while the plant, or a plant grown from the seed, plant part or plant cell, otherwise retains the phenotypic characteristics of the deposited seed when grown under the same environmental conditions.

[204] The backcross or locus conversion may result from either the transfer of a dominant allele or a recessive allele. Selection of progeny containing the trait of interest can be accomplished by direct selection for a trait associated with a dominant allele. Transgenes transferred via backcrossing typically function as a dominant single gene trait and are relatively easy to classify. Selection of progeny for a trait that is transferred via a recessive allele, such as the waxy starch characteristic, requires growing and selfing the first backcross generation to determine which plants carry the recessive alleles. Recessive traits may require additional progeny testing in successive backcross generations to determine the presence of the locus of interest. The last backcross generation is usually selfed to give pure breeding progeny for the gene(s) being transferred, although a backcross conversion with a stably introgressed trait may also be maintained by further backcrossing to the recurrent parent with selection for the converted trait.

[205] Along with selection for the trait of interest, progeny are selected for the phenotype and/or genotype of the recurrent parent. While occasionally additional polynucleotide sequences or genes may be transferred along with the backcross conversion, the backcross conversion variety “fits into the same hybrid combination as the recurrent parent inbred variety and contributes the effect of the additional locus added through the backcross.” Poehlman et al (1995) Breeding Field Crop, 4th Ed., Iowa State University Press, Ames, IA., pp. 132-155 and 321-344. When one or more traits are introgressed into the variety a difference in quantitative agronomic traits, such as yield or dry down, between the variety and an introgressed version of the variety in some environments may occur. For example, the introgressed version may provide a net yield increase in environments where the trait provides a benefit, such as when a variety with an introgressed trait for insect resistance is grown in an environment where

insect pressure exists, or when a variety with herbicide tolerance is grown in an environment where herbicide is used.

[206] One process for adding or modifying a trait or locus in maize variety 1PFHC43 comprises crossing 1PFHC43 plants grown from 1PFHC43 seed with plants of another maize variety that comprise the desired trait or locus, selecting F1 progeny plants that comprise the desired trait or locus to produce selected F1 progeny plants, crossing the selected progeny plants with the 1PFHC43 plants to produce backcross progeny plants, selecting for backcross progeny plants that have the desired trait or locus and the phenotypic characteristics of maize variety 1PFHC43 to produce selected backcross progeny plants; and backcrossing to 1PFHC43 one or more times in succession to produce backcross progeny plants that comprise the trait or locus.

[207] The modified 1PFHC43 or a plant otherwise derived from 1PFHC43 may be further characterized as having all or essentially all of the phenotypic characteristics, or essentially all of the morphological and physiological characteristics of maize variety 1PFHC43, such as those listed in Table 1 and/or may be characterized by percent identity to 1PFHC43 as determined by molecular markers, such as SSR markers or SNP markers. By essentially all of the phenotypic or morphological and physiological characteristics, it is meant that all of the characteristics of a plant are recovered that are otherwise present when compared in the same environment, other than an occasional variant trait that might arise during backcrossing or direct introduction of a transgene. Such traits may be determined, for example, relative to the traits listed in Table 1 as determined at the 5% significance level when grown under the same environmental conditions.

[208] In addition, the above process and other similar processes described herein may be used to produce F1 hybrid maize seed by adding a step at the end of the process that comprises crossing 1PFHC43 with the locus conversion with a different maize plant and harvesting the resultant F1 hybrid maize seed.

[209] Traits are also used by those of ordinary skill in the art to characterize progeny. Traits are commonly evaluated at a significance level, such as a 1%, 5% or 10% significance level, when measured in plants grown in the same environmental conditions.

[210] Male Sterility and Hybrid Seed Production

[211] Hybrid seed production requires elimination or inactivation of pollen produced by the female inbred parent. Incomplete removal or inactivation of the pollen provides the potential for self-pollination. A reliable method of controlling male fertility in plants offers the opportunity for improved seed production.

[212] 1PFHC43 can be produced in a male-sterile form. There are several ways in which a maize plant can be manipulated so that it is male sterile. These include use of manual or mechanical emasculation (or detasseling), use of one or more genetic factors that confer male sterility, including cytoplasmic genetic and/or nuclear genetic male sterility, use of gametocides and the like. A male sterile designated 1PFHC43 may include one or more genetic factors, which result in cytoplasmic genetic and/or nuclear genetic male sterility. All of such embodiments are within the scope of the present claims. The male sterility may be either partial or complete male sterility.

[213] Hybrid maize seed is often produced by a male sterility system incorporating manual or mechanical detasseling. Alternate strips of two maize inbreds are planted in a field, and the pollen-bearing tassels are removed from one of the inbreds (female). Provided that there is sufficient isolation from sources of foreign maize pollen, the ears of the detasseled inbred will be fertilized only from the other inbred (male), and the resulting seed is therefore hybrid and will form hybrid plants.

[214] The laborious detasseling process can be avoided by using cytoplasmic male-sterile (CMS) inbreds. Plants of a CMS inbred are male sterile as a result of genetic factors in the cytoplasm, as opposed to the nucleus, and so nuclear linked genes are not transferred during backcrossing. Thus, this characteristic is inherited exclusively through the female parent in maize plants, since only the female provides cytoplasm to the fertilized seed. CMS plants are fertilized with pollen from another inbred that is not male-sterile. Pollen from the second inbred may or may not contribute genes that make the hybrid plants male-fertile, and either option may be preferred depending on the intended use of the hybrid. The same hybrid seed, a portion produced from detasseled fertile maize and a portion produced using the CMS system, can be blended to insure that adequate pollen loads are available for fertilization when the hybrid plants are

grown. CMS systems have been successfully used since the 1950's and the male sterility trait is routinely backcrossed into inbred varieties.

[215] There are several methods of conferring genetic male sterility available, such as multiple mutant genes at separate locations within the genome that confer male sterility, as disclosed in US Patent Nos 4,654,465 and 4,727,219. and chromosomal translocations as described in US Patent Nos. 3,861,709 and 3,710,511. In addition to these methods US Patent No. 5,432,068 describes a system of nuclear male sterility which includes: identifying a gene which is needed for male fertility; silencing this native gene which is needed for male fertility; removing the native promoter from the essential male fertility gene and replacing it with an inducible promoter; inserting this genetically engineered gene back into the plant; and thus creating a plant that is male sterile because the inducible promoter is not "on" resulting in the male fertility gene not being transcribed. Fertility is restored by inducing, or turning "on", the promoter, which in turn allows the gene that confers male fertility to be transcribed.

[216] These, and the other methods of conferring genetic male sterility in the art, each possess their own benefits and drawbacks. Some other methods use a variety of approaches such as delivering into the plant a gene encoding a cytotoxic substance associated with a male tissue specific promoter or an antisense system in which a gene needed for fertility is identified and an antisense to that gene is inserted in the plant (see EP 89/3010153.8 publication no. 329,308 and PCT application PCT/CA90/00037 published as WO 90/08828).

[217] Another system for controlling male sterility makes use of gametocides. Gametocides are not a genetic system, but rather a topical application of chemicals. These chemicals affect cells that are needed for male fertility. The application of these chemicals affects fertility in the plants only for the growing season in which the gametocide is applied (see US Patent No.: 4,936,904). Application of the gametocide, timing of the application and genotype specificity often limit the usefulness of the approach and it is not appropriate in all situations.

[218] Incomplete control over male fertility may result in self-pollinated seed being unintentionally harvested and packaged with hybrid seed. This would typically be only female parent seed, because the male plant is grown in rows that are typically

destroyed prior to seed development. Once the seed from the hybrid bag is planted, it is possible to identify and select these self-pollinated plants. These self-pollinated plants will be one of the inbred varieties used to produce the hybrid. Though the possibility of 1PFHC43 being included in a hybrid seed bag exists, the occurrence is very low because much care is taken by seed companies to avoid such inclusions. It is worth noting that hybrid seed is sold to growers for the production of grain or forage and not for breeding or seed production. These self-pollinated plants can be identified and selected by one skilled in the art due to their less vigorous appearance for vegetative and/or reproductive characteristics, including shorter plant height, small ear size, ear and kernel shape, or other characteristics.

[219] Identification of these self-pollinated varieties can also be accomplished through molecular marker analyses. Through these technologies, the homozygosity of the self-pollinated variety can be verified by analyzing allelic composition at various loci along the genome. Those methods allow for rapid identification of the plants disclosed herein.

[220] Transformation

[221] Transgenes and transformation methods facilitate engineering of the genome of plants to contain and express heterologous genetic elements, such as foreign genetic elements, or additional copies of endogenous elements, or modified versions of native or endogenous genetic elements in order to alter at least one trait of a plant in a specific manner. Any sequences, such as DNA, whether from a different species or from the same species, which have been stably inserted into a genome using transformation are referred to herein collectively as “transgenes” and/or “transgenic events”. Transgenes can be moved from one genome to another using breeding techniques which may include crossing, backcrossing or double haploid production. In some embodiments, a transformed variant of 1PFHC43 may comprise at least one transgene but could contain at least 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and/or no more than 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, or 2. Transformed versions of the claimed maize variety 1PFHC43 as well as hybrid combinations containing and inheriting the transgene thereof are provided. F1 hybrid seed are provided which are produced by crossing a different maize plant with maize variety 1PFHC43 comprising a transgene introduced into maize variety 1PFHC43

by backcrossing or genetic transformation and which transgene is inherited by the F1 hybrid seed.

[222] Numerous methods for plant transformation have been developed, including biological and physical plant transformation protocols. In addition, expression vectors and *in vitro* culture methods for plant cell or tissue transformation and regeneration of plants are available.

[223] In general, methods to transform, modify, edit or alter plant endogenous genomic DNA include altering the plant native DNA sequence or a pre-existing transgenic sequence including regulatory elements, coding and non-coding sequences. These methods can be used, for example, to target nucleic acids to pre-engineered target recognition sequences in the genome. Such pre-engineered target sequences may be introduced by genome editing or modification. As an example, a genetically modified plant variety is generated using “custom" or engineered endonucleases such as meganucleases produced to modify plant genomes (see e.g., WO 2009/114321; Gao et al. (2010) Plant Journal 1:176-187). Another site-directed engineering method is through the use of zinc finger domain recognition coupled with the restriction properties of restriction enzyme. A transcription activator-like (TAL) effector-DNA modifying enzyme (TALE or TALEN) is also used to engineer changes in plant genome. See e.g., US20110145940. Site-specific modification of plant genomes can also be performed using the bacterial type II CRISPR (clustered regularly interspaced short palindromic repeats)/Cas (CRISPR-associated) system. The Cas9/guide RNA-based system allows targeted cleavage of genomic DNA guided by a customizable small noncoding RNA in plants (see e.g., WO 2015026883A1).

[224] Plant transformation methods may involve the construction of an expression vector. Such a vector comprises a DNA sequence that contains a gene under the control of or operatively linked to a regulatory element, for example a promoter. The vector may contain one or more genes and one or more regulatory elements.

[225] A transgenic event which has been stably engineered into the germ cell line of a particular maize plant using transformation techniques, could be moved into the germ cell line of another variety using traditional breeding techniques that are well known in the plant breeding arts. For example, a backcrossing approach is commonly used to

move a transgenic event from a transformed maize plant to another variety, and the resulting progeny would then comprise the transgenic event(s). Also, if an inbred variety was used for the transformation then the transgenic plants could be crossed to a different inbred in order to produce a transgenic hybrid maize plant.

[226] Various genetic elements can be introduced into the plant genome using transformation. These elements include, but are not limited to genes, coding sequences; inducible, constitutive, and tissue specific promoters; enhancing sequences; and signal and targeting sequences. For example, see the traits, genes and transformation methods listed in US Patent Nos. 6,118,055 and 6,284,953. In addition, transformability of a variety can be increased by introgressing the trait of high transformability from another variety known to have high transformability, such as Hi-II. See US Patent Publication US2004/0016030.

[227] With transgenic or genetically modified plants, a foreign protein can be produced in commercial quantities. Thus, techniques for the selection and propagation of transformed plants, which are well understood in the art, yield a plurality of transgenic or genetically modified plants that are harvested in a conventional manner, and a foreign protein then can be extracted from a tissue of interest or from total biomass. Protein extraction from plant biomass can be accomplished by known methods.

[228] Transgenic events can be mapped by one of ordinary skill in the art and such techniques are well known to those of ordinary skill in the art.

[229] Plants can be genetically engineered or modified to express various phenotypes of agronomic interest. Through the transformation or modification of maize the expression of genes can be altered to enhance disease resistance, insect resistance, herbicide tolerance, agronomic traits, grain quality and other traits. Transformation can also be used to insert DNA sequences which control or help control male-sterility. DNA sequences native to maize as well as non-native DNA sequences can be transformed into maize and used to alter levels of native or non-native proteins. Various promoters, targeting sequences, enhancing sequences, and other DNA sequences can be inserted into the maize genome for the purpose of altering the expression of proteins. Reduction of the activity of specific genes (also known as gene silencing, or gene suppression) is desirable for several aspects of genetic engineering in plants.

[230] Many techniques for gene silencing are well known to one of skill in the art, including but not limited to knock-outs (such as by insertion of a transposable element such as mu (Vicki Chandler, *The Maize Handbook* Ch. 118 (Springer-Verlag 1994) or other genetic elements such as a FRT, Lox or other site specific integration site, antisense technology (see, *e.g.*, Sheehy et al. (1988) *PNAS* USA 85:8805-8809; and US Patent Nos. 5,107,065; 5,453, 566; and 5,759,829); co-suppression (*e.g.*, Taylor (1997) *Plant Cell* 9:1245; Jorgensen (1990) *Trends Biotech*. 8(12):340-344; Flavell (1994) *PNAS* USA 91:3490-3496; Finnegan et al. (1994) *Bio/Technology* 12: 883-888; and Neuhuber et al. (1994) *Mol. Gen. Genet*. 244:230-241); RNA interference (Napoli et al. (1990) *Plant Cell* 2:279-289; US Patent No. 5,034,323; Sharp (1999) *Genes Dev*. 13:139-141; Zamore et al. (2000) *Cell* 101:25-33; and Montgomery et al. (1998) *PNAS* USA 95:15502-15507), virus-induced gene silencing (Burton, et al. (2000) *Plant Cell* 12:691-705; and Baulcombe (1999) *Curr. Op. Plant Bio*. 2:109-113); target-RNA-specific ribozymes (Haseloff et al. (1988) *Nature* 334: 585-591); hairpin structures (Smith et al. (2000) *Nature* 407:319-320; WO 99/53050; and WO 98/53083); MicroRNA (Aukerman and Sakai (2003) Plant Cell 15:2730-2741); ribozymes (Steinecke et al. (1992) *EMBO J*. 11:1525; and Perriman et al. (1993) *Antisense Res. Dev*. 3:253); oligonucleotide mediated targeted modification (*e.g.*, WO 03/076574 and WO 99/25853); Zn-finger targeted molecules (*e.g.*, WO 01/52620; WO 03/048345; and WO 00/42219); and other methods or combinations of the above methods known to those of skill in the art.

[231] Exemplary nucleotide sequences that may be altered by genetic engineering include, but are not limited to, those categorized below.

[232] 1. Transgenes that Confer Resistance to Insects or Disease and that Encode:

[233] (A) Plant disease resistance genes. Plant defenses are often activated by specific interaction between the product of a disease resistance gene (R) in the plant and the product of a corresponding avirulence (Avr) gene in the pathogen. A plant variety can be transformed with cloned resistance gene to engineer plants that are resistant to specific pathogen strains. See, for example Jones et al., Science 266: 789

(1994) (cloning of the tomato Cf-9 gene for resistance to *Cladosporium fulvum*); Martin et al., Science 262: 1432 (1993) (tomato *Pto* gene for resistance to *Pseudomonas syringae* pv. tomato encodes a protein kinase); Mindrinos et al., Cell 78: 1089 (1994) (*Arabidopsis RSP2* gene for resistance to *Pseudomonas syringae*), McDowell and Woffenden, (2003) Trends Biotechnol. 21(4): 178-83 and Toyoda et al., (2002) Transgenic Res. 11(6):567-82. A plant resistant to a disease is one that is more resistant to a pathogen as compared to the wild type plant.

[234] (B) A *Bacillus thuringiensis* protein, a derivative thereof or a synthetic polypeptide modeled thereon. See, for example, Geiser et al*., Gene* 48: 109 (1986), who disclose the cloning and nucleotide sequence of a *Bt* delta-endotoxin gene. Moreover, DNA molecules encoding delta-endotoxin genes can be purchased from American Type Culture Collection (Rockville, MD), for example, under ATCC Accession Nos. 40098, 67136, 31995 and 31998. Other non-limiting examples of *Bacillus thuringiensis* transgenes being genetically engineered are given in the following patents and patent publications: 5,188,960; 5,689,052; 5,880,275; 5,986,177; 7,105,332; 7,208,474, 7,329,736; 7,449,552, 7,468,278, 7,510,878, 7,521,235, 7,605,304, 7,696,412, 7,629,504, 7,772,465, 7,790,846, 7,858,849, WO 91/14778; WO 99/31248; WO 01/12731; WO 99/24581; and WO 97/40162.

[235] (C) An insect-specific hormone or pheromone such as an ecdysteroid and juvenile hormone, a variant thereof, a mimetic based thereon, or an antagonist or agonist thereof. See, for example, the disclosure by Hammock et al., Nature 344: 458 (1990), of baculovirus expression of cloned juvenile hormone esterase, an inactivator of juvenile hormone.

[236] (D) An insect-specific peptide which, upon expression, disrupts the physiology of the affected pest. For example, see Regan, *J. Biol. Chem.* 269: 9 (1994) (expression cloning yields DNA coding for insect diuretic hormone receptor); Pratt et al*., Biochem. Biophys. Res. Comm.*163: 1243 (1989) (an allostatin is identified in *Diploptera puntata);* Chattopadhyay et al. (2004) Critical Reviews in Microbiology 30 (1): 33-54 2004; Zjawiony (2004) J Nat Prod 67 (2): 300-310; Carlini and Grossi-de-Sa (2002) Toxicon, 40 (11): 1515-1539; Ussuf et al. (2001) Curr Sci. 80 (7): 847-853; and Vasconcelos and

Oliveira (2004) Toxicon 44 (4): 385-403. See also US Patent No.5,266,317 disclosing genes encoding insect-specific toxins.

[237] (E) An enzyme responsible for a hyperaccumulation of a monoterpene, a sesquiterpene, a steroid, hydroxamic acid, a phenylpropanoid derivative or another non-protein molecule with insecticidal activity.

[238] (F) An enzyme involved in the modification, including the post-translational modification, of a biologically active molecule; for example, a glycolytic enzyme, a proteolytic enzyme, a lipolytic enzyme, a nuclease, a cyclase, a transaminase, an esterase, a hydrolase, a phosphatase, a kinase, a phosphorylase, a polymerase, an elastase, a chitinase and a glucanase, whether natural or synthetic. See PCT application WO 93/02197 in the name of Scott et al., which discloses the nucleotide sequence of a callase gene. DNA molecules which contain chitinase-encoding sequences can be obtained, for example, from the ATCC under Accession Nos. 39637 and 67152. See also Kramer et al., *Insect Biochem. Molec. Biol.*23: 691 (1993), who teach the nucleotide sequence of a cDNA encoding tobacco hookworm chitinase, and Kawalleck et al., *Plant Molec. Biol.* 21: 673 (1993), who provide the nucleotide sequence of the parsley *ubi*4-2 polyubiquitin gene, and US Patent Nos. 6,563,020; 7,145,060 and 7,087,810.

[239] (G) A molecule that stimulates signal transduction. For example, see the disclosure by Botella et al., *Plant Molec. Biol.* 24: 757 (1994), of nucleotide sequences for mung bean calmodulin cDNA clones, and Griess et al., *Plant Physiol.*104: 1467 (1994), who provide the nucleotide sequence of a maize calmodulin cDNA clone.

[240] (H) A hydrophobic moment peptide. See PCT application WO 95/16776 and US 5,580,852 disclosure of peptide derivatives of Tachyplesin which inhibit fungal plant pathogens) and PCT application WO 95/18855 and US 5,607,914 (teaches synthetic antimicrobial peptides that confer disease resistance).

[241] (I) A membrane permease, a channel former or a channel blocker. For example, see the disclosure by Jaynes et al., *Plant Sci.* 89: 43 (1993), of heterologous expression of a cecropin-beta lytic peptide analog to render transgenic tobacco plants resistant to *Pseudomonas solanacearum.*

[242] (J) A viral-invasive protein or a complex toxin derived therefrom. For example, the accumulation of viral coat proteins in transformed plant cells imparts resistance to viral infection and/or disease development effected by the virus from which the coat protein gene is derived, as well as by related viruses. See Beachy et al., *Ann. Rev. Phytopathol.*28: 451 (1990). Coat protein-mediated resistance has been conferred upon transformed plants against alfalfa mosaic virus, cucumber mosaic virus, tobacco streak virus, potato virus X, potato virus Y, tobacco etch virus, tobacco rattle virus and tobacco mosaic virus. *Id.*

[243] (K) An insect-specific antibody or an immunotoxin derived therefrom. Thus, an antibody targeted to a critical metabolic function in the insect gut would inactivate an affected enzyme, killing the insect. *Cf.* Taylor et al., Abstract #497, SEVENTH INT'L SYMPOSIUM ON MOLECULAR PLANT-MICROBE INTERACTIONS (Edinburgh, Scotland, 1994) (enzymatic inactivation in transgenic tobacco via production of single-chain antibody fragments).

[244] (L) A virus-specific antibody. See, for example, Tavladoraki et al., *Nature* 366: 469 (1993), which shows that transgenic plants expressing recombinant antibody genes are protected from virus attack.

[245] (M) A developmental-arrestive protein produced in nature by a pathogen or a parasite. Thus, fungal endo alpha-1,4-D-polygalacturonases facilitate fungal colonization and plant nutrient release by solubilizing plant cell wall homo-alpha-1,4-D-galacturonase. See Lamb et al., *Bio/Technology* 10: 1436 (1992). The cloning and characterization of a gene which encodes a bean endopolygalacturonase-inhibiting protein is described by Toubart et al., *Plant J.* 2: 367 (1992).

[246] (N) A developmental-arrestive protein produced in nature by a plant. For example, Logemann et al., *Bio/Technology* 10: 305 (1992), have shown that transgenic plants expressing the barley ribosome-inactivating gene have an increased resistance to fungal disease.

[247] (O) Genes involved in the Systemic Acquired Resistance (SAR) Response and/or the pathogenesis related genes.

[248] (P) Antifungal genes See, e.g., US Application Nos: 09/950,933; 11/619,645; 11/657,710; 11/748,994; 11/774,121 and US Patent Nos 6,891,085 and 7,306,946.

[249] (Q) Detoxification genes, such as for fumonisin, beauvericin, moniliformin and zearalenone and their structurally related derivatives. For example, see US Patent Nos. 5,716,820; 5,792,931; 5,798,255; 5,846,812; 6,083,736; 6,538,177; 6,388,171 and 6,812,380.

[250] (R) Cystatin and cysteine proteinase inhibitors. See US Patent No: 7,205,453.

[251] (S) Defensin genes. See WO03000863 and US Patent Nos: 6,911,577; 6,855,865; 6,777,592 and 7,238,781.

[252] (T) Genes conferring resistance to nematodes. See *e.g.* PCT Application WO96/30517; PCT Application WO93/19181, WO 03/033651 and Urwin et al., Planta 204:472-479 (1998), Williamson (1999) Curr Opin Plant Bio. 2(4):327-31; and US Patent Nos. 6,284,948 and 7,301,069.

[253] (U) Genes that confer resistance to Phytophthora Root Rot, such as the Rps 1, Rps 1-a, Rps 1-b, Rps 1-c, Rps 1-d, Rps 1-e, Rps 1-k, Rps 2, Rps 3-a, Rps 3-b, Rps 3-c, Rps 4, Rps 5, Rps 6, Rps 7 and other Rps genes.

[254] (V) Genes that confer resistance to Brown Stem Rot, such as described in US 5,689, 035.

[255] (W) Genes that confer resistance to *Colletotrichum*, such as described in US Patent Publication No. US20090035765. This includes the *Rcg* locus that may be utilized as a single locus conversion.

[256] 2. Transgenes that Confer Tolerance to a Herbicide, for example:

[257] (A) A herbicide that inhibits the growing point or meristem, such as an imidazolinone or a sulfonylurea. Exemplary genes in this category code for mutant acetolactate synthase (ALS) and acetohydroxyacid synthase (AHAS) enzyme as described, for example, in US Patent Nos. 5,605,011; 5,013,659; 5,141,870; 5,767,361; 5,731,180; 5,304,732; 4,761,373; 5,331,107; 5,928,937; and 5,378,824; US Patent Publication No. 20070214515, and international publication WO 96/33270.

[258] (B) Glyphosate (tolerance imparted by *aroA* genes and mutant 5-enolpyruvl -3-phosphikimate synthase (EPSP) and) and other phosphono compounds such as glufosinate (phosphinothricin acetyl transferase (PAT) and *Streptomyces hygroscopicus* phosphinothricin acetyl transferase (*bar)* genes), and pyridinoxy or phenoxy proprionic

acids and cyclohexones (ACCase inhibitor-encoding genes). See, for example, US Patent No. 4,940,835, which discloses the nucleotide sequence of a form of EPSPS which can confer glyphosate tolerance. US Patent No. 5,627,061 also describes genes encoding EPSPS enzymes. See also U.S. Patent Nos. 6,566,587; 6,338,961; 6,248,876; 6,040,497; 5,804,425; 5,633,435; 5,145,783; 4,971,908; 5,312,910; 5,188,642; 4,940,835; 5,866,775; 6,225,114; 6,130,366; 5,310,667; 4,535,060; 4,769,061; 5,633,448; 5,510,471; RE. 36,449; RE 37,287; and 5,491,288; and international publications EP1173580; WO 01/66704; EP1173581 and EP1173582.

[259] Glyphosate tolerance is also imparted to plants that express a gene that encodes a glyphosate oxido-reductase enzyme as described more fully in U.S. Patent Nos. 5,776,760 and 5,463,175. In addition glyphosate tolerance can be imparted to plants by the over expression of genes encoding glyphosate N-acetyltransferase. See, for example, US2004/0082770; US2005/0246798; and US2008/0234130. A DNA molecule encoding a mutant *aro*A gene can be obtained under ATCC accession No. 39256, and the nucleotide sequence of the mutant gene is disclosed in U.S. Patent No. 4,769,061. EP Patent Application No. 0333033 and U.S. Patent No. 4,975,374 disclose nucleotide sequences of glutamine synthetase genes which confer tolerance to herbicides such as L-phosphinothricin. The nucleotide sequence of a phosphinothricin-acetyl-transferase gene is provided in EP Patent Nos. 0242246 and 0242236. See also, U.S. Patent Nos. 5,969,213; 5,489,520; 5,550,318; 5,874,265; 5,919,675; 5,561,236; 5,648,477; 5,646,024; 6,177,616 B1; and 5,879,903. Exemplary genes conferring resistance to phenoxy propionic acids, cyclohexanediones and cyclohexones, such as sethoxydim and haloxyfop, are the *Acc1-S1, Acc1-S2* and *Acc1-S3* genes.

[260] (C) A herbicide that inhibits photosynthesis, such as a triazine *(psbA* and *gs*+ genes) and a benzonitrile (nitrilase gene) such as bromoxynil. Przibilla et al.*, Plant Cell* 3: 169 (1991), describe the transformation of *Chlamydomonas* with plasmids encoding mutant *psbA* genes. Nucleotide sequences for nitrilase genes are disclosed in U.S. Patent No. 4,810,648 to Stalker, and DNA molecules containing these genes are available under ATCC Accession Nos. 53435, 67441 and 67442.

[261] (D) Other genes that confer tolerance to herbicides include: a gene encoding a chimeric protein of rat cytochrome P4507A1 and yeast NADPH-cytochrome P450

oxidoreductase, genes for glutathione reductase and superoxide dismutase, and genes for various phosphotransferases.

[262] (E) A herbicide that inhibits protoporphyrinogen oxidase (protox or PPO) is necessary for the production of chlorophyll, which is necessary for all plant survival. The protox enzyme serves as the target for a variety of herbicidal compounds. PPO-inbibitor herbicides can inhibit growth of all the different species of plants present, causing their total destruction. The development of plants containing altered protox activity which are tolerant to these herbicides are described, for example, in U.S. Patent Nos. 6,288,306 B1; 6,282,837 B1; and 5,767,373; and international patent publication WO 01/12825.

[263] (F) Dicamba (3,6-dichloro-2-methoxybenzoic acid) is an organochloride derivative of benzoic acid which functions by increasing plant growth rate such that the plant dies.

[264] 3. Transgenes that Confer or Contribute to an Altered Grain Characteristic, such as:

[265] (A) Altered fatty acids, for example, by

[266] (i) Down-regulation of stearoyl-ACP desaturase to increase stearic acid content of the plant. See Knultzon *et al.*, *Proc. Natl. Acad. Sci. USA* 89: 2624 (1992) and WO99/64579 (Genes for Desaturases to Alter Lipid Profiles in Corn),

[267] (ii) Elevating oleic acid via FAD-2 gene modification and/or decreasing linolenic acid via FAD-3 gene modification (see U.S. Patent Nos. 6,063,947; 6,323,392; 6,372,965 and WO 93/11245),

[268] (iii) Altering linolenic or linoleic acid content, such as in WO 01/12800,

[269] (iv) Altering LEC1, AGP, Dek1, Superal1, mi1ps, various lpa genes such as lpa1, lpa3, hpt or hggt. For example, see WO 02/42424, WO 98/22604, WO 03/011015, WO02/057439, WO03/011015, U.S. Patent Nos. 6,423,886, 6,197,561, 6,825,397, and U.S. Application Serial Nos. US2003/0079247, US2003/0204870.

[270] (B) Altered phosphate content, for example, by the:

[271] (i) Introduction of a phytase-encoding gene would enhance breakdown of phytate, adding more free phosphate to the transformed plant.

[272] (ii) Modulating a gene that reduces phytate content. In maize, this, for example, could be accomplished, by cloning and then re-introducing DNA associated with one or more of the alleles, such as the LPA alleles, identified in maize mutants characterized by low levels of phytic acid, such as in WO 05/113778 and/or by altering inositol kinase activity as in WO 02/059324, US2003/0009011, WO 03/027243, US2003/0079247, WO 99/05298, US6197561, US6291224, US6391348, WO2002/059324, US2003/0079247, Wo98/45448, WO99/55882, WO01/04147.

[273] (C) Altered carbohydrates affected, for example, by altering a gene for an enzyme that affects the branching pattern of starch or, a gene altering thioredoxin such as NTR and/or TRX (see. (See US Patent No. 6,531,648) and/or a gamma zein knock out or mutant such as cs27 or TUSC27 or en27 (See US Patent No. 6,858,778 and US2005/0160488, US2005/0204418). See Shiroza et al., J. Bacteriol. 170: 810 (1988) (nucleotide sequence of Streptococcus mutans fructosyltransferase gene), Steinmetz et al., Mol. Gen. Genet. 200: 220 (1985) (nucleotide sequence of *Bacillus subtilis* levansucrase gene), Pen et al., Bio/Technology 10: 292 (1992) (production of transgenic plants that express *Bacillus licheniformis* alpha-amylase), Elliot et al., Plant Molec. Biol. 21: 515 (1993) (nucleotide sequences of tomato invertase genes), Søgaard et al., J. Biol. Chem. 268: 22480 (1993) (site-directed mutagenesis of barley alpha-amylase gene), and Fisher et al., Plant Physiol. 102: 1045 (1993) (maize endosperm starch branching enzyme II), WO 99/10498 (improved digestibility and/or starch extraction through modification of UDP-D-xylose 4-epimerase, Fragile 1 and 2, Ref1, HCHL, C4H), US Patent No .6,232,529 (method of producing high oil seed by modification of starch levels (AGP)). The fatty acid modification genes mentioned herein may also be used to affect starch content and/or composition through the interrelationship of the starch and oil pathways.

[274] (D) Altered antioxidant content or composition, such as alteration of tocopherol or tocotrienols. For example, see US Patent No. 6,787,683, US2004/0034886 and WO 00/68393 involving the manipulation of antioxidant levels, and WO 03/082899 through alteration of a homogentisate geranyl geranyl transferase (hggt).

[275] (E) Altered essential seed amino acids. For example, see US Patent No. 6,127,600 (method of increasing accumulation of essential amino acids in seeds), US Patent No. 6,080,913 (binary methods of increasing accumulation of essential amino acids in seeds), US :Patent No. 5,990,389 (high lysine), WO99/40209 (alteration of amino acid compositions in seeds), WO99/29882 (methods for altering amino acid content of proteins), US Patent No. 5,850,016 (alteration of amino acid compositions in seeds), WO98/20133 (proteins with enhanced levels of essential amino acids), US Patent No. 5,885,802 (high methionine), US Patent No. 5,885,801 (high threonine), US Patent No. 6,664,445 (plant amino acid biosynthetic enzymes), US Patent No. 6,459,019 (increased lysine and threonine), US Patent No. 6,441,274 (plant tryptophan synthase beta subunit), US Patent No. 6,346,403 (methionine metabolic enzymes), US Patent No. 5,939,599 (high sulfur), US Patent No. 5,912,414 (increased methionine), WO98/56935 (plant amino acid biosynthetic enzymes), WO98/45458 (engineered seed protein having higher percentage of essential amino acids), WO98/42831 (increased lysine), US Patent No. 5,633,436 (increasing sulfur amino acid content), US Patent No. 5,559,223 (synthetic storage proteins with defined structure containing programmable levels of essential amino acids for improvement of the nutritional value of plants), WO96/01905 (increased threonine), WO95/15392 (increased lysine), US2003/0163838, US2003/0150014, US2004/0068767, US6803498, WO01/79516.

[276] 4. Genes that Control Male-sterility

[277] There are several methods of conferring genetic male sterility available, such as multiple mutant genes at separate locations within the genome that confer male sterility, as disclosed in U.S. Patent Nos. 4,654,465 and 4,727,219 to Brar *et al.* and chromosomal translocations as described by Patterson in U.S. Patent Nos. 3,861,709 and 3,710,511. In addition to these methods, Albertsen *et al.*, U.S. Patent No. 5,432,068, describe a system of nuclear male sterility which includes: identifying a gene which is needed for male fertility; silencing this native gene which is needed for male fertility; removing the native promoter from the essential male fertility gene and replacing it with an inducible promoter; inserting this genetically engineered gene back into the plant; and thus creating a plant that is male sterile because the inducible

promoter is not "on" resulting in the male fertility gene not being transcribed. Fertility is restored by inducing, or turning "on", the promoter, which in turn allows the gene that confers male fertility to be transcribed.

[278] (A) Introduction of a deacetylase gene under the control of a tapetum-specific promoter and with the application of the chemical N-Ac-PPT (WO 01/29237).

[279] (B) Introduction of stamen-specific promoters (WO 92/13956, WO 92/13957).

[280] (C) Introduction of the barnase and the barstar gene (Paul *et al.* Plant Mol. Biol. 19:611-622, 1992).

[281] For additional examples of nuclear male and female sterility systems and genes, see also, U.S. Patent Nos. 5,859,341; 6,297,426; 5,478,369; 5,824,524; 5,850,014; and 6,265,640.

[282] 5. Genes that create a site for site specific DNA integration. This includes the introduction of FRT sites that may be used in the FLP/FRT system and/or Lox sites that may be used in the Cre/Loxp system. For example, see Lyznik, *et al.*, Site-Specific Recombination for Genetic Engineering in Plants, Plant Cell Rep (2003) 21:925-932 and WO 99/25821. Other systems that may be used include the Gin recombinase of phage Mu (Maeser *et al.*, 1991; Vicki Chandler, *The Maize Handbook* Ch. 118 (Springer-Verlag 1994), the Pin recombinase of E. coli (Enomoto *et al.*, 1983), and the R/RS system of the pSR1 plasmid (Araki *et al.*, 1992).

[283] 6. Genes that affect abiotic stress resistance (including but not limited to flowering, ear and seed development, enhancement of nitrogen utilization efficiency, altered nitrogen responsiveness, drought resistance or tolerance, cold resistance or tolerance, and salt resistance or tolerance) and increased yield under stress. For example, see: WO 00/73475 where water use efficiency is altered through alteration of malate; U.S. Patent Nos. 5,892,009; 5,965,705; 5,929,305; 5,891,859; 6,417,428; 6,664,446; 6,706,866; 6,717,034; 6,801,104; WO2000060089; WO2001026459; WO2001035725; WO2001034726; WO2001035727; WO2001036444; WO2001036597; WO2001036598; WO2002015675; WO2002017430; WO2002077185; WO2002079403; WO2003013227; WO2003013228; WO2003014327; WO2004031349; WO2004076638;

WO9809521; and WO9938977 describing genes, including CBF genes and transcription factors effective in mitigating the negative effects of freezing, high salinity, and drought on plants, as well as conferring other positive effects on plant phenotype; US2004/0148654 and WO01/36596 where abscisic acid is altered in plants resulting in improved plant phenotype such as increased yield and/or increased tolerance to abiotic stress; WO2000/006341, WO04/090143, U.S. Application Nos. 10/817483 and 09/545,334 where cytokinin expression is modified resulting in plants with increased stress tolerance, such as drought tolerance, and/or increased yield. Also see WO0202776, WO2003052063, JP2002281975, U.S. Patent No. 6,084,153, WO0164898, U.S. Patent Nos. 6,177,275 and 6,107,547 (enhancement of nitrogen utilization and altered nitrogen responsiveness). For ethylene alteration, see US20040128719, US20030166197 and WO200032761. For plant transcription factors or transcriptional regulators of abiotic stress, see e.g. US20040098764 or US20040078852.

[284] Other genes and transcription factors that affect plant growth and agronomic traits such as yield, flowering, plant growth and/or plant structure, can be introduced or introgressed into plants, see e.g. WO97/49811 (LHY), WO98/56918 (ESD4), WO97/10339 and U.S. Patent No. 6,573,430 (TFL), U.S. Patent No. 6,713,663 (FT), WO96/14414 (CON), WO96/38560, WO01/21822 (VRN1), WO00/44918 (VRN2), WO99/49064 (GI), WO00/46358 (FRI), WO97/29123, U.S. Patent No. 6,794,560, U.S. Patent No. 6,307,126 (GAI), WO99/09174 (D8 and Rht), WO2004076638 and WO2004031349 (transcription factors).

[285] Using 1PFHC43 to Develop another Maize Plant

[286] Maize varieties such as 1PFHC43 are typically developed for use in the production of hybrid maize varieties. However, varieties such as 1PFHC43 also provide a source of breeding material that may be used to develop new maize inbred varieties. Plant breeding techniques known in the art and used in a maize plant breeding program include, but are not limited to, recurrent selection, mass selection, bulk selection, mass selection, backcrossing, pedigree breeding, open pollination breeding, restriction fragment length polymorphism enhanced selection, genetic marker enhanced selection,

making double haploids, and transformation. Often combinations of these techniques are used. The development of maize hybrids in a maize plant breeding program requires, in general, the development of homozygous inbred varieties, the crossing of these varieties, and the evaluation of the crosses. There are many analytical methods available to evaluate the result of a cross. The oldest and most traditional method of analysis is the observation of phenotypic traits but genotypic analysis may also be used.

[287] Methods for producing a maize plant by crossing a first parent maize plant with a second parent maize plant wherein either the first or second parent maize plant is a maize plant of the variety 1PFHC43 are provided. The other parent may be any other maize plant, such as another inbred variety or a plant that is part of a synthetic or natural population. Any such methods may be used with the maize variety 1PFHC43 such as selfing, sibbing, backcrosses, mass selection, pedigree breeding, bulk selection, hybrid production, crosses to populations, and the like. These methods are well known in the art and some of the more commonly used breeding methods are described below.

[288] Pedigree Breeding

[289] Pedigree breeding starts with the crossing of two genotypes, such as 1PFHC43 and one other inbred variety having one or more desirable characteristics that is lacking or which complements 1PFHC43. If the two original parents do not provide all the desired characteristics, other sources can be included in the breeding population. In the pedigree method, superior plants are selfed and selected in successive filial generations. In the succeeding filial generations the heterozygous condition gives way to homogeneous varieties as a result of self-pollination and selection. Typically in the pedigree method of breeding, five or more successive filial generations of selfing and selection is practiced: F1 → F2; F2→ F3; F3 → F4; F4 → F5, etc. After a sufficient amount of inbreeding, successive filial generations will serve to increase seed of the developed inbred. Preferably, the inbred variety comprises homozygous alleles at about 95% or more of its loci.

[290] Recurrent Selection and Mass Selection

[291] Recurrent selection is a method used in a plant breeding program to improve a population of plants. 1PFHC43 is suitable for use in a recurrent selection program. The method entails individual plants cross pollinating with each other to form progeny. The progeny are grown and the superior progeny selected by any number of selection methods, which include individual plant, half-sib progeny, full-sib progeny, selfed progeny and topcrossing. The selected progeny are cross pollinated with each other to form progeny for another population. This population is planted and again superior plants are selected to cross pollinate with each other. Recurrent selection is a cyclical process and can be repeated as many times as desired. The objective of recurrent selection is to improve the traits of a population. The improved population can then be used as a source of breeding material to obtain inbred varieties to be used in hybrids or used as parents for a synthetic cultivar. A synthetic cultivar is the resultant progeny formed by the intercrossing of several selected inbreds.

[292] 1PFHC43 is suitable for use in mass selection. Mass selection is a useful technique when used in conjunction with molecular marker enhanced selection. In mass selection seeds from individuals are selected based on phenotype and/or genotype. These selected seeds are then bulked and used to grow the next generation. Bulk selection requires growing a population of plants in a bulk plot, allowing the plants to self-pollinate, harvesting the seed in bulk and then using a sample of the seed harvested in bulk to plant the next generation. Instead of self pollination, directed pollination could be used as part of the breeding program.

[293] Mutation Breeding

[294] Mutation breeding is one of many methods that could be used to introduce new traits into 1PFHC43. 1PFHC43 is suitable for use in a mutation breeding program. Mutations that occur spontaneously or are artificially induced can be useful sources of variability for a plant breeder. The goal of artificial mutagenesis is to increase the rate of mutation for a desired characteristic. Mutation rates can be increased by many different means including temperature, long-term seed storage, tissue culture conditions, radiation; such as X-rays, Gamma rays (e.g. cobalt 60 or cesium 137), neutrons, (product of nuclear fission by uranium 235 in an atomic reactor), Beta

radiation (emitted from radioisotopes such as phosphorus 32 or carbon 14), or ultraviolet radiation (preferably from 2500 to 2900nm), or chemical mutagens (such as base analogues (5-bromo-uracil), related compounds (8-ethoxy caffeine), antibiotics (streptonigrin), alkylating agents (sulfur mustards, nitrogen mustards, epoxides, ethylenamines, sulfates, sulfonates, sulfones, lactones), azide, hydroxylamine, nitrous acid, or acridines. Once a desired trait is observed through mutagenesis the trait may then be incorporated into existing germplasm by traditional breeding techniques, such as backcrossing. In addition, mutations created in other varieties may be used to produce a backcross conversion of 1PFHC43 that comprises such mutation.

[295] Production of Double Haploids

[296] The production of double haploids can also be used for the development of inbreds in the breeding program. For example, an F1 hybrid for which 1PFHC43 is a parent can be used to produce double haploid plants. Double haploids are produced by the doubling of a set of chromosomes (1N) from a heterozygous plant to produce a completely homozygous individual. For example, see Wan et al., Theoretical and Applied Genetics, 77:889-892, 1989 and US Patent Publication No. 2003/0005479. This can be advantageous because the process omits the generations of selfing needed to obtain a homozygous plant from a heterozygous source.

[297] Haploid induction systems have been developed for various plants to produce haploid tissues, plants and seeds. The haploid induction system can produce haploid plants from any genotype by crossing a selected variety (as female) with an inducer variety. Such inducer varieties for maize include Stock 6 (Coe, 1959, *Am. Nat.* 93:381-382; Sharkar and Coe, 1966, *Genetics* 54:453-464) RWS (available online from the Universität Hohenheim), KEMS (Deimling, Roeber, and Geiger, 1997, *Vortr. Pflanzenzuchtg* 38:203-224), KMS and ZMS (Chalyk, Bylich and Chebotar, 1994, *MNL* 68:47; Chalyk and Chebotar, 2000*, Plant Breeding* 119:363-364), and indeterminate gametophyte (ig) mutation (Kermicle 1969 *Science* 166:1422-1424).

[298] Methods for obtaining haploid plants are also disclosed in Kobayashi, M. et al., *Journ. of Heredity* 71(1):9-14, 1980, Pollacsek, M., Agronomie (Paris) 12(3):247-251, 1992; Cho-Un-Haing et al., *Journ. of Plant Biol.,* 1996, 39(3):185-188; Verdoodt, L., et

al., Feb. 1998, 96(2):294-300; Genetic Manipulation in Plant Breeding, Proceedings International Symposium Organized by EUCARPIA, Sept. 8-13, 1985, Berlin, Germany; Chalyk et al., 1994, Maize Genet Coop. Newsletter 68:47; Chalyk, S. T., 1999, *Maize Genet. Coop. Newsletter* 73:53-54; Coe, R.H., 1959, *Am. Nat.* 93:381-382; Deimling, S. et al., 1997, *Vortr. Pflanzenzuchtg* 38:203-204; Kato, A., 1999, *J. Hered.* 90:276-280; Lashermes, P. et al., 1988, *Theor. Appl. Genet.* 76:570-572 and 76:405-410; Tyrnov, V.S. et al., 1984, Dokl. Akad. Nauk. SSSR 276:735-738; Zabirova, E.R. et al., 1996, Kukuruza I Sorgo N4, 17-19; Aman, M.A., 1978, *Indian J. Genet Plant Breed* 38:452-457; Chalyk S.T., 1994, Euphytica 79:13-18; Chase, S.S., 1952, *Agron. J.* 44:263-267; Coe, E.H., 1959, *Am. Nat.* 93:381-382; Coe, E.H., and Sarkar, K.R., 1964 *J. Hered.* 55:231-233; Greenblatt, I.M. and Bock, M., 1967, *J. Hered.* 58:9-13; Kato, A., 1990, *Maize Genet. Coop. Newsletter* 65:109-110; Kato, A., 1997, *Sex. Plant Reprod.* 10:96-100; Nanda, D.K. and Chase, S.S., 1966, *Crop Sci.* 6:213-215; Sarkar, K.R. and Coe, E.H., 1966, *Genetics* 54:453-464; Sarkar, K.R. and Coe, E.H., 1971, *Crop Sci.* 11:543-544; Sarkar, K.R. and Sachan J.K.S., 1972, *Indian J. Agric. Sci.* 42:781-786; Kermicle J.L., 1969, Mehta Yeshwant, M. R., Genetics and Molecular Biology, September 2000, 23(3):617-622; Tahir, M.S. et al. Pakistan Journal of Scientific and Industrial Research, August 2000, 43(4):258-261; Knox, R.E. et al. Plant Breeding, August 2000, 119(4):289-298; US Patent No. 5,639,951 and US Patent Publication No. 20020188965.

[299] Thus, certain embodiments include a process for making a homozygous 1PFHC43 progeny plant substantially similar to 1PFHC43 by producing or obtaining a seed from the cross of 1PFHC43 and another maize plant and applying double haploid methods to the F1 seed or F1 plant or to any successive filial generation. Such methods decrease the number of generations required to produce an inbred with similar genetics or characteristics to 1PFHC43. See Bernardo, R. and Kahler, A.L., Theor. Appl. Genet. 102:986-992, 2001.

[300] In particular, a process of making seed substantially retaining the molecular marker profile of maize variety 1PFHC43 is contemplated, such process comprising obtaining or producing F1 hybrid seed for which maize variety 1PFHC43 is a parent, inducing double haploids to create progeny without the occurrence of meiotic

segregation, obtaining the molecular marker profile of maize variety 1PFHC43, and selecting progeny that retain the molecular marker profile of 1PFHC43.

[301] Another embodiment is a maize seed derived from inbred maize variety 1PFHC43 produced by crossing a plant or plant part of inbred maize variety 1PFHC43 with another plant, wherein representative seed of said inbred maize variety 1PFHC43 has been deposited and wherein said maize seed derived from the inbred maize variety 1PFHC43 has 92%, 93%, 94%, 95%, 96%, 97%, 98% or 99% of the same polymorphisms for molecular markers as the plant or plant part of inbred maize variety 1PFHC43. The number of molecular markers used for the molecular marker profile can be found in the Panzea database which is available online from Panzea. The type of molecular marker used in the molecular profile can be but is not limited to Single Nucleotide Polymorphisms, SNPs. A maize seed derived from inbred maize variety 1PFHC43 produced by crossing a plant or plant part of inbred maize variety 1PFHC43 with another plant, wherein representative seed of said inbred maize variety 1PFHC43 has been deposited and wherein said maize seed derived from the inbred maize variety 1PFHC43 has essentially the same morphological characteristics as maize variety 1PFHC43 when grown in the same environmental conditions. The same environmental conditions may be, but is not limited to a side-by-side comparison. The characteristics can be those listed in Table 1. The comparison can be made using any number of professionally accepted experimental designs and statistical analysis.

[302] Use of 1PFHC43 in Tissue Culture

[303] Methods of tissue culturing cells of 1PFHC43 and a tissue culture of 1PFHC43 is provided. As used herein, the term “tissue culture” includes plant protoplasts, plant cell tissue culture, cultured microspores, plant calli, plant clumps, and the like. In certain embodiments, the tissue culture comprises embryos, protoplasts, meristematic cells, pollen, leaves or anthers derived from immature tissues of pollen, flowers, kernels, ears, cobs, leaves, husks, stalks, roots, root tips, anthers, silk, and the like. As used herein, phrases such as “growing the seed” or “grown from the seed” include embryo rescue, isolation of cells from seed for use in tissue culture, as well as traditional growing methods.

[304] Means for preparing and maintaining plant tissue cultures are well known in the art See, e.g., US Patent Nos. 5,538,880; 5,550,318, and 6,437,224, the latter describing tissue culture of maize, including tassel/anther culture. A tissue culture comprising organs such as tassels or anthers is provided which can be used to produce regenerated plants. (See, e.g., US Patent Nos. 5,445,961 and 5,322,789). Thus, in certain embodiments, cells are provided which upon growth and differentiation produce maize plants having the genotype and/or phenotypic characteristics of variety 1PFHC43.

[305] Seed Treatments and Cleaning

[306] Methods of harvesting the seed of the maize variety 1PFHC43 as seed for planting are provided. Embodiments include cleaning the seed, treating the seed, and/or conditioning the seed. Cleaning the seed is understood in the art to include removal of foreign debris such as one or more of weed seed, chaff, and plant matter, from the seed. Conditioning the seed is understood in the art to include controlling the temperature and rate of dry down of the seed and storing seed in a controlled temperature environment. Seed treatment is the application of a composition to the seed such as a coating or powder. Methods for producing a treated seed include the step of applying a composition to the seed or seed surface. Seeds are provided which have on the surface a composition. Biological active components such as bacteria can also be used as a seed treatment. Some examples of compositions are insecticides, fungicides, pesticides, antimicrobials, germination inhibitors, germination promoters, cytokinins, and nutrients.

[307] To protect and to enhance yield production and trait technologies, seed treatment options can provide additional crop plan flexibility and cost effective control against insects, weeds and diseases, thereby further enhancing the invention described herein. Seed material can be treated, typically surface treated, with a composition comprising combinations of chemical or biological herbicides, herbicide safeners, insecticides, fungicides, germination inhibitors and enhancers, nutrients, plant growth regulators and activators, bactericides, nematicides, avicides and/or molluscicides. These compounds are typically formulated together with further carriers, surfactants or application-

promoting adjuvants customarily employed in the art of formulation. The coatings may be applied by impregnating propagation material with a liquid formulation or by coating with a combined wet or dry formulation. Examples of the various types of compounds that may be used as seed treatments are provided in The Pesticide Manual: A World Compendium, C.D.S. Tomlin Ed., Published by the British Crop Production Council.

[308] Some seed treatments that may be used on crop seed include, but are not limited to, one or more of abscisic acid, acibenzolar-S-methyl, avermectin, amitrol, azaconazole, azospirillum, azadirachtin, azoxystrobin, *Bacillus* spp. (including one or more of *cereus, firmus, megaterium, pumilis, sphaericus, subtilis* and/or *thuringiensis*), *Bradyrhizobium* spp. (including one or more of *betae, canariense, elkanii, iriomotense, japonicum, liaonigense, pachyrhizi* and/or *yuanmingense*), captan, carboxin, chitosan, clothianidin, copper, cyazypyr, difenoconazole, etidiazole, fipronil, fludioxonil, fluoxastrobin, fluquinconazole, flurazole, fluxofenim, harpin protein, imazalil, imidacloprid, ipconazole, isoflavenoids, lipo-chitooligosaccharide, mancozeb, manganese, maneb, mefenoxam, metalaxyl, metconazole, myclobutanil, PCNB, penflufen, penicillium, penthiopyrad, permethrine, picoxystrobin, prothioconazole, pyraclostrobin, rynaxypyr, S-metolachlor, saponin, sedaxane, TCMTB, tebuconazole, thiabendazole, thiamethoxam, thiocarb, thiram, tolclofos-methyl, triadimenol, trichoderma, trifloxystrobin, triticonazole and/or zinc. PCNB seed coat refers to EPA registration number 00293500419, containing quintozen and terrazole. TCMTB refers to 2-(thiocyanomethylthio) benzothiazole.

[309] Seed varieties and seeds with specific transgenic traits may be tested to determine which seed treatment options and application rates may complement such varieties and transgenic traits in order to enhance yield. For example, a variety with good yield potential but head smut susceptibility may benefit from the use of a seed treatment that provides protection against head smut, a variety with good yield potential but cyst nematode susceptibility may benefit from the use of a seed treatment that provides protection against cyst nematode, and so on. Likewise, a variety encompassing a transgenic trait conferring insect resistance may benefit from the second mode of action conferred by the seed treatment, a variety encompassing a transgenic trait conferring herbicide resistance may benefit from a seed treatment with a

safener that enhances the plants resistance to that herbicide, etc. Further, the good root establishment and early emergence that results from the proper use of a seed treatment may result in more efficient nitrogen use, a better ability to withstand drought and an overall increase in yield potential of a variety or varieties containing a certain trait when combined with a seed treatment.

[310] Industrial Applicability

[311] Another embodiment is a method of harvesting the grain or plant material of the F1 plant of variety 1PFHC43 and using the grain or plant material in a commodity. Methods of producing a commodity plant product are also provided. Examples of maize grain or plant material as a commodity plant product include, but are not limited to, oils, meals, flour, starches, syrups, proteins, cellulose, silage, and sugars. Maize grain is used as human food, livestock feed, and as raw material in industry. The food uses of maize, in addition to human consumption of maize kernels, include both products of dry- and wet-milling industries. The principal products of maize dry milling are grits, meal and flour. The maize wet-milling industry can provide maize starch, maize syrups, and dextrose for food use. Maize oil is recovered from maize germ, which is a by-product of both dry- and wet-milling industries. Processing the grain can include one or more of cleaning to remove foreign material and debris from the grain, conditioning, such as addition of moisture to the grain, steeping the grain, wet milling, dry milling and sifting.

[312] Maize, including both grain and non-grain portions of the plant, is also used extensively as livestock feed, primarily for beef cattle, dairy cattle, hogs, and poultry.

[313] Industrial uses of maize include production of ethanol, maize starch in the wet-milling industry and maize flour in the dry-milling industry. The industrial applications of maize starch and flour are based on functional properties, such as viscosity, film formation, adhesive properties, and ability to suspend particles. The maize starch and flour have application in the paper and textile industries. Other industrial uses include applications in adhesives, building materials, foundry binders, laundry starches, explosives, oil-well muds, and other mining applications.

[314] Provided are plant parts other than the grain of maize and their use in industry: for example, methods for making stalks and husks into paper and wallboard and for using cobs for fuel and to make charcoal are provided.

[315] The seed of maize variety 1PFHC43, the plant produced from the seed, the hybrid maize plant produced from the crossing of the variety, hybrid seed, and various parts of the hybrid maize plant and transgenic versions of the foregoing, can be utilized for human food, livestock feed, and as a raw material in industry.

[316] All publications, patents, and patent applications mentioned in the specification are incorporated by reference herein for the purpose cited to the same extent as if each was specifically and individually indicated to be incorporated by reference herein.

[317] The foregoing invention has been described in detail by way of illustration and example for purposes of clarity and understanding. As is readily apparent to one skilled in the art, the foregoing are only some of the methods and compositions that illustrate the embodiments of the foregoing invention. It will be apparent to those of ordinary skill in the art that variations, changes, modifications, and alterations may be applied to the compositions and/or methods described herein without departing from the true spirit, concept, and scope of the invention.

[318] As used herein, the terms “comprises,” “comprising,” “includes,” “including,” “has,” “having,” “contains”, “containing,” “characterized by” or any other variation thereof, are intended to cover a non-exclusive inclusion.

[319] Unless expressly stated to the contrary, “or” is used as an inclusive term. For example, a condition A or B is satisfied by any one of the following: A is true (or present) and B is false (or not present), A is false (or not present) and B is true (or present), and both A and B are true (or present). The indefinite articles “a” and “an” preceding an element or component are nonrestrictive regarding the number of instances (i.e., occurrences) of the element or component. Therefore “a” or “an” should be read to include one or at least one, and the singular word form of the element or component also includes the plural unless the number is obviously meant to be singular.

[320] DEPOSITS

[321] Applicant will make a deposit of at least 625 seeds of Maize Variety 1PFHC43 with the Provasoli-Guillard National Center for Marine Algae and Microbiota (NCMA), 60 Bigelow Drive, East Boothbay, ME 04544, USA, with NCMA Accession Number XXXX. The seeds deposited with the ATCC on [date] were obtained from the seed of the variety maintained by Pioneer Hi-Bred International, Inc., 7250 NW 62nd Avenue, Johnston, Iowa, 50131 since prior to the filing date of this application. Access to this seed will be available during the pendency of the application to the Commissioner of Patents and Trademarks and persons determined by the Commissioner to be entitled thereto upon request. Upon issuance of any claims in the application, the Applicant will make the deposit available to the public pursuant to 37 C.F.R. §1.808. This deposit of the Maize Variety 1PFHC43 will be maintained in the NCMA depository, which is a public depository, for a period of 30 years, or 5 years after the most recent request, or for the enforceable life of the patent, whichever is longer, and will be replaced if it becomes nonviable during that period. Additionally, Applicant has or will satisfy all of the requirements of 37 C.F.R. §§1.801–1.809, including providing an indication of the viability of the sample upon deposit. Applicant has no authority to waive any restrictions imposed by law on the transfer of biological material or its transportation in commerce. Applicant does not waive any infringement of rights granted under this patent or under the Plant Variety Protection Act (7 USC 2321 et seq.).

[322] Breeding History of 1PFHC43

[323] Inbred Maize variety 1PFHC43 was developed by the following method. 1PFHC43 is an elite corn inbred line originated from a cross between inbred line PH1VNA and inbred line PH1D84. From this cross, ears were selected based on genetic analysis predicting disease, insect, and agronomic phenotypic performance. Inbred 1PFHC43 was developed by producing a doubled haploid from the F1 plants, selfing and using pedigree selection amongst the D1 lines, and selfing and bulking from the subsequent generations.

[324] Maize variety 1PFHC43, being substantially homozygous, can be reproduced by planting seeds of the variety, growing the resulting maize plants under self-pollinating or sib-pollinating conditions with adequate isolation, and harvesting the resulting seed using techniques familiar to the agricultural arts.

[325] TABLE 1 - VARIETY DESCRIPTION INFORMATION - 1PFHC43

1. TYPE:			
Grain Texture	FLINT-DENT		
2. MATURITY:	Days	Heat Units	
Comparative Relative Maturity (CRM)	111		
Emergence to 50% of plants in silk	54	1325	
Emergence to 50% of plants in pollen shed	55	1348	
3. PLANT:	Value	SE	Number
Plant Height (to tassel tip) (cm)	209.3	9.26	20
Ear Height (to base of top ear node) (cm)	72	6	20
Length of Top Ear Internode (cm)	13.6	1.43	20
Number of Nodes Above Ground	13.3	1.1	20
Anthocyanin of Brace Roots: 1= absent, 2= faint, 3= moderate, 4= dark	2		
4. LEAF:	Value	SE	Number

Width of Ear Node Leaf (cm)	8.1	0.62	20
Length of Ear Node Leaf (cm)	87.2	2.84	20
Number of Leaves Above Top Ear	6.2	0.73	20
Leaf Angle (Degrees)	29.8	7.33	20
(at anthesis, 2nd leaf above top ear to the stalk)			
Leaf Color	V. Dark Green		
Leaf Sheath Pubescence:	2		
1= none to 9= peach-like fuzz			

5. TASSEL:	Value	SE	Number
Number of Primary Lateral Branches	3	1.47	20
Number of Secondary Branches	0	0	20
Branch Angle from Central Spike (Degrees)	27	10.77	20
Tassel Length:	60.3	3.45	20
(from peduncle node to tassel tip) (cm)			
Peduncle Length:	25.2	3.17	20
(From top leaf node to lower branch) (cm)			
Central Spike Length (cm)	30.6	3.71	20
Flag Leaf Length (cm)	45.3	3.32	20
(from flag leaf collar to tassel tip)			
Pollen Shed: 0= male sterile, 9= heavy shed	4		
Bar Glumes (glume bands):	1		
1= absent, 2= present			
Anther Color:	yellow		
Glume Color:			

6a. EAR (Unhusked ear):	
Silk color: (~3 days after silk emergence)	Light Red
Fresh husk color:	Light Green
Dry husk color: (~65 days after 50% silking)	White
Ear position at dry husk stage:	1

(1= upright, 2= horizontal, 3= pendant)			
Husk Tightness:(1= very loose, 9= very tight)	6		
Husk Extension (at harvest):	2		
1= short (ears exposed), 2= medium (<8cm),			
3= long (8-10cm), 4= very long (>10cm)			
Length of Interior Husk (cm)	21.1	1.8	20

6b. EAR (Husked ear data):	Value	SE	Number
Shank Length (cm)	6.7	1.66	20
Ear Length (cm)	16.5	2.29	20
Ear Diameter at mid-point (mm)	43.6	1.38	20
Ear Weight (gm)	149.7	26.81	20
Number of Kernel Rows	15.6	0.99	20
Number of Kernels Per Row	30.9	6.09	20
Kernel Rows: 1= indistinct, 2= distinct	2		
Row Alignment:	2		
1= straight, 2= slightly curved, 3= spiral			
Ear Taper:	2		
1= slight cylind., 2= average, 3= extreme conic.			

7. KERNEL (Dried):	Value	SE	Number
Kernel Length (mm)	11.7	0.88	49
Kernel Width (mm)	8	0.6	49
Kernel Thickness (mm)			
Weight/100 Kernels (un-sized sample) (gm)	32.5		
Kernel Pericarp color	Clear		
Aleurone Color Pattern	Homozygous		
Aleurone Color	Clear		
Hard Endosperm Color	Yellow		

8. COB:	Value	SE	Number

Cob Diameter at mid-point (mm)	27.2	1.42	20
Cob Color	Pink-Orange		

Number is the number of individual plants that were scored.

Value is an average if more than one plant or plot is scored.

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

(VIA EFS-WEB)

Attorney Docket Number: 8572-US-NP

Title of Invention:	MAIZE INBRED 1PFHC43

As the below named inventor, I hereby declare that:

This declaration is directed to

☒ The attached application, or

☐ United States application or PCT international application number ____________________

filed on ______________________________.

☐ As amended on ________________________(if applicable).

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

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LEGAL NAME OF INVENTOR 1

Inventor: MICHIEL CB COETZEE Date (Optional): 06/22/2021

Signature: /Michiel CB Coetzee/

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number
17/366,059

APPLICATION AS FILED - PART I

	(Column 1)	(Column 2)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE($)	FEE($)		RATE($)	FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	320
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	700
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	800
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*				x 480 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
			TOTAL			TOTAL	1820

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1)		(Column 2)	(Column 3)					
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
17/366,059	07/02/2021	1662	1820	8572-US-NP	20	3

CONFIRMATION NO. 1295

FILING RECEIPT

OC000000127048353

27310
PIONEER HI-BRED INTERNATIONAL, INC.
7250 NW 62ND AVENUE
PO BOX 552
JOHNSTON, IA 50131-0552

Date Mailed: 07/20/2021

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

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Inventor(s)
MICHIEL CB COETZEE, INDIANAPOLIS, IN;

Applicant(s)
PIONEER HI-BRED INTERNATIONAL, INC., Johnston, IA

Assignment For Published Patent Application
PIONEER HI-BRED INTERNATIONAL, INC., JOHNSTON, IA

Power of Attorney: The patent practitioners associated with Customer Number 27310

Domestic Applications for which benefit is claimed - None.
A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 07/16/2021

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/366,059**

Projected Publication Date: Request for Non-Publication Acknowledged

Non-Publication Request: Yes

Early Publication Request: No
Title

MAIZE INBRED 1PFHC43

Preliminary Class

800

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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	Filing Date	2021-07-02
	First Named Inventor	COETZEE
	Art Unit	
	Examiner Name	
	Attorney Docket Number	8572-US-NP

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	Filing Date	2021-07-02
	First Named Inventor	COETZEE
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	1	US Patent Application Serial Number 17/377529 for MAIZE HYBRID X13R124, filed 2021-07-16	
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Examiner Signature		Date Considered	

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[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**	Application Number	17366059
	Filing Date	2021-07-02
	First Named Inventor	COETZEE
	Art Unit	
	Examiner Name	
	Attorney Docket Number	8572-US-NP

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/lmfitzpatrick/	Date (YYYY-MM-DD)	2021-11-16
Name/Print	LYNDA M. FITZPATRICK	Registration Number	60901

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/366,059	**01/06/2022 10:46:33 AM ET**	**8572-US-NP**

Title of Invention

MAIZE INBRED 1PFHC43

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1295	FILED BY	Tiffany Brotherson
PATENT CENTER #	60474805	FILING DATE	07/02/2021
CUSTOMER #	27310	FIRST NAMED INVENTOR	MICHIEL CB COETZEE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Lynda Fitzpatrick

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
20220106_8572-US-NP_IDS_Form.pdf	4	Information Disclosure Statement (IDS) Form (SB08)	613 KB

Warning: The PDF file contains multiple layers and must be flattened prior to submission. Documents submitted with multiple layers will be flattened by the USPTO when converted to an image. Layers marked as "invisible" will be lost during conversion.

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
20210716_8695-US-NP_X13R124_APPLICATION.pdf	56	Other Reference-Patent/App/Search documents	340 KB
20210722_8715-US-NP_X08R655_APPLICATION.pdf	56	Other Reference-Patent/App/Search documents	340 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
20220106_8572-US-NP_IDS_Form.pdf	355ED0598C7953B0A770FAE82C0ADDE334B7BAB018DDD72123F13280BDA900E4DC9D1E9B2BE558E61FF1E7B9275A5C8774ED0F3F36F41D0717014D145376EFA6
20210716_8695-US-NP_X13R124_APPLICATION.pdf	69059C2CF17B1CEAB289F172B72204B160E95774B1082C704A557B47818B1435371D1D1F8059E44AC8EC382A0D10E18A6A65B3611F8EE95D8CD8C4EE598C8BE4
20210722_8715-US-NP_X08R655_APPLICATION.pdf	86BD4003088628ADE2829888ED54C6A29E635122381FF80FB1CE725F28A131B6042F6C95B98168971949920B47EB8BE7D627EBEF3962DBA0F3B115E87E5205BD

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/366,059	07/02/2021	MICHIEL CB COETZEE	8572-US-NP	1295

27310 7590 11/14/2022
PIONEER HI-BRED INTERNATIONAL, INC.
7250 NW 62ND AVENUE
PO BOX 552
JOHNSTON, IA 50131-0552

EXAMINER	
BOGGS, RUSSELL T	

ART UNIT	PAPER NUMBER
1663	

NOTIFICATION DATE	DELIVERY MODE
11/14/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

IPsupport@corteva.com
tiffany.brotherson@corteva.com

PTOL-90A (Rev. 04/07)

Office Action Summary	**Application No.** 17/366,059	**Applicant(s)** COETZEE, MICHIEL CB	
	Examiner RUSSELL T BOGGS	**Art Unit** 1663	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 2 July 2021.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.
3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-20 is/are pending in the application.
5a) Of the above claim(s) _____ is/are withdrawn from consideration.
6) ☐ Claim(s) _____ is/are allowed.
7) ☑ Claim(s) 1-20 is/are rejected.
8) ☐ Claim(s) _____ is/are objected to.
9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☑ The specification is objected to by the Examiner.
11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
Certified copies:
a)☐ All b)☐ Some** c)☐ None of the:
1.☐ Certified copies of the priority documents have been received.
2.☐ Certified copies of the priority documents have been received in Application No. _____.
3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)
2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date ______.
3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ______.
4) ☐ Other: ______.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor-to-file provisions of the AIA.

Status

1. Claims 1-20 as filed on 2 July 2021 are examined herein.

This patent application is assigned to Pioneer Hi-Bred Int'l Inc.

Examiner's Notes & Claim Interpretation

2. Citations to Applicant's specification are abbreviated herein "Spec."

Examination of the instant patent application relies on the values presented in Table 1. Spec., pp. 59-62. In particular, e.g. anther color, silk color, cob color, and anthocyanin of brace roots were used. Other useful traits such as glume color are not provided.

Applicant defines "locus conversion" beginning in paragraphs 008 and 121. The definition(s) explicitly allow for the possibility of more than one locus conversion. Applicant also defines "a" very broadly in paragraph 319.

For the purpose of examining he instant claimed 1PFHC43 and comparing it to other maize plants in the art, in the interest of compact prosecution, "a single locus conversion" or "a locus conversion" is interpreted as if refers to a single locus conversion. As discussed further elsewhere, the scope of the limitation is considerably larger in view of the explicit definitions in the specification.

Similarly, for these purposes, "a trait" is interpreted herein as being ONE trait or only a small number. Otherwise, given the extremely broad definition of "a" / "an" the claims arguably could include all maize plants. This interpretation is also consistent with the limited number of traits listed in claim 11.

Also, “a transgene” is interpreted herein as being ONE transgene or only a small number. It is believed that this is consistent with how the term is used in the art. In general, a multitude of transgenes are not added to a maize line.

The above is a reasonable approach given the following.

A variety is distinguished from other plants of the same species by DUS traits and/or by genetic fingerprint. In the United States, the genetic variation for commercial varieties of maize is limited with only a limited number of ancestors which may limit the potential for genetic improvement of maize . E.g. Moore (2008) Farm Industry News) (“A Shallow Gene Pool”), p. 3.

Also, in Fehr (1987) (“Backcross Method” in Principles of Cultivar Development (Macmillan Pub. Co. (New York)) pp. 360-76), the backcross method is described as restoring 75% of the recurrent parent genome after the first backcross and restoring 87.5% of the recurrent parent genome after the second backcross (*see* Fig. 28-1, p. 362).

No request for Information under 37 CFR § 1.105 is made for one of the parent lines (Spec, p. 59) is made because it is the subject of: U.S. Patent No. 8,759,636 B1, issued on 24 June 2014 for PH1D84. “Maize Inbred PH1D84.”

This patent is listed in the attached IDS.

Also listed in the attached IDS are Application Serial Nos. 17/377,529 & 17/382,716. These applications each features a hybrid in which the instant claimed inbred is one of the parents.

No rejection under 35 USC 103 is made because there is no motivation in the prior art to select the particular other parent in either application.

A request for Information under 37 CFR § 1.105 is attached to this Office action for the other parent.

Specification

3. The disclosure is objected to because of the following informalities.

The specification is objected to because in the “Deposits” section (Spec. p. 58) there are placeholders – “[date] and XXXX” for the accession numbers and the date of the deposit.

Appropriate correction is requested.

Claim Objections

4. Claims 1, 2, 10, 18 are objected to because of the following informalities.

Claims 1, 10 and 18 are objected to because of the following informality. These claims all have “XXXX” as a place-holder for the deposit number.

Claim 2 is objected to because of the following reason. Claim 2 refers to “the plant part.” That plant part can be “an ovule.” That plant part can also be “pollen” which suggests a plurality of pollen grains. In general it is preferable to restrict an invention to a single embodiment. Applicant is requested to reconsider the plurality of what is being claimed and consider amending the claim. Certainly, pollen (plural) is a plant part as in an ovule.

35 USC § 112(b) based Claim Rejections

The following is a quotation of 35 U.S.C. 112(b):

> (B) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-20 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

In this first rejection under 35 USC 112(b), claims 1, 8, 10 and 18 are rejected because they recite the limitation “1PFHC43” in reference to maize plants without referencing a perfected deposit. The meaning of this limitation is uncertain and creates ambiguity in the claims and thus renders the claims indefinite. The term "1PFHC43" is not well known and generally accepted in the art, and the use of this name by itself does not carry art-recognized limitations defining the specific characteristics or essential characteristics that are associated with this denomination. In addition, the names appears to be arbitrary, and the specific characteristics associated therewith could be modified, as there is no written description of a maize plant that encompasses all of its traits except by deposit. Thus the term in question lacks a general art-accepted meaning and Applicant does not explicitly define the term in the specification.

Furthermore, the meaning of this term could arbitrarily change to designate something different during the lifetime of a patent. Thus, one's ability to determine the metes and bounds of the claim would be impaired. See *In re Hammack*, 427 F.2d 1378, 1382; 166 USPQ 204, 208 (CCPA 1970).

Dependent claims are included in this rejection because provide limitations obviating the rejection.

Claim 18 is additionally rejected because it references "variety 1PFHC43 further [comprising] a transgene that it inherited by the seed." Claim 18, l. 4. For the purposes of this application, the deposit defines the variety. Said deposit either has or does not have the referenced transgene. Since it is ambiguous, the claim is indefinite.

As discussed elsewhere in this Office action, since Applicant will deposit seeds to an inbred line, Applicant has claims where a transgene is added to the inbred variety represented by the deposited seeds.

35 USC § 112(a) based Claim Rejections

The following is a quotation of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), first paragraph:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

> art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The Enablement Requirement of 35 USC 112(a) (Deposit)

6. Claims 1-20 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The invention appears to employ novel plants designated inbred maize variety 1PFHC43. Since the plant is essential to the claimed invention it must be obtainable by a repeatable method set forth in the specification or otherwise be readily available to the public. If the plant is not so obtainable or available, the requirements of 35 U.S.C. § 112 may be satisfied by a deposit of the seeds. A deposit of 625 seeds of each of the claimed embodiments is considered sufficient to ensure public availability.

The specification does not disclose a repeatable process to obtain the plant and thus it is not apparent if the plant is readily available to the public with respect to this application. The specification does not teach such a process. Therefore Applicant must deposit seeds to comply with 35 USC 112(a). If a deposit is made, the deposit must be accepted under the terms of the Budapest Treaty or the results or a viability test must be provided.

Also, a statement, affidavit or declaration by Applicant, or a statement by an attorney of record over his or her signature and registration number, or someone empowered to make such a statement, stating that the instant invention will be irrevocably and without restriction released to the public upon the issuance of a patent, is required to satisfy the deposit requirement made herein.

Dependent claims are included in this rejection.

Applicant stated an intention to deposit seeds. Spec., p. 58.

The written description requirement of 35 USC 112(a)

7. Claims 10 and 12-20 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for pre-AIA the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 10 is drawn to a converted seed, plant, plant part or plant cell of inbred maize variety 1PFHC43. The converted plant comprises the locus conversion and otherwise comprises the physiological and morphological characteristics of maize variety 1PFHC43 when grown under the same environmental conditions. Although the claim is not explicit, it implies that that the locus conversion may affect the physiological and morphological characteristics – this is a reasonable interpretation. In the alternative, the locus conversion(s) may not significantly change physiological and morphological characteristics after backcrossing. Claim 12, for example, broadens the scope still farther by crossing the plant of claim 10.

Further the specification does not provide an explicit definition for "locus conversion" that limits its scope, but discusses its meaning in paragraph 121. Applicant asserts that one or more locus conversion traits may by incorporated. *Id.* Applicant also explicitly provides an extremely broad, “nonrestrictive” definition of “a”. *Id.*, para. 319.

Therefore claim 10 reads on the deposited seed with an unlimited number of locus conversions relative to the deposited seeds described by the deposit-to-be-made. Fehr (*op. cit.*) teaches the during backcrossing traits from both parents are found in the progeny. Furthermore, Moore (*op. cit.*) teaches that the gene pool for maize in this country is very shallow. Therefore the scope of the claimed genus is certainly very large. In view of the teachings of Moore, the claims arguably read on any maize plant.

Claims 12-17 do not impact the scope of the claims and are therefore included in this rejection.

Dependent claim 11, on the other hand, restricts the scope of the claim.

Thus the rejected claims read a vast genus of plants comprising an unlimited number of converted loci. The claims are open-ended with respect to how many locus conversions are made. The Applicants do not describe a seed of said converted plant having a single locus conversion. Variety 1PFHC43 is described and enabled by the deposited seeds and does not have a “locus conversion” relative to the claimed and described plant.

Further, one form of locus conversion, a transgene, can be incorporated either by direct transformation or by backcrossing with another maize plant that has the transgene. If it is added by backcrossing, it can introduce and/or modify other traits.

One of ordinary skill in the art would thus recognize that the resulting plant could comprise transgenes and/or locus conversions in addition to the one that was introduced. Thus, the resulting plant would differ genotypically and phenotypically from the parent plant.

Thus these claims are "reach through" claims in which the Applicant has described a starting material and at least one method step, however, they have not described the resulting product, and the genus of products that can be produced by the recited method steps and materials is so large that one of skill in the art is not able to envision the members of the genus. See e.g. *Univ. of Rochester v. G.D. Searle & Co.*, 358 F.3d 916, 920-23, 69 USPQ2d 1886, 1890-93 (Fed. Cir. 2004).

See also *Vas-Cath Inc. v. Mahurkar*, which teaches that

> “the purpose of the written description is for the purpose of warning an innocent purchaser, or other person using a machine, of his [or her] infringement of the patent; and at the same time, of taking from the inventor the means of practicing upon the credulity or the fears of other persons, by pretending that his invention is more than what it really is, or different from its ostensible objects, that the patentee is required to distinguish his invention in his specification.

Vas-Cath Inc. v. Mahurkar, 935 F.2d 1555, 1561, 19 U.S.P.Q.2d 1111, 1115 (Fed. Cir. 1991).

Therefore, in the instant application, the disclosure of a single maize inbred 1PFHC43 does not provide adequate written description for the claimed genera of plants.

The specification fails to describe the fully array of plants comprising the genera of transgenes, heritable traits and/or locus conversions encompassed by the rejected claims, e.g. claim 10. The specification fails to provide an adequate written description to support the breadth of the claims, Applicant has not demonstrated possession to one of skill in the art of the instant invention as broadly as claimed at the time of filing.

In instant application, there is no way that a practitioner would be able to determine if any particular corn plant is infringing the instant claims, and therefore, the public has not been put on notice with a sufficient description of the claimed invention.

Claim 18 is included in this rejection under the following reasoning. Claim 18 is drawn to a hybrid seed where one parent is derived from 1PFHC43 further comprises a transgene. Although, as discussed above, this interpreted as being a single transgene or a small number of transgenes, the claim is not specific in terms of how the transgene is added or how many are added. If the transgene is added by backcrossing, additional, unspecified characteristics may also be added. Therefore the genus encompassed by the claim is much broader than an F1 hybrid created by transforming the deposited seed/plant and then crossing it with another maize plant.

Dependent claims are included in this rejection because none provide further limitations obviating this rejection. For example, claim 17 is drawn to a method of isolating nucleic acids. There is no evidence in the record hat this is not routine using well-established techniques. Its patentability depends on the patentability of the inbred variety.

Second Examiner's Note

8. Neither the undersigned examiner nor the Office is taking the position that the deposited seeds together with the description in Table 1 cannot adequately describe and/or enable a single locus conversion. It is just that when the claims are interpreted in view of the explicit definitions in the specification, the claims read on an unlimited number of locus conversions.

Allowable Subject Matter

9. The claimed maize variety 1PFHC43 appears to be free of the prior art of record.

For example, the claimed 1PFHC43 variety is somewhat similar in phenotype to the maize inbred LH244 taught by US Patent No. 6,252,148 , issued on 26 June 2001 (Table 1, cols. 5-7) (the " '148 Patent"),

Both the instant 1PFHC43 and the LH244 from the '148 Patent has/have yellow anthers, light red silk, faint brace root anthocyanin, yellow endosperm, and pink-orange cobs.

However, instant 1PFHC43 has/have flint-dent grain, slightly curved rows, and clear aleurone; while the LH244 has/have straight rows, white aleurone and dent grain.

The claimed 1PFHC43 variety is also somewhat similar in phenotype to the maize variety PHACE taught by US Patent Publication No. 2005/0257298 A1, 17 November 2005 (Table 1, pp. 19-21). They can be distinguished, however, at least on the basis of flint-dent grain versus dent grain.

Conclusion

10. No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RUSSELL T BOGGS whose telephone number is (571)272-2805. The examiner can normally be reached on Monday - Friday, 0800 to 1830 Mtn.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amjad Abraham can be reached on 571-270-0708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see https://ppairmy.uspto.gov/pair/PrivatePair. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/RUSSELL T BOGGS/
Examiner, Art Unit 1663

Request for Information under 37 CFR § 1.105

Applicant and the assignee of this application are required under 37 CFR § 1.105 to provide the following information that the examiner has determined is reasonably necessary to the examination of this application.

This request is being made for the following reasons:

Applicant is claiming a seed of plant variety "1PFHC43," but the instant specification is silent about some of the starting materials and methods were used to produce plant variety "1PFHC43" with respect to the parent PH1VNA (Spec. p. 59). The requested information is required to make a meaningful and complete search of the prior art.

Response to this requirement, if known, please provide answers to each of the following interrogatories eliciting factual information regarding the parental line / variety PH1VNA (Spec., p. 59):

(i) Please supply the breeding methodology and history regarding the development of the instant variety.

a) Such information should include the all the designations / denominations used for the original parental lines.

b) Information should also include information pertaining to the public availability of the original parental lines.

c) The breeding method used should be set forth such as whether single seed descent, bulk method, backcross method, or some other method was used.

d) The filial generation in which the instant plant was chosen should be set forth.

e) Information pertaining to the homozygosity or heterozygosity of the parents as well as the instant plant should be set forth.

f) Are there any patent applications or patents in which sibs of the instant plant are claimed? If so, please set forth their serial numbers as well as the names of the sibs.

If Applicant views any or all of the above requested information as a Trade Secret, then Applicant should follow the guidance of MPEP § 724.02 when submitting the requested information.

In responding to those requirements that require copies of documents, where the document is a bound text or a single article over 50 pages, the requirement may be met by providing copies of those pages that provide the particular subject matter indicated in the requirement, or where such subject matter is not indicated, the subject matter found in applicant's disclosure. Please indicate where the relevant information can be found.

The fee and certification requirements of 37 CFR § 1.97 are waived for those documents submitted in reply to this requirement. This waiver extends only to those documents within the scope of this requirement under 37 CFR § 1.105 that are included in the applicant's first complete communication responding to this requirement. Any supplemental replies subsequent to the first communication responding to this requirement and any information disclosures beyond the scope of this requirement under 37 CFR § 1.105 are subject to the fee and certification requirements of 37 CFR § 1.97.

The applicant is reminded that the reply to this requirement must be made with candor and good faith under 37 CFR § 1.56. Where the applicant does not have or cannot readily obtain an item of required information, a statement that the item is unknown or cannot be readily obtained may be accepted as a complete reply to the requirement for that item.

This requirement is an attachment of the enclosed Office action. A complete reply to the enclosed Office action must include a complete reply to this requirement. The time period for reply to this requirement coincides with the time period for reply to the enclosed Office action.

Notice of References Cited	Application/Control No. 17/366,059	Applicant(s)/Patent Under Reexamination COETZEE, MICHIEL CB
	Examiner RUSSELL T BOGGS	Art Unit 1663 — Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-8759636-B1	06-2014	Smalley; Matthew David	A01H6/4684	800/278
*	B	US-6252148-B1	06-2001	Armstrong; Mark F.	A01H5/10	800/301
*	C	US-20050257298-A1	11-2005	Benson, David Lee	A01H6/4684	800/320.1
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Moore (2008) Farm Industry News) (“A Shallow Gene Pool”), p. 3
	V	Fehr (1987) (“Backcross Method” in Principles of Cultivar Development (Macmillan Pub. Co. (New York)) pp. 360-76)
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

U.S. Patent and Trademark Office
PTO-892 (Rev. 01-2001) **Notice of References Cited** Part of Paper No. 20221103

Search Notes	**Application/Control No.** 17/366,059	**Applicant(s)/Patent Under Reexamination** COETZEE, MICHIEL CB
	Examiner RUSSELL T BOGGS	**Art Unit** 1663

CPC - Searched*		
Symbol	**Date**	**Examiner**

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	**Date**	**Examiner**
inventor search in PE2E	11/04/2022	RTB
PE2E search as per attached for phenotypes	11/04/2022	RTB
PE2E search as per attached for parents	11/04/2022	RTB
NPL search as per attached	11/05/2022	RTB

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**

/RUSSELL T BOGGS/ Examiner, Art Unit 1663	

Your search - **1PFHC43** - did not match any articles.

Suggestions:

- Make sure all words are spelled correctly.
- Try different keywords.
- Try more general keywords.
- Try your query on the entire web

Google 1PFHC43

All Images Videos Shopping Maps More Tools

About 0 results (0.32 seconds)

Your search - **1PFHC43** - did not match any documents.

Suggestions:

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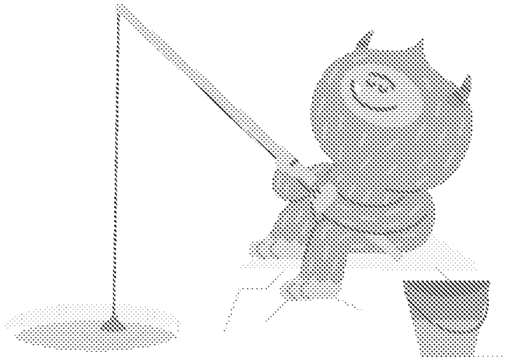
- Try more general keywords.



Snyderville, Utah - Based on your places (Home) - Update location

Help Send feedback Privacy Terms

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CONFORMED SUBMISSION TYPE:      424B2
PUBLIC DOCUMENT COUNT:          7
FILED AS OF DATE:               20210401
DATE AS OF CHANGE:              20210401

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                CENTRAL INDEX KEY:                      0001045520
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in this preliminary pricing supplement is not complete and may be changed. This preliminary pricing
supplement and the accompanying underlying
supplement, prospectus supplement and prospectus are not an offer to sell these securities and we are
not soliciting an offer to buy
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these securities in any jurisdiction where the offer or sale is not permitted.</B></FONT></P>

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securities do not pay interest, do not repay a fixed amount of principal at maturity and are subject
to potential automatic call upon the terms described below. Any return you receive on the securities
and whether they are automatically called will depend on the performance of the Index</FONT></TD>
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the principal amount of your securities </FONT></TD></TR>
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subject to the credit risk of Canadian Imperial Bank of Commerce and you will have no ability to
pursue any securities included in the Index for payment; if Canadian Imperial Bank of Commerce
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features and investing in the securities
involves risks not associated with an investment in conventional debt securities. See &ldquo;Risk
Factors&rdquo; beginning on page PRS-8
herein and beginning on page S-1 of the accompanying underlying supplement, page S-1 of the
prospectus supplement and page 1 of the prospectus.</B></P>

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<P STYLE="font: 8pt Times New Roman, Times, Serif; margin: 0pt 0"><B>The securities are unsecured
obligations of Canadian Imperial Bank
of Commerce and all payments on the securities are subject to the credit risk of Canadian Imperial
Bank of Commerce. The securities will
not constitute deposits insured by the Canada Deposit Insurance Corporation, the U.S. Federal Deposit
Insurance Corporation or any other
government agency or instrumentality of Canada, the United States or any other jurisdiction. The
securities are not bail-inable debt securities
(as defined on page 6 of the prospectus).</B></P>

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<P STYLE="font: 8pt Times New Roman, Times, Serif; margin: 0pt 0"><B>Neither the Securities and
Exchange Commission (the &ldquo;SEC&rdquo;)
nor any state or provincial securities commission has approved or disapproved of these securities or
determined if this pricing supplement
or the accompanying underlying supplement, prospectus supplement and prospectus is truthful or
complete. Any representation to the contrary
is a criminal offense.</B></P>

<P STYLE="font: 8pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<TABLE CELLSPACING="0" CELLPADDING="0" STYLE="font: 11pt Times New Roman, Times, Serif; width: 100%;
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  <TR STYLE="vertical-align: bottom">
    <TD COLSPAN="2">&nbsp;</TD>
    <TD STYLE="border-bottom: black 1pt solid">&nbsp;</TD>
    <TD STYLE="border-bottom: black 1pt solid">&nbsp;</TD>
    <TD STYLE="border-bottom: black 1pt solid">&nbsp;</TD>
    <TD STYLE="border-bottom: black 1pt solid; text-align: center"><FONT STYLE="font-family: Times
New Roman, Times, Serif; font-size: 8pt"><B>Original Offering Price</B></FONT></TD>
    <TD STYLE="border-bottom: black 1pt solid">&nbsp;</TD>
    <TD STYLE="border-bottom: black 1pt solid; text-align: center"><FONT STYLE="font-family: Times
New Roman, Times, Serif; font-size: 8pt"><B>Maximum&nbsp;Underwriting&nbsp;Discount&nbsp; <SUP>(1)
(2)</SUP></B></FONT></TD>
    <TD STYLE="border-bottom: black 1pt solid">&nbsp;</TD>
    <TD STYLE="border-bottom: black 1pt solid; text-align: center"><FONT STYLE="font-family: Times
New Roman, Times, Serif; font-size: 8pt"><B>Minimum&nbsp;Proceeds&nbsp;to&nbsp;CIBC</B></FONT></TD>
</TR>
  <TR STYLE="background-color: #E0E3E2">
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text-indent: -12pt"><FONT STYLE="font-family: Times New Roman, Times, Serif; font-size: 8pt"><B>Per
Security</B></FONT></TD>
    <TD STYLE="border-bottom: white 1pt solid; border-left: white 1pt solid; vertical-align:
bottom">&nbsp;</TD>
    <TD STYLE="border-bottom: white 1pt solid; vertical-align: bottom">&nbsp;</TD>
    <TD STYLE="border-bottom: white 1pt solid; vertical-align: bottom"></TD>
    <TD STYLE="border-bottom: white 1pt solid; vertical-align: bottom; text-align: center"><FONT
STYLE="font-family: Times New Roman, Times, Serif; font-size: 8pt">$1,000.00</FONT></TD>
    <TD STYLE="border-bottom: white 1pt solid; border-left: white 1pt solid; vertical-align:
bottom">&nbsp;</TD>
    <TD STYLE="border-bottom: white 1pt solid; vertical-align: bottom; text-align: center"><FONT
STYLE="font-family: Times New Roman, Times, Serif; font-size: 8pt">Up to $31.50</FONT></TD>
    <TD STYLE="border-bottom: white 1pt solid; border-left: white 1pt solid; vertical-align:
bottom">&nbsp;</TD>
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    <TD STYLE="border-bottom: white 1pt solid; vertical-align: bottom; text-align: center"><FONT
STYLE="font-family: Times New Roman, Times, Serif; font-size: 8pt">At least $968.50</FONT></TD></TR>
  <TR STYLE="background-color: #E0E3E2">
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STYLE="font-family: Times New Roman, Times, Serif; font-size: 8pt"><B>Total&nbsp;</B></FONT></TD>
    <TD STYLE="border-left: white 1pt solid; vertical-align: bottom">&nbsp;</TD>
    <TD STYLE="vertical-align: bottom">&nbsp;</TD>
    <TD STYLE="vertical-align: bottom">&nbsp;</TD>
    <TD STYLE="vertical-align: bottom; text-align: center"><FONT STYLE="font-family: Times New Roman,
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    <TD STYLE="border-left: white 1pt solid; vertical-align: bottom">&nbsp;</TD>
    <TD STYLE="vertical-align: bottom; text-align: center"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 8pt">$</FONT></TD>
    <TD STYLE="border-left: white 1pt solid; vertical-align: bottom">&nbsp;</TD>
    <TD STYLE="vertical-align: bottom; text-align: center"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 8pt">$</FONT></TD></TR>
  <TR STYLE="vertical-align: top">
    <TD><FONT STYLE="font-family: Times New Roman, Times, Serif; font-size: 8pt">&nbsp;<SUP>(1)
</SUP>&nbsp;</FONT></TD>
    <TD COLSPAN="9"><FONT STYLE="font-family: Times New Roman, Times, Serif; font-size: 8pt">The
agent, Wells Fargo Securities, LLC (&ldquo;Wells Fargo Securities&rdquo;), will receive an
underwriting discount of up to $31.50 per security. The agent may resell the securities to other
securities dealers at the principal amount less a concession not in excess of $17.50 per security.
Such securities dealers may include Wells Fargo Advisors (&ldquo;WFA&rdquo;) (the trade name of the
retail brokerage business of Wells Fargo Clearing Services, LLC and Wells Fargo Advisors Financial
Network, LLC, each an affiliate of Wells Fargo Securities). In addition to the selling concession
allowed to WFA, the agent will pay $0.75 per security of the underwriting discount to WFA as a
distribution expense fee for each security sold by WFA. See &ldquo;Supplemental Plan of
Distribution&rdquo; in this pricing supplement and &ldquo;Use of Proceeds and Hedging&rdquo; in the
underlying supplement for information regarding how we may hedge our obligations under the
securities.</FONT></TD></TR>
  <TR STYLE="vertical-align: top">
    <TD><FONT STYLE="font-family: Times New Roman, Times, Serif; font-size: 8pt"><SUP>(2)</SUP>
</FONT></TD>
    <TD COLSPAN="9"><FONT STYLE="font-family: Times New Roman, Times, Serif; font-size: 8pt">In
respect of certain securities sold in this offering, the Issuer may pay a fee of up to $1.00 per
security to selected securities dealers in consideration for marketing and other services in
connection with the distribution of the securities to other securities dealers.</FONT></TD></TR>
  <TR STYLE="font-size: 1pt">
    <TD STYLE="font-size: 1pt; width: 1%"><FONT STYLE="font-size: 1pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 1pt; width: 12%"><FONT STYLE="font-size: 1pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 1pt; width: 1%"><FONT STYLE="font-size: 1pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 1pt; width: 1%"><FONT STYLE="font-size: 1pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 1pt; width: 1%"><FONT STYLE="font-size: 1pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 1pt; width: 16%"><FONT STYLE="font-size: 1pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 1pt; width: 1%"><FONT STYLE="font-size: 1pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 1pt; width: 38%"><FONT STYLE="font-size: 1pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 1pt; width: 1%"><FONT STYLE="font-size: 1pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 1pt; width: 28%"><FONT STYLE="font-size: 1pt">&nbsp;</FONT></TD></TR>
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<P STYLE="font: 8pt Times New Roman, Times, Serif; margin: 0pt 0">Our estimated value of the
securities on the Pricing Date, based on
our internal pricing models, is expected to be at least $922.60 per security. The estimated value is
expected to be less than the principal
amount of the securities. See &ldquo;The Estimated Value of the Securities&rdquo; in this pricing
supplement.</P>

<P STYLE="font: 8pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 12pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"><B>Wells Fargo
Securities</B></P>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"></P>

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Securities&mdash;Auto-Callable with Fixed <BR>  Percentage
Buffered Downside<BR>  <FONT STYLE="font-size: 10pt">Principal at Risk Securities Linked to the
S&amp;P 500<SUP>&reg;</SUP>&nbsp;Index
due May 7, 2025</FONT></B></TD>
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SRC="tm218219d79_424b2img001.jpg" ALT=""></TD></TR>
</TABLE>


<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"><B>TERMS OF
THE SECURITIES</B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The information in this
&ldquo;Terms of the Securities&rdquo; section
is only a summary and is qualified by the more detailed information set forth in this pricing
supplement, the underlying supplement, the
prospectus supplement and the prospectus, each filed with the SEC. See &ldquo;About This Pricing
Supplement&rdquo; in this pricing supplement.</P>

<P STYLE="font: 6pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

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    <TD STYLE="vertical-align: bottom; padding-bottom: 6pt">&nbsp;</TD>
    <TD COLSPAN="3" STYLE="padding-bottom: 6pt"><FONT STYLE="font-family: Times New Roman, Times,
Serif; font-size: 10pt">Canadian Imperial Bank of Commerce</FONT></TD></TR>
  <TR>
    <TD STYLE="font-size: 10pt; vertical-align: top; border-bottom: white 1pt solid; background-
color: #E0E3E2; padding-bottom: 6pt"><FONT STYLE="font-size: 10pt"><B>Reference
    Asset:</B></FONT></TD>
    <TD STYLE="vertical-align: bottom; padding-bottom: 6pt">&nbsp;</TD>
    <TD COLSPAN="3" STYLE="vertical-align: bottom; padding-bottom: 6pt"><FONT STYLE="font-family:
Times New Roman, Times, Serif; font-size: 10pt">The S&amp;P 500<B><SUP>&reg;</SUP></B> Index
(Bloomberg ticker symbol &ldquo;SPX&rdquo;) </FONT></TD></TR>
  <TR>
    <TD STYLE="font-size: 10pt; vertical-align: top; border-bottom: white 1pt solid; background-
color: #E0E3E2; padding-bottom: 6pt"><FONT STYLE="font-size: 10pt"><B>Pricing
    Date:</B></FONT></TD>
    <TD STYLE="vertical-align: bottom; padding-bottom: 6pt">&nbsp;</TD>
    <TD COLSPAN="3" STYLE="vertical-align: bottom; padding-bottom: 6pt"><FONT STYLE="font-family:
Times New Roman, Times, Serif; font-size: 10pt">Expected to be April 30, 2021*.</FONT><FONT
STYLE="font-family: Times New Roman, Times, Serif; font-size: 6pt">&nbsp;</FONT></TD></TR>
  <TR>
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color: #E0E3E2; padding-bottom: 6pt"><FONT STYLE="font-size: 10pt"><B>Issue
    Date:</B></FONT></TD>
    <TD STYLE="vertical-align: bottom; padding-bottom: 6pt">&nbsp;</TD>
    <TD COLSPAN="3" STYLE="vertical-align: bottom; padding-bottom: 6pt"><FONT STYLE="font-family:
Times New Roman, Times, Serif; font-size: 10pt">Expected to be May 5, 2021* (to be determined on the
Pricing Date and expected to be the 3rd scheduled Business Day after the Pricing Date).</FONT><FONT
STYLE="font-family: Times New Roman, Times, Serif; font-size: 6pt">&nbsp;</FONT></TD></TR>
  <TR>
    <TD STYLE="font-size: 10pt; vertical-align: top; border-bottom: white 1pt solid; background-
color: #E0E3E2; padding-bottom: 6pt"><FONT STYLE="font-size: 10pt"><B>Principal
    Amount:</B></FONT></TD>
    <TD STYLE="vertical-align: bottom; padding-bottom: 6pt">&nbsp;</TD>
    <TD COLSPAN="3" STYLE="vertical-align: bottom; padding-bottom: 6pt"><FONT STYLE="font-family:
Times New Roman, Times, Serif; font-size: 10pt">$1,000 per security. References in this pricing
supplement to a &ldquo;security&rdquo; are to a security with a principal amount of $1,000.</FONT>
<FONT STYLE="font-family: Times New Roman, Times, Serif; font-size: 6pt">&nbsp;</FONT></TD></TR>
  <TR>
    <TD STYLE="font-size: 10pt; vertical-align: top; border-bottom: white 1pt solid; background-
color: #E0E3E2; padding-bottom: 6pt"><FONT STYLE="font-size: 10pt"><B>Automatic
    Call:</B></FONT></TD>
    <TD STYLE="vertical-align: bottom; padding-bottom: 6pt">&nbsp;</TD>
    <TD COLSPAN="3" STYLE="vertical-align: bottom">
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">If the Closing Level of the
Index on any Call Observation Date (including
    the Final Valuation Date) is greater than or equal to the Starting Level, the securities will be
automatically called, and on the related
    Call Payment Date you will be entitled to receive a cash payment per security in U.S. dollars
equal to the principal amount per security
    plus the Call Premium applicable to the relevant Call Observation Date. The last Call Observation
Date is the Final Valuation Date, and
    payment upon an automatic call on the Final Valuation Date, if applicable, will be made on the
Stated Maturity Date.</P>
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B>Any positive return on the
securities will be limited to the applicable
    Call Premium, even if the Closing Level of the Index on the applicable Call Observation Date
significantly exceeds the Starting Level.
    You will not participate in any appreciation of the Index beyond the applicable Call Premium.</B>
</P>
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>
    <P STYLE="font: 11pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">If the securities are automatically called,
    they will cease to be outstanding on the related Call Payment Date and you will have no further
rights under the securities after such
    Call Payment Date. You will not receive any notice from us if the securities are automatically
called.</FONT><FONT STYLE="font-size: 6pt">&nbsp;</FONT></P>
    <P STYLE="font: 11pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P></TD></TR>
  <TR>
    <TD ROWSPAN="6" STYLE="font-size: 10pt; vertical-align: top; width: 16%; border-bottom: white 1pt
solid; background-color: #E0E3E2"><FONT STYLE="font-size: 10pt"><B>Call
    Observation Dates and Call Premiums:</B></FONT></TD>
    <TD ROWSPAN="6" STYLE="vertical-align: bottom; width: 1%; padding-bottom: 6pt">&nbsp;</TD>
    <TD STYLE="vertical-align: bottom; width: 18%; padding-bottom: 6pt"><FONT STYLE="font-family:
Times New Roman, Times, Serif; font-size: 10pt"><U>Call Observation Date</U></FONT></TD>
    <TD STYLE="vertical-align: bottom; width: 35%; padding-bottom: 6pt"><FONT STYLE="font-family:
Times New Roman, Times, Serif; font-size: 10pt"><U>Call Premium</U></FONT></TD>
    <TD STYLE="vertical-align: bottom; width: 30%">
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">Payment per Security upon</P>
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-indent: 0.25in"><U>an
Automatic Call</U></P></TD></TR>
  <TR>
    <TD STYLE="vertical-align: bottom; padding-bottom: 6pt"><FONT STYLE="font-family: Times New
Roman, Times, Serif; font-size: 10pt">May 5, 2022*</FONT></TD>
    <TD STYLE="vertical-align: top; padding-bottom: 6pt"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">[5.25 - 6.25%] of the principal amount</FONT></TD>
```

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    <TD STYLE="vertical-align: bottom; padding-bottom: 6pt"><FONT STYLE="font-family: Times New
Roman, Times, Serif; font-size: 10pt">[$1,052.50 - $1,062.50]</FONT></TD></TR>
  <TR>
    <TD STYLE="vertical-align: bottom; padding-bottom: 6pt"><FONT STYLE="font-family: Times New
Roman, Times, Serif; font-size: 10pt">May 5, 2023*</FONT></TD>
    <TD STYLE="vertical-align: top; padding-bottom: 6pt"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">[10.50 - 12.50%] of the principal amount</FONT></TD>
    <TD STYLE="vertical-align: bottom; padding-bottom: 6pt"><FONT STYLE="font-family: Times New
Roman, Times, Serif; font-size: 10pt">[$1,105.00 - $1,125.00]</FONT></TD></TR>
  <TR>
    <TD STYLE="vertical-align: bottom; padding-bottom: 6pt"><FONT STYLE="font-family: Times New
Roman, Times, Serif; font-size: 10pt">May 6, 2024*</FONT></TD>
    <TD STYLE="vertical-align: top; padding-bottom: 6pt"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">[15.75 - 18.75%] of the principal amount</FONT></TD>
    <TD STYLE="vertical-align: bottom; padding-bottom: 6pt"><FONT STYLE="font-family: Times New
Roman, Times, Serif; font-size: 10pt">[$1,157.50 - $1,187.50]</FONT></TD></TR>
  <TR>
    <TD STYLE="vertical-align: bottom; padding-bottom: 6pt"><FONT STYLE="font-family: Times New
Roman, Times, Serif; font-size: 10pt">April 30, 2025*</FONT></TD>
    <TD STYLE="vertical-align: top; padding-bottom: 6pt"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">[21.00 - 25.00%] of the principal amount</FONT></TD>
    <TD STYLE="vertical-align: bottom; padding-bottom: 6pt"><FONT STYLE="font-family: Times New
Roman, Times, Serif; font-size: 10pt">[$1,210.00 - $1,250.00]</FONT></TD></TR>
  <TR STYLE="vertical-align: bottom">
    <TD COLSPAN="3">
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The actual Call Premium and
payment per security upon an automatic
    call that is applicable to each Call Observation Date will be determined on the Pricing Date and
will be within the ranges specified in
    the foregoing table.</P>
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">We refer to April 30, 2025* as
the &ldquo;Final Valuation Date.&rdquo;</P>
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The Call Observation Dates are
subject to postponement for non-Trading
    Days and the occurrence of a market disruption event. See &ldquo;&mdash;Postponement of a
Calculation Day&rdquo; below.</P>
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P></TD></TR>
  <TR>
    <TD STYLE="font-size: 10pt; vertical-align: top; border-bottom: white 1pt solid; background-
color: #E0E3E2; padding-bottom: 6pt"><FONT STYLE="font-size: 10pt"><B>Call
    Payment Date:</B></FONT></TD>
    <TD STYLE="vertical-align: bottom; padding-bottom: 6pt">&nbsp;</TD>
    <TD COLSPAN="3" STYLE="vertical-align: bottom; padding-bottom: 6pt"><FONT STYLE="font-family:
Times New Roman, Times, Serif; font-size: 10pt">Five Business Days after the applicable Call
Observation Date (as each such Call Observation Date may be postponed pursuant to
&ldquo;&mdash;Postponement of a Calculation Day&rdquo; below, if applicable); <I>provided </I>that
the Call Payment Date for the last Call Observation Date will be the Stated Maturity Date.</FONT>
</TD></TR>
  <TR>
    <TD STYLE="font-size: 10pt; vertical-align: top; border-bottom: white 1pt solid; background-
color: #E0E3E2"><FONT STYLE="font-size: 10pt"><B>Stated
    Maturity Date:</B></FONT></TD>
    <TD STYLE="vertical-align: bottom; padding-bottom: 6pt">&nbsp;</TD>
    <TD COLSPAN="3" STYLE="vertical-align: bottom; padding-bottom: 6pt"><FONT STYLE="font-family:
Times New Roman, Times, Serif; font-size: 10pt">Expected to be May 7, 2025*. If the Final Valuation
Date is postponed, the Stated Maturity Date will be the later of (i) May 7, 2025* and (ii) three
Business Days after the Final Valuation Date, as postponed. No interest will be paid in respect of
such postponement. See &ldquo;&mdash;Postponement of a Calculation Day&rdquo; below. The securities
are not subject to redemption at the option of CIBC or repayment at the option of any holder of the
securities prior to the Stated Maturity Date.</FONT></TD></TR>
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<P STYLE="margin: 0">&nbsp;</P>
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<P STYLE="margin: 0"></P>

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Buffered Downside<BR>  <FONT STYLE="font-size: 10pt">Principal at Risk Securities Linked to the
S&amp;P 500<SUP>&reg;</SUP>&nbsp;Index
due May 7, 2025</FONT></B></TD>
<TD STYLE="padding-left: 2.75in; vertical-align: top; font-size: 10pt"><IMG
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color: #E0E3E2"><P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B>Payment at </B>
</P>
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B>Maturity:</B></P></TD>
    <TD STYLE="font-size: 10pt; vertical-align: bottom; padding-bottom: 6pt">&nbsp;</TD>
    <TD STYLE="font-size: 10pt; vertical-align: top; text-align: center"><P STYLE="font-size: 10pt;
text-align: left; margin-top: 0; margin-bottom: 0">If the Closing Level of the Index is less than the
Starting Level on each of the Call Observation Dates, the securities will not be automatically
called, and on the Stated Maturity Date, you will be entitled to receive a cash payment per security
in U.S. dollars determined as follows:</P>
                                                                                <P STYLE="font-size:
10pt; margin-top: 0; margin-bottom: 0">&nbsp;</P>
                                                                                <P STYLE="font-size:
10pt; text-align: left; margin-top: 0; margin-bottom: 0">&bull;&nbsp;&nbsp;if the Ending Level is
greater than or equal to the Threshold Level: $1,000; or</P>
                                                                                <P STYLE="font-size:
10pt; margin-top: 0; margin-bottom: 0">&nbsp;</P>
                                                                                <P STYLE="font-size:
10pt; text-align: left; margin-top: 0; margin-bottom: 0">&bull;&nbsp;&nbsp;if the Ending Level is
less than the Threshold Level: $1,000 minus:</P>
                                                                                <P STYLE="font-size:
10pt; margin-top: 0; margin-bottom: 0">&nbsp;</P>
                                                                                <P STYLE="font-size:
10pt; margin-top: 0; margin-bottom: 0"><IMG SRC="tm218219d79_424b2img002.jpg" ALT=""></P>
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10pt; text-align: left; margin-top: 0; margin-bottom: 0"><B>&nbsp;</B></P>
                                                                                <P STYLE="font-size:
10pt; text-align: left; margin-top: 0; margin-bottom: 0"><B>If
                                            the securities are not automatically called on or prior
to the Final Valuation Date and the
                                            Ending Level is less than the Threshold Level, you will
receive less, and possibly 90% less,
                                            than the principal amount of your securities at maturity.
</B></P></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt; vertical-align: top; border-bottom: white 1pt solid; background-
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color: #E0E3E2; padding-bottom: 6pt"><B>Threshold
    Level:</B></TD>
    <TD STYLE="font-size: 10pt; vertical-align: bottom">&nbsp;</TD>
    <TD COLSPAN="3" STYLE="font-size: 10pt; vertical-align: bottom; padding-bottom:
6pt">&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;,
    which is equal to 90% of the Starting Level.</TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt; vertical-align: top; border-bottom: white 1pt solid; background-
color: #E0E3E2; padding-bottom: 6pt"><B>Starting
    Level:</B></TD>
    <TD STYLE="font-size: 10pt; vertical-align: bottom">&nbsp;</TD>
    <TD COLSPAN="3" STYLE="font-size: 10pt; vertical-align: bottom; padding-bottom:
6pt">&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;, the Closing Level of the Index on the Pricing
    Date.</TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt; vertical-align: top; border-bottom: white 1pt solid; background-
color: #E0E3E2; padding-bottom: 6pt"><B>Ending
    Level:</B></TD>
    <TD STYLE="font-size: 10pt; vertical-align: bottom">&nbsp;</TD>
    <TD COLSPAN="3" STYLE="font-size: 10pt; vertical-align: bottom; padding-bottom: 6pt"><FONT
STYLE="font-family: Times New Roman, Times, Serif; font-size: 10pt">The
    &ldquo;Ending Level&rdquo; will be the Closing Level of the Index on the Final Valuation Date.
</FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt; vertical-align: top; border-bottom: white 1pt solid; background-
color: #E0E3E2; padding-bottom: 6pt"><B>Closing
    Level:</B></TD>
    <TD STYLE="font-size: 10pt; vertical-align: bottom">&nbsp;</TD>
    <TD COLSPAN="3" STYLE="font-size: 10pt; vertical-align: bottom; padding-bottom: 6pt"><FONT
STYLE="font-family: Times New Roman, Times, Serif; font-size: 10pt">The &ldquo;Closing Level&rdquo;
of the Index on any Trading Day means the official closing level of the Index as reported by the
Index Sponsor on such Trading Day.</FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt; vertical-align: top; border-bottom: white 1pt solid; background-
color: #E0E3E2"><B>Postponement of a
    Calculation Day:</B></TD>
    <TD STYLE="font-size: 10pt; vertical-align: bottom; padding-bottom: 6pt">&nbsp;</TD>
    <TD COLSPAN="3" STYLE="font-size: 10pt; vertical-align: bottom; padding-bottom: 6pt"><FONT
STYLE="font-family: Times New Roman, Times, Serif; font-size: 10pt">The Call Observation Dates
(including the Final Valuation Date) are each referred to as a &ldquo;calculation day.&rdquo; If any
calculation day is not a Trading Day, such calculation day will be postponed to the next succeeding
Trading Day. A calculation day is also subject to postponement due to the occurrence of a market
disruption event. See &ldquo;Additional Terms of the Securities&mdash;Market Disruption Events&rdquo;
in this pricing supplement.</FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt; vertical-align: top; border-bottom: white 1pt solid; background-
color: #E0E3E2; padding-bottom: 6pt"><B>Calculation
    Agent:</B></TD>
    <TD STYLE="font-size: 10pt; vertical-align: bottom">&nbsp;</TD>
    <TD COLSPAN="3" STYLE="font-size: 10pt; vertical-align: bottom; padding-bottom: 6pt"><FONT
STYLE="font-family: Times New Roman, Times, Serif; font-size: 10pt">CIBC</FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt; border-bottom: white 1pt solid; background-color: #E0E3E2; padding-
bottom: 6pt"><B>Material U.S. Tax
    Consequences:</B></TD>
    <TD STYLE="font-size: 10pt; vertical-align: bottom; padding-bottom: 6pt">&nbsp;</TD>
    <TD COLSPAN="3" STYLE="font-size: 10pt; vertical-align: bottom; padding-bottom: 6pt"><FONT
STYLE="font-family: Times New Roman, Times, Serif; font-size: 10pt">For a discussion of the material
U.S. federal income tax consequences of the ownership and disposition of the securities, see
&ldquo;Summary of U.S. Federal Income Tax Consequences&rdquo; in this pricing supplement and
&ldquo;Certain U.S. Federal Income Tax Consequences&rdquo; in the underlying supplement.</FONT></TD>
</TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt; border-bottom: white 1pt solid; background-color: #E0E3E2; padding-
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<B>Agent&rsquo;s
    Underwriting Discount and Other Fees:</B></FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: bottom; padding-bottom: 6pt">&nbsp;</TD>
    <TD COLSPAN="3" STYLE="font-size: 10pt; vertical-align: bottom; padding-bottom: 6pt"><FONT
STYLE="font-family: Times New Roman, Times, Serif; font-size: 10pt">Wells Fargo Securities. The agent
will receive an underwriting discount of up to $31.50 per security. The agent may resell the
securities to other securities dealers, including securities dealers acting as custodians, at the
principal amount of the securities less a concession of not in excess of $17.50 per security. Such
securities dealers may include WFA. In addition to the selling concession allowed to WFA, Wells Fargo
Securities will pay $0.75 per security of the underwriting discount to WFA as a distribution expense
fee for each security sold by WFA. In addition, in respect of certain securities sold in this
offering, the Issuer may pay a fee of up to $1.00 per security to selected securities dealers in
consideration for marketing and other services in connection with the distribution of the securities
to other securities dealers.</FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt; vertical-align: top; border-bottom: white 1pt solid; background-
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    <TD STYLE="font-size: 10pt; vertical-align: bottom; padding-bottom: 6pt">&nbsp;</TD>
    <TD COLSPAN="3" STYLE="font-size: 10pt; vertical-align: bottom; padding-bottom: 6pt"><FONT
STYLE="font-family: Times New Roman, Times, Serif; font-size: 10pt">$1,000 and any integral multiple
of $1,000.</FONT><FONT STYLE="font-family: Times New Roman, Times, Serif; font-size: 6pt">&nbsp;
</FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt; vertical-align: top; border-bottom: white 1pt solid; background-
color: #E0E3E2; padding-bottom: 6pt"><B>CUSIP
    / ISIN:</B></TD>
    <TD STYLE="font-size: 10pt; vertical-align: bottom; padding-bottom: 6pt">&nbsp;</TD>
    <TD COLSPAN="3" STYLE="font-size: 10pt; padding-bottom: 6pt"><FONT STYLE="font-family: Times New
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<P STYLE="font: 9pt Times New Roman, Times, Serif; margin: 0pt 0"><I>*To the extent that the issuer
makes any change to the expected Pricing
Date or expected Issue Date, the Call Observation Dates and Stated Maturity Date may also be changed
in the issuer&rsquo;s discretion
to ensure that the term of the securities remains the same.</I></P>

<P STYLE="font: 9pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 9pt Times New Roman, Times, Serif; margin: 0pt 0"></P>

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S&amp;P 500<SUP>&reg;</SUP>&nbsp;Index
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"><B>DETERMINING
TIMING AND AMOUNT OF PAYMENT ON
THE SECURITIES</B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The timing and amount of the
payment you will receive will be determined
as follows:</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>




<P STYLE="text-align: center; font: 10pt Times New Roman, Times, Serif; margin-top: 0pt; margin-
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Securities&mdash;Auto-Callable with Fixed <BR>  Percentage
Buffered Downside<BR>  <FONT STYLE="font-size: 10pt">Principal at Risk Securities Linked to the
S&amp;P 500<SUP>&reg;</SUP>&nbsp;Index
due May 7, 2025</FONT></B></TD>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center">
<B>HYPOTHETICAL PAYOUT PROFILE</B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"><B>&nbsp;</B>
</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The following profile illustrates
the potential payment on the securities
for a range of hypothetical percentage changes in the Closing Level of the Index from the Pricing
Date to the applicable Call Observation
Date (including the Final Valuation Date). The profile is based on a hypothetical Call Premium of
5.75% for the first Call Observation
Date, 11.50% for the second Call Observation Date, 17.25% for the third Call Observation Date and
23.00% for the final Call Observation
Date (based on the midpoint of the ranges specified for the Call Premiums) and a Threshold Level
equal to 90% of the Starting Level.
This profile has been prepared for purposes of illustration only. Your actual return will depend on
(i)&nbsp;whether the securities are
automatically called; (ii)&nbsp;if the securities are automatically called, the actual Call Premium
and the actual Call Observation Date
on which the securities are called; (iii)&nbsp;if the securities are not automatically called, the
actual Ending Level of the Index;
and (iv)&nbsp;whether you hold your securities to maturity or earlier automatic call.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

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Securities&mdash;Auto-Callable with Fixed <BR>  Percentage
Buffered Downside<BR>  <FONT STYLE="font-size: 10pt">Principal at Risk Securities Linked to the
S&amp;P 500<SUP>&reg;</SUP>&nbsp;Index
due May 7, 2025</FONT></B></TD>
<TD STYLE="padding-left: 2.75in; vertical-align: top; font-size: 10pt"><IMG
SRC="tm218219d79_424b2img001.jpg" ALT=""></TD></TR>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"><B>ABOUT THIS
PRICING SUPPLEMENT</B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">You should read this pricing
supplement together with the prospectus
dated December 16, 2019 (the &ldquo;prospectus&rdquo;), the prospectus supplement dated December 16,
2019 (the &ldquo;prospectus supplement&rdquo;)
and the Equity Index Underlying Supplement dated December 16, 2019 (the &ldquo;underlying
supplement&rdquo;), relating to our Senior Global
Medium-Term Notes, of which these securities are a part, for additional information about the
securities. Information included in this
pricing supplement supersedes information in the underlying supplement, the prospectus supplement and
the prospectus to the extent it
is different from that information. Certain defined terms used but not defined herein have the
meanings set forth in the underlying supplement,
the prospectus supplement and the prospectus.</P>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">You should rely only on the
information contained in or incorporated
by reference in this pricing supplement, the accompanying underlying supplement, prospectus
supplement and prospectus. This pricing supplement
may be used only for the purpose for which it has been prepared. No one is authorized to give
information other than that contained in
this pricing supplement, the accompanying underlying supplement, prospectus supplement and
prospectus, and in the documents referred to
in these documents and which are made available to the public. We have not, and Wells Fargo
Securities has not, authorized any other person
to provide you with different or additional information. If anyone provides you with different or
additional information, you should not
rely on it.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">We are not, and Wells Fargo
Securities is not, making an offer to sell
the securities in any jurisdiction where the offer or sale is not permitted. You should not assume
that the information contained in or
incorporated by reference in this pricing supplement, the accompanying underlying supplement,
prospectus supplement or prospectus is accurate
as of any date other than the date of the applicable document. Our business, financial condition,
results of operations and prospects
may have changed since that date. Neither this pricing supplement, nor the accompanying underlying
supplement, prospectus supplement or
prospectus constitutes an offer, or an invitation on our behalf or on behalf of Wells Fargo
Securities, to subscribe for and purchase
any of the securities and may not be used for or in connection with an offer or solicitation by
anyone in any jurisdiction in which such
an offer or solicitation is not authorized or to any person to whom it is unlawful to make such an
offer or solicitation.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">References to &ldquo;CIBC,&rdquo;
&ldquo;the Issuer,&rdquo; &ldquo;the
Bank,&rdquo; &ldquo;we,&rdquo; &ldquo;us&rdquo; and &ldquo;our&rdquo; in this pricing supplement are
references to Canadian Imperial Bank
of Commerce and not to any of our subsidiaries, unless we state otherwise or the context otherwise
requires.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">You may access the underlying
supplement, the prospectus supplement
and the prospectus on the SEC website www.sec.gov as follows (or if such address has changed, by
reviewing our filing for the relevant
date on the SEC website):</P>

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Risk Securities Linked to the S&amp;P 500<SUP>&reg;</SUP>&nbsp;Index
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">The
notes are not appropriate for all
investors. The notes may be an appropriate investment for investors who:</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
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    <TD STYLE="font-size: 10pt; vertical-align: top; width: 1%"><FONT STYLE="font-size: 10pt">&nbsp;
</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">believe that the Closing
    Level of the Index will be greater than or equal to the Starting Level on one of the Call
Observation Dates; </FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">&#9679;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">seek the potential for
    a fixed return if the Index has appreciated at all as of any of the Call Observation Dates in
lieu of full participation in any potential
    appreciation of the Index; </FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">&#9679;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">understand that if the
    Closing Level of the Index is less than the Starting Level on each of the Call Observation Dates
(including the Final Valuation Date),
    they will not receive any positive return on their investment in the securities, and that if the
Closing Level of the Index on the
    Final Valuation Date is less than the Starting Level by more than 10%, they will receive less,
and up to 90% less, than the principal
    amount per security;</FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">&#9679;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">understand that the term
    of the securities may be as short as approximately one year and that they will not receive a
higher Call Premium payable with respect
    to a later Call Observation Date if the securities are called on an earlier Call Observation
Date; </FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">&#9679;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top; padding-bottom: 2pt"><FONT STYLE="font-family:
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Times New Roman, Times, Serif; font-size: 10pt">are
    willing to forgo periodic interest payments on the securities and dividends on securities
included in the Index; and </FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">&#9679;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">are willing to hold the
    securities until maturity or earlier automatic call.</FONT></TD></TR>
  </TABLE>
<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">The
securities may not be an appropriate
investment for investors who:</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<TABLE CELLSPACING="0" CELLPADDING="0" STYLE="font: 10pt Times New Roman, Times, Serif; width: 100%;
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Roman, Times, Serif; font-size: 10pt">&#9679;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top; width: 1%"><FONT STYLE="font-size: 10pt">&nbsp;
</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">seek a liquid investment
    or are unable or unwilling to hold the securities to maturity or earlier automatic call;</FONT>
</TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
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    <TD STYLE="font-size: 10pt; vertical-align: top; padding-bottom: 2pt"><FONT STYLE="font-family:
Times New Roman, Times, Serif; font-size: 10pt">believe
    that the Closing Level of the Index will be less than the Starting Level on each of the Call
Observation Dates;</FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
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    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">seek a security with a
    fixed term; </FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">&#9679;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">seek full return at maturity
    of the principal amount of the securities; </FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">&#9679;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">are unwilling to accept
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    the risk that, if the Closing Level of the Index is less than the Starting Level on each of the
Call Observation Dates (including
    the Final Valuation Date), they will not receive any positive return on their investment in the
securities; </FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
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    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">are unwilling to accept
    the risk that the Closing Level of the Index may decrease by more than 10% from the Starting
Level to the Ending Level; </FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">&#9679;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">are unwilling to purchase
    securities with an estimated value as of the Pricing Date that is lower than the original
offering price, and may be as low as the
    lower estimate set forth on the cover page;</FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
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    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">seek current income;</FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">&#9679;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">are unwilling to accept
    the risk of exposure to the large capitalization segment of the U.S. equity market;</FONT></TD>
</TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">&#9679;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">seek uncapped exposure
    to the upside performance of the Index beyond the applicable Call Premiums;</FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">&#9679;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">are unwilling to accept
    the credit risk of CIBC to obtain exposure to the Index generally, or to the exposure to the
Index that the securities provide specifically;
    or</FONT></TD></TR>
  <TR STYLE="font-size: 10pt">
    <TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">&#9679;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-size: 10pt">&nbsp;</FONT></TD>
    <TD STYLE="font-size: 10pt; vertical-align: top"><FONT STYLE="font-family: Times New Roman,
Times, Serif; font-size: 10pt">prefer the lower risk of
    fixed income investments with comparable maturities issued by companies with comparable credit
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ratings.</FONT></TD></TR>
  </TABLE>
<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>The considerations identified above
are not exhaustive. Whether or not the securities are an appropriate investment for you will depend
on your individual circumstances,
and you should reach an investment decision only after you and your investment, legal, tax,
accounting and other advisors have carefully
considered the appropriateness of an investment in the securities in light of your particular
circumstances. You should also review carefully
the &ldquo;Risk Factors&rdquo; herein for risks related to an investment in the securities.</B>
</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>&nbsp;</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt"><B>
</B></FONT></P>

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Securities&mdash;Auto-Callable with
    Fixed </B></P>
    <P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Percentage
Buffered Downside</B></P>
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Principal at
Risk Securities Linked to the S&amp;P 500<SUP>&reg;</SUP>&nbsp;Index
    due May 7, 2025</B></P></TD>
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SRC="tm218219d79_424b2img001.jpg" ALT=""></TD></TR>
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10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"><FONT
STYLE="font-size: 10pt"><B>RISK FACTORS</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"><FONT
STYLE="font-size: 10pt"><B>&nbsp;</B></FONT></P>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">The
securities have complex features
and investing in the securities will involve risks not associated with an investment in conventional
debt securities or the securities
included in the Index. You should carefully consider the risk factors set forth below and &ldquo;Risk
Factors&rdquo; beginning on page
S-1 of the accompanying underlying supplement, page S-1 of the prospectus supplement and page 1 of
the prospectus, as well as the other
information contained in this pricing supplement and the accompanying underlying supplement,
prospectus supplement and prospectus, including
the documents they incorporate by reference. As described in more detail below, the value of the
securities may vary considerably before
the Stated Maturity Date due to events that are difficult to predict and are beyond our control. You
should reach an investment decision
only after you have carefully considered with your advisors the <FONT STYLE="background-color:
white">appropriateness</FONT> of an investment
in the securities in light of your particular circumstances.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt"><B>
<U>Risks Relating To The Structure
Of The Securities </U></B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>If The Securities Are Not Automatically
Called And The Ending Level Is Less Than The Threshold Level, You Will Receive Less, And Up To 90%
Less, Than The Principal Amount Of
Your Securities At Maturity.</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">We
will not repay you a fixed amount
on the securities on the Stated Maturity Date. If the Closing Level of the Index is less than the
Starting Level on each of the Call
Observation Dates, the securities will not be automatically called, and you will receive a payment at
maturity that will be equal to
or less than the principal amount per security, depending on the Ending Level (i.e., the Closing
Level of the Index on the Final Valuation
Date).</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">If
the Ending Level is less than the
Threshold Level, the payment you receive at maturity will be reduced by an amount equal to the
decline in the level of the Index to the
extent it is below the Threshold Level (expressed as a percentage of the Starting Level). The
Threshold Level is 90% of the Starting
Level. As a result, you may receive less, and up to 90% less, than the principal amount per security
at maturity even if the level of
the Index is greater than or equal to the Starting Level or the Threshold Level at certain times
during the term of the securities.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">If
the securities are not automatically
called, your return on the securities will be zero or negative, and your yield on the securities will
be less than the yield you would
earn if you bought a traditional interest-bearing debt security of CIBC or another issuer with a
similar credit rating with the same
Stated Maturity Date.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>The Potential Return On The Securities
Is Limited To The Call Premium And May Be Less Than The Return On A Direct Investment In The
Securities Included In The Index.</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">The
potential return on the securities
is limited to the applicable Call Premium, regardless of the performance of the Index. The Index may
appreciate by significantly more
than the percentage represented by the applicable Call Premium from the Pricing Date through the
applicable Call Observation Date, in
which case an investment in the securities will underperform a hypothetical alternative investment
providing a 1-to-1 return based on
the performance of the Index. Furthermore, if the securities are called on an earlier Call
Observation Date, you will receive a lower
Call Premium than if the securities were called on a later Call Observation Date, and accordingly, if
the securities are called on one
of the earlier Call Observation Dates, you will not receive the highest potential Call Premium.
</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">In
addition, your return on the securities
will not reflect the return you would realize if you actually owned the securities included in the
Index and received the dividends and
other payments paid on those securities. This is in part because any payment on the securities will
be determined by reference to the
Closing Level of the Index, which will be calculated by reference to the prices of the securities in
the Index without taking into consideration
the value of dividends and other payments paid on those securities.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>You Will Be Subject To Reinvestment
Risk. </B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">If
your securities are automatically
called early, the term of the securities may be reduced to as short as approximately one year. There
is no guarantee that you would be
able to reinvest the proceeds from an investment in the securities at a comparable return for a
similar level of risk in the event the
securities are automatically called prior to maturity.</FONT></P>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>No Periodic Interest Will Be Paid
On The Securities.</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">No
periodic interest will be paid on
the securities. However, if the securities were classified for U.S. federal income tax purposes as
contingent payment debt instruments
rather than prepaid cash-settled derivative contracts, you would be required to accrue interest
income over the term of your securities.
See &ldquo;Summary of U.S. Federal Income Tax Consequences&rdquo; in this pricing supplement and
&ldquo;Certain U.S. Federal Income Tax
Consequences&rdquo; in the underlying supplement.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
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    <P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Percentage
Buffered Downside</B></P>
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Principal at
Risk Securities Linked to the S&amp;P 500<SUP>&reg;</SUP>&nbsp;Index
    due May 7, 2025</B></P></TD>
    <TD STYLE="vertical-align: bottom; font-size: 11pt; width: 5%">&nbsp;</TD>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt"><B>A
Call Payment Date And The Stated
Maturity Date May Be Postponed In Certain Circumstances. </B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">A
calculation day (i.e., a Call Observation
Date, including the Final Valuation Date) will be postponed if the applicable originally scheduled
calculation day is not a Trading Day
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or if the calculation agent determines that a market disruption event has occurred or is continuing
on that calculation day. If such
a postponement occurs with respect to a calculation day other than the Final Valuation Date, then the
related Call Payment Date will
be postponed. If such a postponement occurs with respect to the Final Valuation Date, the Stated
Maturity Date will be the later of (i)&nbsp;the
initial Stated Maturity Date and (ii)&nbsp;three Business Days after the Final Valuation Date, as
postponed.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: justify"><FONT
STYLE="font-size: 10pt"><B><U>Risk Relating
To The Credit Risk Of CIBC</U></B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: justify"><FONT
STYLE="font-size: 10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>The Securities Are Subject To The
Credit Risk Of Canadian Imperial Bank of Commerce.</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">The
securities are our obligations exclusively
and are not, either directly or indirectly, an obligation of any third party. Any amounts payable
under the securities are subject to
our creditworthiness, and you will have no ability to pursue any securities included in the Index for
payment. As a result, our actual
and perceived creditworthiness and actual or anticipated decreases in our credit ratings may affect
the value of the securities and,
in the event we were to default on our obligations, you may not receive any amounts owed to you under
the terms of the securities. See
 &ldquo;Description of Senior Debt Securities&mdash;Events of Default&rdquo; in the prospectus.
</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt"><B>
<U>Risks Relating To The Value Of
The Securities And Any Secondary Market</U></B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>Our Estimated Value Of The Securities
Will Be Lower Than The Original Offering Price Of The Securities.</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">Our
estimated value is only an estimate
using several factors. The original offering price of the securities will exceed our estimated value
because costs associated with selling
and structuring the securities, as well as hedging the securities, are included in the original
offering price of the securities. See
 &ldquo;The Estimated Value of the Securities&rdquo; in this pricing supplement.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
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10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>Our Estimated Value Does Not Represent
Future Values Of The Securities And May Differ From Others&rsquo; Estimates.</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">Our
estimated value of the securities
is determined by reference to our internal pricing models when the terms of the securities are set.
This estimated value is based on
market conditions and other relevant factors existing at that time and our assumptions about market
parameters, which can include volatility,
dividend rates, interest rates and other factors. Different pricing models and assumptions could
provide valuations for the securities
that are greater than or less than our estimated value. In addition, market conditions and other
relevant factors in the future may change,
and any assumptions may prove to be incorrect. On future dates, the value of the securities could
change significantly based on, among
other things, changes in market conditions, our creditworthiness, interest rate movements and other
relevant factors, which may impact
the price, if any, at which Wells Fargo Securities or any other person would be willing to buy
securities from you in secondary market
transactions. See &ldquo;The Estimated Value of the Securities&rdquo; in this pricing supplement.
</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>Our Estimated Value Is Not Determined
By Reference To Credit Spreads For Our Conventional Fixed-Rate Debt.</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">The
internal funding rate used in the
determination of our estimated value generally represents a discount from the credit spreads for our
conventional fixed-rate debt. If
we were to use the interest rate implied by our conventional fixed-rate credit spreads, we would
expect the economic terms of the securities
to be more favorable to you. Consequently, our use of an internal funding rate would have an adverse
effect on the terms of the securities
and any secondary market prices of the securities. See &ldquo;The Estimated Value of the
Securities&rdquo; in this pricing supplement.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>The Estimated Value Of The Securities
Will Not Be An Indication Of The Price, If Any, At Which Wells Fargo Securities Or Any Other Person
May Be Willing To Buy The Securities
From You In The Secondary Market.</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">The
price, if any, at which Wells Fargo
Securities or any of its affiliates may purchase the securities in the secondary market will be based
on Wells Fargo Securities&rsquo;
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proprietary pricing models and will fluctuate over the term of the securities as a result of changes
in the market and other factors
described in the next risk factor. Any such secondary market price for the securities will also be
reduced by a bid-offer spread, which
may vary depending on the aggregate principal amount of the securities to be purchased in the
secondary market transaction, and the expected
cost of unwinding any related hedging transactions. Unless the factors described in the next risk
factor change significantly in your
favor, any such secondary market price for the securities will likely be less than the original
offering price.</FONT></P>

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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">If
Wells Fargo Securities or any of
its affiliates makes a secondary market in the securities at any time up to the Issue Date or during
the four-month period following
the Issue Date, the secondary market price offered by Wells Fargo Securities or any of its affiliates
will be increased by an amount
reflecting a portion of the costs associated with selling, structuring, hedging and issuing the
securities that are included in the original
offering price. Because this portion of the costs is not fully deducted upon issuance, any
secondary</FONT></P>

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    Fixed </B></P>
    <P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Percentage
Buffered Downside</B></P>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
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10pt">market price offered by Wells Fargo
Securities or any of its affiliates during this period will be higher than it would be if it were
based solely on Wells Fargo Securities&rsquo;
proprietary pricing models less the bid-offer spread and hedging unwind costs described above. The
amount of this increase in the secondary
market price will decline steadily to zero over this four-month period. If you hold the securities
through an account at Wells Fargo
Securities or one of its affiliates, we expect that this increase will also be reflected in the value
indicated for the securities on
your brokerage account statement. If you hold your securities through an account at a broker-dealer
other than Wells Fargo Securities
or any of its affiliates, the value of the securities on your brokerage account statement may be
different than if you held your securities
at Wells Fargo Securities or any of its affiliates.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>The Value Of The Securities Prior
To Maturity Will Be Affected By Numerous Factors, Some Of Which Are Related In Complex Ways.</B>
</FONT></P>

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10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">The
value of the securities prior to
maturity will be affected by the then-current level of the Index, interest rates at that time and a
number of other factors, some of
which are interrelated in complex ways. The effect of any one factor may be offset or magnified by
the effect of another factor. The
following factors, among others, are expected to affect the value of the securities. When we refer to
the &ldquo;value&rdquo; of your
security, we mean the value you could receive for your security if you are able to sell it in the
open market before the Stated Maturity
Date.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

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STYLE="font-family: Symbol; font-size: 10pt">&middot;</FONT></TD><TD STYLE="font-size: 10pt"><FONT
STYLE="font-family: Times New Roman, Times, Serif; font-size: 10pt"><B>Index
                                            Performance.</B>&nbsp;The value of the securities prior
to maturity will depend substantially
                                            on the then-current level of the Index. The price at
which you may be able to sell the securities
                                            before maturity may be at a discount, which could be
substantial, from their principal amount,
                                            if the level of the Index at such time is less than,
equal to or not sufficiently above its
                                            Starting Level or Threshold Level.</FONT></TD></TR>
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STYLE="font-family: Symbol; font-size: 10pt">&middot;</FONT></TD><TD STYLE="font-size: 10pt"><FONT
STYLE="font-family: Times New Roman, Times, Serif; font-size: 10pt"><B>Interest
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                                            Rates.&nbsp;</B>The value of the securities may be
affected by changes in the interest rates
                                            in the U.S. markets.</FONT></TD></TR></TABLE>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin-top: 0pt; margin-bottom: 0pt"><FONT
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STYLE="font-family: Times New Roman, Times, Serif; font-size: 10pt"><B>Volatility
                                            Of The Index.</B>&nbsp;Volatility is the term used to
describe the size and frequency of
                                            market fluctuations. The value of the securities may be
affected if the volatility of the
                                            Index changes.</FONT></TD></TR></TABLE>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin-top: 0pt; margin-bottom: 0pt"><FONT
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STYLE="font-family: Symbol; font-size: 10pt">&middot;</FONT></TD><TD STYLE="font-size: 10pt"><FONT
STYLE="font-family: Times New Roman, Times, Serif; font-size: 10pt"><B>Time
                                            Remaining To Maturity.</B>&nbsp;The value of the
securities at any given time prior to maturity
                                            will likely be different from that which would be
expected based on the then-current level
                                            of the Index. This difference will most likely reflect a
discount due to expectations and
                                            uncertainty concerning the level of the Index during the
period of time still remaining to
                                            the maturity date. In general, as the time remaining to
maturity decreases, the value of
                                            the securities will approach the amount that could be
payable at maturity based on the then-current
                                            level of the Index.</FONT></TD></TR></TABLE>

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STYLE="font-family: Times New Roman, Times, Serif; font-size: 10pt"><B>Dividend
                                            Yields On Securities Included In The Index.</B>&nbsp;The
value of the securities may be affected
                                            by the dividend yields on securities included in the
Index.</FONT></TD></TR></TABLE>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin-top: 0pt; margin-bottom: 0pt"><FONT
STYLE="font-size: 10pt">&nbsp;</FONT></P>

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STYLE="font-family: Symbol; font-size: 10pt">&middot;</FONT></TD><TD STYLE="font-size: 10pt"><FONT
STYLE="font-family: Times New Roman, Times, Serif; font-size: 10pt"><B>Our
                                            Credit Ratings, Financial Condition And Results Of
Operation.&nbsp;</B>Actual or anticipated
                                            changes in our credit ratings, financial condition or
results of operation may affect the
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                                            value of the securities. However, because the return on
the securities is dependent upon
                                            factors in addition to our ability to pay our obligations
under the securities, such as the
                                            level of the Index, an improvement in our credit ratings,
financial condition or results
                                            of operation will not reduce the other investment risks
related to the securities.</FONT></TD></TR></TABLE>

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STYLE="font-size: 10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">The
value of the securities will also
be limited by the automatic call feature because if the securities are automatically called, the
return will not be greater than the
applicable Call Premium. You should understand that the impact of one of the factors specified above,
such as a change in interest rates,
may offset some or all of any change in the value of the securities attributable to another factor,
such as a change in the level of
the Index.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>The Securities Will Not Be Listed
On Any Securities Exchange And We Do Not Expect A Trading Market For The Securities To Develop.</B>
</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">The
securities will not be listed on
any securities exchange. Although Wells Fargo Securities and/or its affiliates may purchase the
securities from holders, they are not
obligated to do so and are not required to make a market for the securities. There can be no
assurance that a secondary market will develop
for the securities. Because we do not expect that any market makers will participate in a secondary
market for the securities, the price
at which you may be able to sell your securities is likely to depend on the price, if any, at which
Wells Fargo Securities and/or its
affiliates are willing to buy your securities.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">If a
secondary market does exist, it
may be limited. Accordingly, there may be a limited number of buyers if you decide to sell your
securities prior to maturity or automatic
call. This may affect the price you receive upon such sale. Consequently, you should be willing to
hold the securities to maturity or
automatic call.</FONT></P>

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<U>Risks Relating To Conflicts Of
Interest </U></B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>We Or One Of Our Affiliates Will
Be The Calculation Agent And, As A Result, Potential Conflicts Of Interest Could Arise.</B></FONT>
</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">We
or one of our affiliates will be
the calculation agent for purposes of determining, among other things, the Closing Levels of the
Index on each calculation day and whether
the securities are automatically called and may be required to make other determinations that affect
the return you receive on the securities.
In making these determinations, the calculation agent may be required to make discretionary
judgments, including determining whether
a market disruption event has occurred on a scheduled calculation day, which may result in
postponement of that calculation day; determining
the Closing Level of the Index if a calculation day is postponed to the last day to which it may be
postponed and a market disruption
event occurs on that day; if publication of the Index is discontinued, selecting a successor or, if
no successor is available, determining
the Closing Level on the applicable calculation day; and determining whether to adjust the Closing
Level of the Index on a calculation
day in the event of certain changes in or modifications to the Index. Although the calculation agent
will exercise its judgment in good
faith when performing its functions, potential conflicts of interest may exist between the
calculation agent and you.</FONT></P>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>Our Economic Interests And Those
Of Any Dealer Participating In The Offering Of Securities Will Potentially Be Adverse To Your
Interests.</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">You
should be aware of the following
ways in which our economic interests and those of any dealer participating in the distribution of the
securities, which we refer to as
a &ldquo;participating dealer,&rdquo; will potentially be adverse to your interests as an investor in
the securities. In engaging in
certain of the activities described below, our affiliates or any participating dealer or its
affiliates may take actions that may adversely
affect the value of and your return on the securities, and in so doing they will have no obligation
to consider your interests as an
investor in the securities. Our affiliates or any participating dealer or its affiliates may realize
a profit from these activities even
if investors do not receive a favorable investment return on the securities.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
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STYLE="font-family: Symbol; font-size: 10pt">&middot;</FONT></TD><TD STYLE="font-size: 10pt"><FONT
STYLE="font-family: Times New Roman, Times, Serif; font-size: 10pt"><B><I>Research
                                            reports by our affiliates or any participating dealer or
its affiliates may be inconsistent
                                            with an investment in the securities and may adversely
affect the level of the Index. </I></B>Our
                                            affiliates or any dealer participating in the offering of
the securities or its affiliates
                                            may, at present or in the future, publish research
reports on the Index or the companies
                                            whose securities are included in the Index. This research
will be modified from time to time
                                            without notice and may, at present or in the future,
express opinions or provide recommendations
                                            that are inconsistent with purchasing or holding the
securities. Any research reports on
                                            the Index or the companies whose securities are included
in the Index could adversely affect
                                            the level of the Index and, therefore, adversely affect
the value of and your return on the
                                            securities. You are encouraged to derive information
concerning the Index from multiple sources
                                            and should not rely on the views expressed by us or our
affiliates or any participating dealer
                                            or its affiliates. In addition, any research reports on
the Index or the companies whose
                                            securities are included in the Index published on or
prior to the Pricing Date could result
                                            in an increase in the level of the Index on the Pricing
Date, which would adversely affect
                                            investors in the securities by increasing the level at
which the Index must close on a calculation
                                            day in order for investors in the securities to receive a
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favorable return.</FONT></TD></TR></TABLE>

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STYLE="font-family: Times New Roman, Times, Serif; font-size: 10pt"><B><I>Business
                                            activities of our affiliates or any participating dealer
or its affiliates with the companies
                                            whose securities are included in the Index may adversely
affect the level of the Index.&nbsp;</I></B>Our
                                            affiliates or any participating dealer or its affiliates
may, at present or in the future,
                                            engage in business with the companies whose securities
are included in the Index, including
                                            making loans to those companies (including exercising
creditors&rsquo; remedies with respect
                                            to such loans), making equity investments in those
companies or providing investment banking,
                                            asset management or other advisory services to those
companies. These business activities
                                            could adversely affect the level of the Index and,
therefore, adversely affect the value
                                            of and your return on the securities. In addition, in the
course of these business activities,
                                            our affiliates or any participating dealer or its
affiliates may acquire non-public information
                                            about one or more of the companies whose securities are
included in the Index. If our affiliates
                                            or any participating dealer or its affiliates do acquire
such non-public information, we
                                            and they are not obligated to disclose such non-public
information to you.</FONT></TD></TR></TABLE>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin-top: 0pt; margin-bottom: 0pt"><FONT
STYLE="font-size: 10pt">&nbsp;</FONT></P>

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STYLE="font-family: Symbol; font-size: 10pt">&middot;</FONT></TD><TD STYLE="font-size: 10pt"><P
STYLE="margin-top: 0; margin-bottom: 0"><FONT STYLE="font-family: Times New Roman, Times, Serif;
font-size: 10pt"><B><I>Hedging
activities by our affiliates or any participating dealer or its affiliates may adversely affect the
level of the Index.</I></B>&nbsp;We
expect to hedge our obligations under the securities through one or more hedge counterparties, which
may include our affiliates or any
participating dealer or its affiliates. Pursuant to such hedging activities, our hedge counterparty
may acquire securities included in
the Index or listed or over-the-counter derivative or synthetic instruments related to the Index or
such securities. Depending on, among
other things, future market conditions, the aggregate amount and the composition of such positions
are likely to vary over time. To the
extent that our hedge counterparty has a long hedge position in any of the securities included in the
Index, or derivative or synthetic
instruments related to the Index or such securities,they may liquidate a portion of such holdings at
or about the time of a calculation
day or at or </FONT></P></TD></TR></TABLE>

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Securities&mdash;Auto-Callable with
    Fixed </B></P>
    <P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Percentage
Buffered Downside</B></P>
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Principal at
Risk Securities Linked to the S&amp;P 500<SUP>&reg;</SUP>&nbsp;Index
    due May 7, 2025</B></P></TD>
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    <TD STYLE="vertical-align: top; font-size: 11pt; width: 15%"><IMG
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<TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size:
10pt">about the time of a change in the securities included in the Index. These hedging activities
could potentially adversely affect the level of the Index and, therefore, adversely affect the value
of and your return on the securities.</TD></TR>

<TR STYLE="font-size: 10pt; vertical-align: top">
<TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size:
10pt">&nbsp;</TD></TR>

<TR STYLE="font-size: 10pt; vertical-align: top">
<TD STYLE="font-size: 10pt; width: 0.5in"></TD><TD STYLE="font-size: 10pt; width: 0.25in"><FONT
STYLE="font-family: Symbol; font-size: 10pt">&middot;</FONT></TD><TD STYLE="font-size: 10pt"><FONT
STYLE="font-family: Times New Roman, Times, Serif; font-size: 10pt"><B><I>Trading
                                            activities by our affiliates or any participating dealer
or its affiliates may adversely
                                            affect the level of the Index.&nbsp;</I></B>Our
affiliates or any participating dealer or
                                            its affiliates may engage in trading in the securities
included in the Index and other instruments
                                            relating to the Index or such securities on a regular
basis as part of their general broker-dealer
                                            and other businesses. Any of these trading activities
could potentially adversely affect
                                            the prices of the securities included in the Index and,
therefore, adversely affect the value
                                            of and your return on the securities.</FONT></TD></TR>
</TABLE>

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STYLE="font-size: 10pt">&nbsp;</FONT></P>

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STYLE="font-family: Times New Roman, Times, Serif; font-size: 10pt"><B><I>A
                                            participating dealer or its affiliates may realize
hedging profits projected by its proprietary
                                            pricing models in addition to any selling concession
and/or any fee, creating a further incentive
                                            for the participating dealer to sell the securities to
you.&nbsp;</I></B>If any participating
                                            dealer or any of its affiliates conducts hedging
activities for us in connection with the
                                            securities, that participating dealer or its affiliates
expect to realize a projected profit
                                            from such hedging activities, and this projected profit
will be in addition to any concession
                                            or fee that the participating dealer receives for the
sale of the securities to you. This
                                            additional projected profit may create a further
incentive for the participating dealer to
                                            sell the securities to you.</FONT></TD></TR></TABLE>

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STYLE="font-size: 10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt"><B>
<U>Risks Relating To Tax</U></B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>The U.S. Federal Tax Consequences
Of An Investment In The Securities Are Unclear.</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">There is no direct legal authority regarding
the proper U.S. federal tax treatment of the securities, and we do not plan to request a ruling from
the U.S. Internal Revenue Service
(the &ldquo;IRS&rdquo;). Consequently, significant aspects of the tax treatment of the securities are
uncertain, and the IRS or a court
might not agree with the treatment of the securities as prepaid cash-settled derivative contracts. If
the IRS were successful in asserting
an alternative treatment of the securities, the tax consequences of the ownership and disposition of
the securities might be materially
and adversely affected. As described under &ldquo;Certain U.S. Federal Income Tax Consequences&rdquo;
in the underlying supplement, the
U.S. Treasury Department and the IRS released a notice requesting comments on various issues
regarding the U.S. federal income tax treatment
of &ldquo;prepaid forward contracts&rdquo; and similar instruments. Any Treasury regulations or other
guidance promulgated after consideration
of these issues could materially and adversely affect the tax consequences of an investment in the
securities, including the character
and timing of income or loss and the degree, if any, to which income realized by non-U.S. persons
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should be subject to withholding tax,
possibly with retroactive effect.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">Both
U.S. and non-U.S. persons considering
an investment in the securities should review carefully &ldquo;Summary of U.S. Federal Income Tax
Consequences&rdquo; in this pricing
supplement and &ldquo;Certain U.S. Federal Income Tax Consequences&rdquo; in the underlying
supplement and consult their tax advisors
regarding the U.S. federal tax consequences of an investment in the securities (including possible
alternative treatments and the issues
presented by the notice), as well as tax consequences arising under the laws of any state, local or
non-U.S. taxing jurisdiction.</FONT></P>

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10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>There Can Be No Assurance That The
Canadian Federal Income Tax Consequences Of An Investment In The Securities Will Not Change In The
Future.</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">There can be no assurance that Canadian
federal income tax laws, the judicial interpretation thereof, or the administrative policies and
assessing practices of the Canada Revenue
Agency will not be changed in a manner that adversely affects investors. For a discussion of the
Canadian federal income tax consequences
of investing in the securities, please read the section entitled &ldquo;Certain Canadian Federal
Income Tax Considerations&rdquo; in
this pricing supplement as well as the section entitled &ldquo;Material Income Tax
Consequences&mdash;Canadian Taxation&rdquo; in the
accompanying prospectus. You should consult your tax advisor with respect to your own particular
situation.</FONT></P>

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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"><FONT
STYLE="font-size: 10pt"><B>HYPOTHETICAL
PAYMENTS AT MATURITY</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"><FONT
STYLE="font-size: 10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">If
the Closing Level of the Index is
less than the Starting Level on each of the first three Call Observation Dates, the securities will
not be automatically called prior
to the Final Valuation Date, and you will receive a payment at maturity that will be greater than,
equal to or less than the principal
amount per security, depending on the Ending Level (i.e., the Closing Level of the Index on the Final
Valuation Date). Set forth below
are three examples of calculations of the payment at maturity, assuming that the securities have not
been automatically called on any
of the first three Call Observation Dates, reflecting a hypothetical Call Premium applicable to the
Final Valuation Date of 23.00% (the
midpoint of the specified range for the Call Premium applicable to the Final Valuation Date) and
assuming the hypothetical Starting Level,
Threshold Level and Ending Levels indicated in the examples. The terms used for purposes of these
hypothetical examples do not represent
the actual Starting Level or Threshold Level. The hypothetical Starting Level of 100.00 has been
chosen for illustrative purposes only
and does not represent the actual Starting Level. The actual Starting Level and Threshold Level will
be determined on the Pricing Date.
For historical data regarding the actual Closing Levels of the Index, see the historical information
set forth under the section titled
 &ldquo;The S&amp;P 500<B><SUP>&reg;</SUP></B> Index&rdquo; below. These examples are for purposes of
illustration only and the values
used in the examples may have been rounded for ease of analysis.</FONT></P>

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10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>Example 1.&nbsp;The Ending Level
is greater than the Starting Level, the securities are automatically called on the Final Valuation
Date and the payment at maturity is
equal to the principal amount plus the applicable Call Premium: </B></FONT></P>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0 0pt 0.25in"><FONT STYLE="font-size:
10pt">Hypothetical Starting Level:
100.00</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0 0pt 0.25in"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0 0pt 0.25in"><FONT STYLE="font-size:
10pt">Hypothetical Ending Level:
150.00</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0 0pt 0.25in"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">Since the hypothetical Ending Level
is greater than the hypothetical Starting Level, the securities are automatically called on the Final
Valuation Date and you will receive
the principal amount of your securities plus a hypothetical Call Premium of 23.00% of the principal
amount per security. Even though
the Index appreciated by 50% from its Starting Level to its Ending Level in this example, your return
is limited to the Call Premium
of 23.00%, which is applicable to the Final Valuation Date.</FONT></P>

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10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">On
the Stated Maturity Date, you would
receive $1,230.00 per security.</FONT></P>

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10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>Example 2.&nbsp;The Ending Level
is less than the Starting Level but greater than the Threshold Level and the payment at maturity is
equal to the principal amount: </B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0 0pt 0.25in"><FONT STYLE="font-size:
10pt">Hypothetical Starting Level:
100.00</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0 0pt 0.25in"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0 0pt 0.25in"><FONT STYLE="font-size:
10pt">Hypothetical Ending Level:
95.00</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0 0pt 0.25in"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0 0pt 0.25in"><FONT STYLE="font-size:
10pt">Hypothetical Threshold Level:
90.00, which is 90% of the hypothetical Starting Level</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0 0pt 0.25in"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">Since the hypothetical Ending Level
is less than the hypothetical Starting Level, but not by more than 10%, you would not lose any of the
principal amount of your securities.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">On
the Stated Maturity Date, you would
receive $1,000.00 per security.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>Example 3.&nbsp;The Ending Level
is less than the Threshold Level and the payment at maturity is less than the principal amount: </B>
</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0 0pt 0.25in"><FONT STYLE="font-size:
10pt">Hypothetical Starting Level:
100.00</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0 0pt 0.25in"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0 0pt 0.25in"><FONT STYLE="font-size:
10pt">Hypothetical Ending Level:
50.00</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0 0pt 0.25in"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0 0pt 0.25in"><FONT STYLE="font-size:
10pt">Hypothetical Threshold Level:
90.00, which is 90% of the hypothetical Starting Level</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0 0pt 0.25in"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">Since the hypothetical Ending Level
is less than the hypothetical Starting Level by more than 10%, you would lose a portion of the
principal amount of your securities and
receive a payment at maturity equal to:</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="text-align: center; font: 10pt Times New Roman, Times, Serif; margin-top: 0pt; margin-
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">On
the Stated Maturity Date you would
receive $600.00 per security, resulting in a loss of 40%.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
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10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">To
the extent that the actual Call Premium,
Starting Level, Threshold Level and Ending Level differ from the values assumed above, the results
indicated above would be different.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
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    <TD STYLE="vertical-align: top; width: 80%">
    <P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Market Linked
Securities&mdash;Auto-Callable with
    Fixed </B></P>
    <P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Percentage
Buffered Downside</B></P>
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Principal at
Risk Securities Linked to the S&amp;P 500<SUP>&reg;</SUP>&nbsp;Index
    due May 7, 2025</B></P></TD>
    <TD STYLE="vertical-align: bottom; font-size: 11pt; width: 5%">&nbsp;</TD>
    <TD STYLE="vertical-align: top; font-size: 11pt; width: 15%"><IMG
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10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"><FONT
STYLE="font-size: 10pt"><B>ADDITIONAL TERMS
OF THE SECURITIES</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">The
definitions and provisions below
supersede and replace the relevant definitions and provisions set forth in the underlying supplement.
</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>Certain Definitions </B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">A
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&ldquo;Trading Day&rdquo; means a
day, as determined by the calculation agent, on which (i) the Relevant Stock Exchanges with respect
to each security underlying the Index
are scheduled to be open for trading for their respective regular trading sessions and (ii) each
Related Futures or Options Exchange
is scheduled to be open for trading for its regular trading session.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">The
&ldquo;Relevant Stock Exchange&rdquo;
for any security underlying the Index means the primary exchange or quotation system on which such
security is traded, as determined
by the calculation agent.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">The
&ldquo;Related Futures or Options
Exchange&rdquo; for the Index means an exchange or quotation system where trading has a material
effect (as determined by the calculation
agent) on the overall market for futures or options contracts relating to the Index.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>Market Disruption Events</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>&nbsp;</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">A
&ldquo;market disruption event&rdquo;
means any of the following events as determined by the calculation agent in its sole discretion:
</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

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<TD STYLE="font-size: 10pt; width: 0.5in"></TD><TD STYLE="font-size: 10pt; width: 0.25in"><FONT
STYLE="font-size: 10pt">(A)</FONT></TD><TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">The
                                            occurrence or existence of a material suspension of or
limitation imposed on trading by the
                                            Relevant Stock Exchanges or otherwise relating to
securities which then comprise 20% or more
                                            of the level of the Index or any successor equity index
at any time during the one-hour period
                                            that ends at the close of trading on that day, whether by
reason of movements in price exceeding
                                            limits permitted by those Relevant Stock Exchanges or
otherwise.</FONT></TD></TR><TR STYLE="font-size: 10pt; vertical-align: top">
<TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size:
10pt">&nbsp;</TD></TR>

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<TABLE CELLPADDING="0" CELLSPACING="0" STYLE="width: 100%; font: 10pt Times New Roman, Times, Serif;
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<TD STYLE="font-size: 10pt; width: 0.5in"></TD><TD STYLE="font-size: 10pt; width: 0.25in"><FONT
STYLE="font-size: 10pt">(B)</FONT></TD><TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">The
                                            occurrence or existence of a material suspension of or
limitation imposed on trading by any
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                                            Related Futures or Options Exchange or otherwise in
futures or options contracts relating
                                            to the Index or any successor equity index on any Related
Futures or Options Exchange at
                                            any time during the one-hour period that ends at the
close of trading on that day, whether
                                            by reason of movements in price exceeding limits
permitted by the Related Futures or Options
                                            Exchange or otherwise.</FONT></TD></TR><TR STYLE="font-
size: 10pt; vertical-align: top">
<TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size:
10pt">&nbsp;</TD></TR>
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<TD STYLE="font-size: 10pt; width: 0.5in"></TD><TD STYLE="font-size: 10pt; width: 0.25in"><FONT
STYLE="font-size: 10pt">(C)</FONT></TD><TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">The
                                            occurrence or existence of any event, other than an early
closure, that materially disrupts
                                            or impairs the ability of market participants in general
to effect transactions in, or obtain
                                            market values for, securities that then comprise 20% or
more of the level of the Index or
                                            any successor equity index on their Relevant Stock
Exchanges at any time during the one-hour
                                            period that ends at the close of trading on that day.
</FONT></TD></TR><TR STYLE="font-size: 10pt; vertical-align: top">
<TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size:
10pt">&nbsp;</TD></TR>

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<TD STYLE="font-size: 10pt; width: 0.5in"></TD><TD STYLE="font-size: 10pt; width: 0.25in"><FONT
STYLE="font-size: 10pt">(D)</FONT></TD><TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">The
                                            occurrence or existence of any event, other than an early
closure, that materially disrupts
                                            or impairs the ability of market participants in general
to effect transactions in, or obtain
                                            market values for, futures or options contracts relating
to the Index or any successor equity
                                            index on any Related Futures or Options Exchange at any
time during the one-hour period that
                                            ends at the close of trading on that day.</FONT></TD>
</TR><TR STYLE="font-size: 10pt; vertical-align: top">
<TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size:
10pt">&nbsp;</TD></TR>

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<TABLE CELLPADDING="0" CELLSPACING="0" STYLE="width: 100%; font: 10pt Times New Roman, Times, Serif;
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<TD STYLE="font-size: 10pt; width: 0.5in"></TD><TD STYLE="font-size: 10pt; width: 0.25in"><FONT
STYLE="font-size: 10pt">(E)</FONT></TD><TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">The
                                            closure on any exchange business day of the Relevant
Stock Exchanges on which securities
                                            that then comprise 20% or more of the level of the Index
or any successor equity index are
                                            traded or any Related Futures or Options Exchange prior
to its scheduled closing time unless
                                            the earlier closing time is announced by the Relevant
Stock Exchange or Related Futures or
                                            Options Exchange, as applicable, at least one hour prior
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to the earlier of (1) the actual
                                            closing time for the regular trading session on such
Relevant Stock Exchange or Related Futures
                                            or Options Exchange, as applicable, and (2) the
submission deadline for orders to be entered
                                            into the Relevant Stock Exchange or Related Futures or
Options Exchange, as applicable, system
                                            for execution at such actual closing time on that day.
</FONT></TD></TR><TR STYLE="font-size: 10pt; vertical-align: top">
<TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size:
10pt">&nbsp;</TD></TR>

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margin-top: 0pt; margin-bottom: 0pt"><TR STYLE="font-size: 10pt; vertical-align: top">
<TD STYLE="font-size: 10pt; width: 0.5in"></TD><TD STYLE="font-size: 10pt; width: 0.25in"><FONT
STYLE="font-size: 10pt">(F)</FONT></TD><TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">The
                                            Relevant Stock Exchange for any security underlying the
Index or successor equity index or
                                            any Related Futures or Options Exchange fails to open for
trading during its regular trading
                                            session.</FONT></TD></TR></TABLE>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">For
purposes of determining whether
a market disruption event has occurred:</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<TABLE CELLPADDING="0" CELLSPACING="0" STYLE="width: 100%; font: 10pt Times New Roman, Times, Serif;
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<TD STYLE="font-size: 10pt; width: 0.5in"></TD><TD STYLE="font-size: 10pt; width: 0.25in"><FONT
STYLE="font-size: 10pt">(1)</FONT></TD><TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">the
                                            relevant percentage contribution of a security to the
level of the Index or any successor
                                            equity index will be based on a comparison of (x) the
portion of the level of such index
                                            attributable to that security and (y) the overall level
of the Index or successor equity
                                            index, in each case immediately before the occurrence of
the market disruption event;</FONT></TD></TR><TR STYLE="font-size: 10pt; vertical-align: top">
<TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size:
10pt">&nbsp;</TD></TR>

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<TABLE CELLPADDING="0" CELLSPACING="0" STYLE="width: 100%; font: 10pt Times New Roman, Times, Serif;
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<TD STYLE="font-size: 10pt; width: 0.5in"></TD><TD STYLE="font-size: 10pt; width: 0.25in"><FONT
STYLE="font-size: 10pt">(2)</FONT></TD><TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">the
                                            &ldquo;close of trading&rdquo; on any Trading Day for the
Index or any successor equity index
                                            means the scheduled closing time of the Relevant Stock
Exchanges with respect to the securities
                                            underlying the Index or successor equity index on such
Trading Day; provided that, if the
                                            actual closing time of the regular trading session of any
such Relevant Stock Exchange is
                                            earlier than its scheduled closing time on such Trading
Day, then (x) for purposes of clauses
                                            (A) and (C) of the definition of &ldquo;market disruption
event&rdquo; above, with respect
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                                            to any security underlying the Index or successor equity
index for which such </FONT></TD></TR><TR STYLE="font-size: 10pt; vertical-align: top">
<TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size:
10pt">&nbsp;</TD></TR>

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    <TD STYLE="vertical-align: top; width: 80%">
    <P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Market Linked
Securities&mdash;Auto-Callable with
    Fixed </B></P>
    <P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Percentage
Buffered Downside</B></P>
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Principal at
Risk Securities Linked to the S&amp;P 500<SUP>&reg;</SUP>&nbsp;Index
    due May 7, 2025</B></P></TD>
    <TD STYLE="vertical-align: bottom; font-size: 11pt; width: 5%">&nbsp;</TD>
    <TD STYLE="vertical-align: top; font-size: 11pt; width: 15%"><IMG
SRC="tm218219d79_424b2img001.jpg" ALT=""></TD></TR>
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<TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size:
10pt">Relevant Stock
                                            Exchange is its Relevant Stock Exchange, the &ldquo;close
of trading&rdquo; means such actual
                                            closing time and (y) for purposes of clauses (B) and (D)
of the definition of &ldquo;market
                                            disruption event&rdquo; above, with respect to any
futures or options contract relating to
                                            the Index or successor equity index, the &ldquo;close of
trading&rdquo; means the latest
                                            actual closing time of the regular trading session of any
of the Relevant Stock Exchanges,
                                            but in no event later than the scheduled closing time of
the Relevant Stock Exchanges;</TD></TR>

<TR STYLE="font-size: 10pt; vertical-align: top">
<TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size:
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<TR STYLE="font-size: 10pt; vertical-align: top">
<TD STYLE="font-size: 10pt; width: 0.5in"></TD><TD STYLE="font-size: 10pt; width: 0.25in"><FONT
STYLE="font-size: 10pt">(3)</FONT></TD><TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">the
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                                            &ldquo;scheduled closing time&rdquo; of any Relevant
Stock Exchange or Related Futures or
                                            Options Exchange on any Trading Day for the Index or any
successor equity index means the
                                            scheduled weekday closing time of such Relevant Stock
Exchange or Related Futures or Options
                                            Exchange on such Trading Day, without regard to after
hours or any other trading outside
                                            the regular trading session hours; and</FONT></TD></TR>
<TR STYLE="font-size: 10pt; vertical-align: top">
<TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size: 10pt">&nbsp;</TD><TD STYLE="font-size:
10pt">&nbsp;</TD></TR>

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<TD STYLE="font-size: 10pt; width: 0.5in"></TD><TD STYLE="font-size: 10pt; width: 0.25in"><FONT
STYLE="font-size: 10pt">(4)</FONT></TD><TD STYLE="font-size: 10pt"><FONT STYLE="font-size: 10pt">an
                                            &ldquo;exchange business day&rdquo; means any Trading Day
for the Index or any successor
                                            equity index on which each Relevant Stock Exchange for
the securities underlying the Index
                                            or any successor equity index and each Related Futures or
Options Exchange are open for trading
                                            during their respective regular trading sessions,
notwithstanding any such Relevant Stock
                                            Exchange or Related Futures or Options Exchange closing
prior to its scheduled closing time.</FONT></TD></TR>

</TABLE>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">If a
market disruption event occurs
or is continuing on any calculation day (including the Final Valuation Date), then such calculation
day will be postponed to the first
succeeding Trading Day on which a market disruption event has not occurred and is not continuing;
however, if such first succeeding Trading
Day has not occurred as of the eighth Trading Day after the originally scheduled calculation day,
that eighth Trading Day shall be deemed
to be the calculation day. If a calculation day has been postponed eight Trading Days after the
originally scheduled calculation day
and a market disruption event occurs or is continuing on such eighth Trading Day, the calculation
agent will determine the Closing Level
of the Index on such eighth Trading Day in accordance with the formula for and method of calculating
the Closing Level of the Index last
in effect prior to commencement of the market disruption event, using the closing price (or, with
respect to any relevant security, if
a market disruption event has occurred with respect to such security, its good faith estimate of the
value of such security at the scheduled
closing time of the Relevant Stock Exchange for such security or, if earlier, the actual closing time
of the regular trading session
of such Relevant Stock Exchange) on such date of each security included in the Index. As used herein,
&ldquo;closing price&rdquo; means,
with respect to any security on any date, the Relevant Stock Exchange traded or quoted price of such
security as of the scheduled closing
time of the Relevant Stock Exchange for such security or, if earlier, the actual closing time of the
regular trading session of such
Relevant Stock Exchange.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>Adjustments to the Index</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">If
at any time the method of calculating
the Index or a successor equity index, or the Closing Level thereof, is changed in a material
respect, or if the Index or a successor
equity index is in any other way modified so that such index does not, in the opinion of the
calculation agent, fairly represent the
level of such index had those changes or modifications not been made, then the calculation agent
will, at the close of business in New
York, New York, on each date that the Closing Level of such index is to be calculated, make such
calculations and adjustments as, in
the good faith judgment of the calculation agent, may be necessary in order to arrive at a level of
an index comparable to the Index
or successor equity index as if those changes or modifications had not been made, and the calculation
agent will calculate the Closing
Level of the Index or successor equity index with reference to such index, as so adjusted.
Accordingly, if the method of calculating
the Index or successor equity index is modified so that the level of such index is a fraction or a
multiple of what it would have been
if it had not been modified (e.g., due to a split or reverse split in such equity index), then the
calculation agent will adjust the
Index or successor equity index in order to arrive at a level of such index as if it had not been
modified (e.g., as if the split or
reverse split had not occurred).</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
<B>Discontinuance of the Index</B></FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">If
the sponsor or publisher of the Index
(the &ldquo;Index Sponsor&rdquo;) discontinues publication of the Index, and the Index Sponsor or
another entity publishes a successor
or substitute equity index that the calculation agent determines, in its sole discretion, to be
comparable to the Index (a &ldquo;successor
equity index&rdquo;), then, upon the calculation agent&rsquo;s notification of that determination to
the trustee and CIBC, the calculation
agent will substitute the successor equity index as calculated by the Index Sponsor or any other
entity for purposes of calculating the
Closing Level of the Index on any calculation day. Upon any selection by the calculation agent of a
successor equity index, CIBC will
cause notice to be given to holders of the securities.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">In
the event that the Index Sponsor
discontinues publication of the Index prior to, and the discontinuance is continuing on, a
calculation day and the calculation agent
determines that no successor equity index is available at such time, the calculation agent will
calculate a substitute closing level
for the Index in accordance with the formula for and method of calculating the Index last in effect
prior to the discontinuance, but
using only those securities that comprised the Index immediately prior to that discontinuance. If a
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successor equity index is selected
or the calculation agent calculates a level as a substitute for the Index, the successor equity index
or</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
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Securities&mdash;Auto-Callable with
    Fixed </B></P>
    <P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Percentage
Buffered Downside</B></P>
    <P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Principal at
Risk Securities Linked to the S&amp;P 500<SUP>&reg;</SUP>&nbsp;Index
    due May 7, 2025</B></P></TD>
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10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">level will be used as a substitute
for the Index for all purposes, including the purpose of determining whether a market disruption
event exists.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">If
on a calculation day, the Index Sponsor
fails to calculate and announce the level of the Index, the calculation agent will calculate a
substitute closing level of the Index
in accordance with the formula for and method of calculating the Index last in effect prior to the
failure, but using only those securities
that comprised the Index immediately prior to that failure; provided that, if a market disruption
event occurs or is continuing on such
day, then the provisions set forth above under &ldquo;&mdash;Market Disruption Events&rdquo; shall
apply in lieu of the foregoing.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">Notwithstanding these alternative arrangements,
discontinuance of the publication of, or the failure by the Index Sponsor to calculate and announce
the level of, the Index may adversely
affect the value of the securities.</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
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<!-- Field: Page; Sequence: 17; Value: 7 -->
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<P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Percentage
Buffered Downside</B></P>

<P STYLE="margin: 0pt 0; font-size: 10pt"><FONT STYLE="font-family: Times New Roman, Times, Serif;
color: red"><B>Principal at Risk Securities
Linked to the S&amp;P 500&reg;&nbsp;Index due </B></FONT><B><FONT STYLE="color: #FF0000">May&nbsp;7,
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"><B>&nbsp;</B>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"><B>THE S&amp;P
500<SUP>&reg;</SUP> INDEX</B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"><B>&nbsp;</B>
</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: justify">The Index is
calculated, maintained and published
by S&amp;P Dow Jones Indices LLC (&ldquo;SPDJI&rdquo;). The Index consists of stocks of 500 companies
selected to provide a performance
benchmark for the U.S. equity markets. See &ldquo;Index Descriptions&mdash;The S&amp;P U.S.
Indices&rdquo; beginning on page S-43 of the
accompanying underlying supplement for additional information about the Index.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: justify">&nbsp;</P>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: justify">In addition,
information about the Index may be
obtained from other sources including, but not limited to, SPDJI&rsquo;s website (including
information regarding the Index&rsquo;s sector
weightings). We are not incorporating by reference into this pricing supplement the website or any
material it includes. Neither we nor
the agent makes any representation that such publicly available information regarding the Index is
accurate or complete.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: justify">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: justify"><B>Historical
Data </B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: justify">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">We obtained the Closing Levels of
the Index in the graph below from
Bloomberg L.P. (&ldquo;Bloomberg&rdquo;) without independent verification. The historical performance
of the Index should not be taken
as an indication of future performance, and no assurances can be given as to the Closing Level of the
Index on any calculation day (including
the Final Valuation Date). We cannot give you assurance that the performance of the Index will result
in any positive return on your initial
investment.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The following graph sets forth
daily Closing Levels of the Index for
the period from January 1, 2016 to March 26, 2021. The Closing Level of the Index on March 26, 2021
was 3,974.54.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

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                       with Fixed</B></P>

<P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Percentage
Buffered Downside</B></P>

<P STYLE="margin: 0pt 0; font-size: 10pt"><FONT STYLE="font-family: Times New Roman, Times, Serif;
color: red"><B>Principal at Risk Securities
Linked to the S&amp;P 500&reg;&nbsp;Index due </B></FONT><B><FONT STYLE="color: #FF0000">May&nbsp;7,
2025</FONT></B></P></TD><TD STYLE="text-align: right; width: 30%"><IMG
SRC="tm218219d79_424b2img001.jpg" ALT=""></TD>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"><B>THE
ESTIMATED VALUE OF THE SECURITIES</B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The estimated value of the
securities set forth on the cover of this
pricing supplement is equal to the sum of the values of the following hypothetical components:
(1)&nbsp;a fixed-income debt component
with the same maturity as the securities, valued using our internal funding rate for structured debt
described below, and (2)&nbsp;the
derivative or derivatives underlying the economic terms of the securities. The estimated value does
not represent a minimum price at which
Wells Fargo Securities or any other person would be willing to buy your securities in any secondary
market (if any exists) at any time.
The internal funding rate used in the determination of the Bank&rsquo;s estimated value generally
represents a discount from the credit
spreads for our conventional fixed-rate debt. The discount is based on, among other things, our view
of the funding value of the securities
as well as the higher issuance, operational and ongoing liability management costs of the securities
in comparison to those costs for
our conventional fixed-rate debt. For additional information, see &ldquo;Risk Factors&mdash;Our
Estimated Value Is Not Determined By Reference
To Credit Spreads For Our Conventional Fixed-Rate Debt&rdquo; in this pricing supplement. The value
of the derivative or derivatives underlying
the economic terms of the securities is derived from the Bank&rsquo;s or a third party hedge
provider&rsquo;s internal pricing models.
These models are dependent on inputs such as the traded market prices of comparable derivative
instruments and on various other inputs,
some of which are market-observable, and which can include volatility, dividend rates, interest rates
and other factors, as well as assumptions
about future market events and/or environments. Accordingly, the Bank&rsquo;s estimated value of the
securities is determined when the
terms of the securities are set based on market conditions and other relevant factors and assumptions
existing at that time. See &ldquo;Risk
Factors&mdash;Our Estimated Value Does Not Represent Future Values Of The Securities And
May&nbsp;Differ From Others&rsquo; Estimates&rdquo;
in this pricing supplement.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The Bank&rsquo;s estimated value
of the securities will be lower than
the principal amount of the securities because costs associated with selling, structuring and hedging
the securities are included in the
principal amount of the securities. These costs include the selling commissions paid to affiliated or
unaffiliated dealers, the projected
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profits that our hedge counterparties, which may include our affiliates, expect to realize for
assuming risks inherent in hedging our
obligations under the securities and the estimated cost of hedging our obligations under the
securities. Because hedging our obligations
entails risk and may be influenced by market forces beyond our control, this hedging may result in a
profit that is more or less than
expected, or it may result in a loss. We or one or more of our affiliates will retain any profits
realized in hedging our obligations
under the securities. See &ldquo;Risk Factors&mdash;Our Estimated Value of the Securities Will Be
Lower Than The Original Offering Price
Of The Securities&rdquo; in this pricing supplement.</P>

<P STYLE="font: 12pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 12pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size: 10pt">
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                       with Fixed</B></P>

<P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Percentage
Buffered Downside</B></P>

<P STYLE="margin: 0pt 0; font-size: 10pt"><FONT STYLE="font-family: Times New Roman, Times, Serif;
color: red"><B>Principal at Risk Securities
Linked to the S&amp;P 500&reg;&nbsp;Index due </B></FONT><B><FONT STYLE="color: #FF0000">May&nbsp;7,
2025</FONT></B></P></TD><TD STYLE="text-align: right; width: 30%"><IMG
SRC="tm218219d79_424b2img001.jpg" ALT=""></TD>
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10pt">&nbsp;</FONT></P>

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<B>SUPPLEMENTAL PLAN OF DISTRIBUTION</B></P>

<P STYLE="font: 9pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-size:
10pt">&nbsp;</FONT></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The securities will be purchased
by Wells Fargo Securities as principal,
pursuant to a distribution agreement between Wells Fargo Securities and us. We have agreed to pay
certain of Wells Fargo Securities&rsquo;
expenses in connection with the offering of the securities.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">Wells Fargo Securities will
receive an underwriting discount of up
to $31.50 per security. Wells Fargo Securities proposes to offer the securities to certain securities
dealers, including securities dealers
acting as custodians, at the principal amount of the securities less a concession not in excess of
$17.50 per security. Such securities
dealers may include WFA. In addition to the selling concession allowed to WFA, Wells Fargo Securities
will pay $0.75 per security of the
underwriting discount to WFA as a distribution expense fee for each security sold by WFA.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">In addition, in respect of certain
securities sold in this offering,
the Issuer may pay a fee of up to $1.00 per security to selected securities dealers in consideration
for marketing and other services
in connection with the distribution of the securities to other securities dealers.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">We expect to deliver the
securities against payment therefor in New
York, New York on a date that is more than two business days following the Pricing Date. Under Rule
15c6-1 of the Securities Exchange
Act of 1934, trades in the secondary market generally are required to settle in two business days,
unless the parties to any such trade
expressly agree otherwise. Accordingly, purchasers who wish to trade securities on any date prior to
two business days before delivery
will be required to specify alternative settlement arrangements to prevent a failed settlement.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The principal amount of the
securities includes the underwriting discount
received by Wells Fargo Securities and the projected profit that our hedge counterparties expect to
realize in consideration for assuming
the risks inherent in hedging our obligations under the securities. We expect to hedge our
obligations through an affiliate of Wells Fargo
Securities, one of our affiliates and/or another unaffiliated counterparty. Because hedging our
obligations entails risks and may be influenced
by market forces beyond the counterparties&rsquo; control, such hedging may result in a profit that
is more or less than expected, or
could result in a loss. The underwriting discount and projected profit of our hedge counterparties
reduce the economic terms of the securities.
In addition, the fact that the principal amount includes these items is expected to adversely affect
the secondary market prices of the
securities. These secondary market prices are also likely to be reduced by the cost of unwinding the
related hedging transaction. See
 &ldquo;Use of Proceeds and Hedging&rdquo; in the underlying supplement.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The Bank, Wells Fargo Securities
or any of our respective affiliates
may use this pricing supplement in market-making transactions in the securities after their initial
sale. However, it is not obligated
to do so and may discontinue making a market at any time without notice.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The securities and the related
offer to purchase the securities and
sale of the securities under the terms and conditions provided in this pricing supplement and the
accompanying underlying supplement,
prospectus supplement and prospectus do not constitute a public offering in any non-U.S.
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jurisdiction, and are being made available only
to individually identified investors pursuant to a private offering as permitted in the relevant
jurisdiction. The securities are not,
and will not be, registered with any securities exchange or registry located outside of the United
States and have not been registered
with any non-U.S. securities or banking regulatory authority. The contents of this document have not
been reviewed or approved by any
non-U.S. securities or banking regulatory authority. Any person who wishes to acquire the securities
from outside the United States should
seek the advice or legal counsel as to the relevant requirements to acquire these securities.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B><I>Argentina</I></B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B><I>&nbsp;</I></B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The securities are not and will
not be marketed in Argentina by means
of a public offering, as such term is defined under Section 2 of Law Number 26,831, as amended. No
application has been or will be made
with the Argentine Comisi&oacute;n Nacional de Valores, the Argentine securities governmental
authority, to offer the securities in Argentina.
The contents of this document have not been reviewed by the Argentine Comisi&oacute;n Nacional de
Valores.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B><I>Brazil</I></B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B><I>&nbsp;</I></B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The securities have not been and
will not be issued nor publicly placed,
distributed, offered or negotiated in the Brazilian capital markets and, as a result, have not been
and will not be registered with the
Comiss&atilde;o de Valores Mobili&aacute;ros (&ldquo;CVM&rdquo;). Any public offering or
distribution, as defined under Brazilian laws
and regulations, of the securities in Brazil is not legal without prior registration under Law
6,385/76, and CVM applicable regulation.
Documents relating to the offering of the securities, as well as information contained therein, may
not be supplied to the public in Brazil
(as the offering of the securities is not a public offering of securities in Brazil), nor be used in
connection with any offer for subscription
or sale of the securities to the public in Brazil. Persons</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

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                       with Fixed</B></P>

<P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Percentage
Buffered Downside</B></P>

<P STYLE="margin: 0pt 0; font-size: 10pt"><FONT STYLE="font-family: Times New Roman, Times, Serif;
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</TR>
</TABLE>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="text-align: left; font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">wishing to offer
or acquire the securities within Brazil should consult with
their own counsel as to the applicability of registration requirements or any exemption therefrom.
</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B><I>British Virgin Islands</I>
</B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B><I>&nbsp;</I></B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The securities have not been, and
will not be, registered under the
laws and regulations of the British Virgin Islands, nor has any regulatory authority in the British
Virgin Islands passed comment upon
or approved the accuracy or adequacy of this document. This document shall not constitute an offer,
invitation or solicitation to any
member of the public in the British Virgin Islands for the purposes of the Securities and Investment
Business Act, 2010, of the British
Virgin Islands.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B><I>Chile</I></B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B><I>&nbsp;</I></B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">Neither the issuer nor the
securities have been registered with the
Comisi&oacute;n Para el Mercado Financiero pursuant to Law No. 18.045, the Ley de Mercado de Valores
and regulations thereunder, so they
cannot be publicly offered in Chile. This pricing supplement does not constitute an offer of, or an
invitation to subscribe for or purchase,
the securities in the republic of Chile, other than to individually identified buyers pursuant to a
private offering within the meaning
of Article 4 of the Ley de Mercado de Valores (an offer that is not addressed to the public at large
or to a certain sector or specific
group of the public).</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B><I>Mexico</I></B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B><I>&nbsp;</I></B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><FONT STYLE="font-family: Times
New Roman, Times, Serif">The securities
have not been registered with the National Registry of Securities maintained by the Mexican National
Banking and Securities Commission
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and may not be offered or sold publicly in Mexico. This pricing supplement and the accompanying
underlying supplement, prospectus supplement
and prospectus may not be publicly distributed in Mexico.</FONT> The securities may only be offered
in a private offering pursuant to
Article 8 of the Securities Market Law.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B><I>Panama</I></B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B><I>&nbsp;</I></B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The Securities have not been and
will not be registered with the Superintendency
of Securities Market of the Republic of Panama under Decree Law N&deg;1 of July 8, 1999 (the
&ldquo;Panamanian Securities Act&rdquo;)
and may not be publicly offered or sold within Panama, except in certain limited transactions exempt
from the registration requirements
of the Panamanian Securities Act, including the private placement rule based on number 2 of Article
83 of Law Decree 1 of July 8, 1999
(or number 2 of Article 129 of the Unified Text of Law Decree 1 of July 8, 1999). The Securities do
not benefit from the tax incentives
provided by the Panamanian Securities Act and are not subject to regulation or supervision by the
Superintendency of Securities Market
of the Republic of Panama.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B><I>Paraguay</I></B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The sale of the securities
qualifies as a private placement pursuant
to Law No. 5810/17 &ldquo;Stock Market&rdquo;. The securities must not be offered or sold to the
public in Paraguay, except under circumstances
which do not constitute a public offering in accordance with Paraguayan regulations. The securities
are not and will not be registered
before the Paraguayan securities supervisory body Comisi&oacute;n Nacional de Valores
(&ldquo;CNV&rdquo;) the Paraguayan private stock
exchange Bolsa de Valores y Productos de Asunci&oacute;n (&ldquo;BVPASA&rdquo;). The issuer is also
not registered before the CNV or the
BVPASA.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">In no case may securities not
registered before the CNV be offered
to the general public via mass media such as press, radio, television, or internet when such media
are publicly accessible in the Republic
of Paraguay, regardless of the location from where they are issued.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The privately placed securities
are not registered with the National
Securities Commission, and therefore do not have tax benefits and are not negotiable through the
BVPASA. Privately placed securities may
have less liquidity, making it difficult to sell such securities in the secondary market, which could
also affect the sale price. Private
securities of issuers not registered before the CNV may not have periodic financial information or
audited financial statements, which
could generate greater risk to the investor due to the asymmetry of information. It is the
responsibility of the investor to ascertain
and assess the risk assumed in the acquisition of the security.</P>

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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B><I>Peru</I></B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The securities have not been and
will not be registered with the Capital
Markets Public Registry of the Capital Markets Superintendence nor the Lima Stock Exchange Registry
for their public offering in Peru
under the Peruvian Capital Markets Law (Law No. 861/ Supreme Decree No. 093-2002) and the decrees and
regulations thereunder.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">Consequently, the securities may
not be offered or sold, directly or
indirectly, nor may this pricing supplement, the accompanying supplements or any other offering
material relating to the securities be
distributed or caused to be distributed in Peru to the general public. The securities may only be
offered in a private offering under
Peruvian regulation and without using mass marketing, which is</P>

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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"></P>

<!-- Field: Page; Sequence: 21; Value: 18 -->
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Name: PageNo -->21<!-- Field: /Sequence --></P></DIV>
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<TD STYLE="width: 70%"><P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color:
red"><B>Market Linked Securities&mdash;Auto-Callable
                       with Fixed</B></P>

<P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Percentage
Buffered Downside</B></P>

<P STYLE="margin: 0pt 0; font-size: 10pt"><FONT STYLE="font-family: Times New Roman, Times, Serif;
color: red"><B>Principal at Risk Securities
Linked to the S&amp;P 500&reg;&nbsp;Index due </B></FONT><B><FONT STYLE="color: #FF0000">May&nbsp;7,
2025</FONT></B></P></TD><TD STYLE="text-align: right; width: 30%"><IMG
SRC="tm218219d79_424b2img001.jpg" ALT=""></TD>
</TR>
</TABLE>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">defined as a marketing strategy
utilizing mass distribution and mass media
to offer, negotiate or distribute securities to the whole market. Mass media includes newspapers,
magazines, radio, television, mail,
meetings, social networks, Internet servers located in Peru, and other media or technology platforms.
</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B><I>Taiwan</I></B></P>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B><I>&nbsp;</I></B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The securities may be made
available outside Taiwan for purchase by
Taiwan residents outside Taiwan but may not be offered or sold in Taiwan.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: justify"><B><I>United
Kingdom</I></B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: justify">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The securities may not be offered,
sold or otherwise made available
to any retail investor in the United Kingdom (the &ldquo;UK&rdquo;). For the purposes of this
provision:</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

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<TD STYLE="width: 0.25in"></TD><TD STYLE="width: 0.5in"><FONT STYLE="font-size: 10pt">(a)</FONT></TD>
<TD><FONT STYLE="font-size: 10pt">the expression &quot;retail investor&quot; means a person who is
one (or more) of the following:</FONT></TD></TR></TABLE>

<TABLE CELLPADDING="0" CELLSPACING="0" WIDTH="100%" STYLE="font: 11pt Times New Roman, Times, Serif;
margin-top: 0pt; margin-bottom: 0pt"><TR STYLE="vertical-align: top">
<TD STYLE="width: 58.5pt"></TD><TD STYLE="width: 39.75pt"><FONT STYLE="font-size: 10pt">(i)</FONT>
</TD><TD><FONT STYLE="font-size: 10pt">a retail client, as defined in point (8) of Article 2 of
Regulation (EU) No 2017/565 as it forms part
of UK domestic law by virtue of the European Union (Withdrawal) Act 2018 (as amended, the
&ldquo;EUWA&rdquo;); or</FONT></TD></TR></TABLE>

<TABLE CELLPADDING="0" CELLSPACING="0" WIDTH="100%" STYLE="font: 11pt Times New Roman, Times, Serif;
margin-top: 0pt; margin-bottom: 0pt"><TR STYLE="vertical-align: top">
<TD STYLE="width: 58.5pt"></TD><TD STYLE="width: 39.75pt"><FONT STYLE="font-size: 10pt">(ii)</FONT>
</TD><TD><FONT STYLE="font-size: 10pt">a customer within the meaning of the provisions of the UK
Financial Services and Markets Act 2000 (as
amended, &ldquo;FSMA&rdquo;) and any rules or regulations made under the FSMA to implement Directive
(EU) 2016/97 (as amended), where
that customer would not qualify as a professional client, as defined in point (8) of Article 2(1) of
Regulation (EU) No 600/2014 as it
forms part of domestic law by virtue of the EUWA; or</FONT></TD></TR></TABLE>

<TABLE CELLPADDING="0" CELLSPACING="0" WIDTH="100%" STYLE="font: 11pt Times New Roman, Times, Serif;
margin-top: 0pt; margin-bottom: 0pt"><TR STYLE="vertical-align: top">
<TD STYLE="width: 58.5pt"></TD><TD STYLE="width: 39.75pt"><FONT STYLE="font-size: 10pt">(iii)</FONT>
</TD><TD><FONT STYLE="font-size: 10pt">not a qualified investor as defined in Article 2 of Regulation
(EU) 2017/1129 (as amended) as it forms
part of domestic law by virtue of the EUWA; and</FONT></TD></TR></TABLE>

<TABLE CELLPADDING="0" CELLSPACING="0" WIDTH="100%" STYLE="font: 11pt Times New Roman, Times, Serif;
margin-top: 0pt; margin-bottom: 0pt"><TR STYLE="vertical-align: top">
<TD STYLE="width: 0.25in"></TD><TD STYLE="width: 0.5in"><FONT STYLE="font-size: 10pt">(b)</FONT></TD>
<TD><FONT STYLE="font-size: 10pt">the expression &quot;offer&quot; includes the communication in any
form and by any means of sufficient
information on the terms of the offer and the securities offered so as to enable an investor to
decide to purchase or subscribe for the
securities.</FONT></TD></TR></TABLE>

<P STYLE="font-size: 10pt; margin-top: 0; margin-bottom: 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B><I>Uruguay</I></B></P>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B><I>&nbsp;</I></B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The sale of the securities
qualifies as a private placement pursuant
to section 2 of Uruguayan law 18,627. The securities must not be offered or sold to the public in
Uruguay, except in circumstances which
do not constitute a public offering or distribution under Uruguayan laws and regulations. The
securities are not and will not be registered
with the Financial Services Superintendency of the Central Bank of Uruguay.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"></P>

<!-- Field: Page; Sequence: 22; Value: 18 -->
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Name: PageNo -->22<!-- Field: /Sequence --></P></DIV>
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<TABLE CELLPADDING="0" CELLSPACING="0" STYLE="font: 10pt Times New Roman, Times, Serif; margin-top:
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<TR STYLE="vertical-align: top; text-align: justify">
<TD STYLE="width: 70%"><P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color:
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                       with Fixed</B></P>

<P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Percentage
Buffered Downside</B></P>

<P STYLE="margin: 0pt 0; font-size: 10pt"><FONT STYLE="font-family: Times New Roman, Times, Serif;
color: red"><B>Principal at Risk Securities
Linked to the S&amp;P 500&reg;&nbsp;Index due </B></FONT><B><FONT STYLE="color: #FF0000">May&nbsp;7,
2025</FONT></B></P></TD><TD STYLE="text-align: right; width: 30%"><IMG
SRC="tm218219d79_424b2img001.jpg" ALT=""></TD>
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</TABLE>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"><B>SUMMARY OF
U.S. FEDERAL INCOME TAX CONSEQUENCES</B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"><B>&nbsp;</B>
</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The following discussion is a
brief summary of the material U.S. federal
income tax considerations relating to an investment in the securities. The following summary is not
complete and is both qualified and
supplemented by, or in some cases supplements, the discussion entitled &ldquo;Certain U.S. Federal
Income Tax Consequences&rdquo; in the
underlying supplement, which you should carefully review prior to investing in the securities.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The U.S. federal income tax
consequences of your investment in the
securities are uncertain. No statutory, judicial or administrative authority directly discusses how
the securities should be treated for
U.S. federal income tax purposes. In the opinion of our tax counsel, Mayer Brown LLP, it would
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generally be reasonable to treat the securities
as prepaid cash-settled derivative contracts. Pursuant to the terms of the securities, you agree to
treat the securities in this manner
for all U.S. federal income tax purposes. If this treatment is respected, you should generally
recognize capital gain or loss upon the
sale, exchange, redemption or payment on maturity in an amount equal to the difference between the
amount you receive at such time and
the amount that you paid for your securities. Such gain or loss should generally be long-term capital
gain or loss if you have held your
securities for more than one year. Non-U.S. holders should consult the section entitled &ldquo;<I>Tax
Consequences to Non-U.S. Holders</I>&rdquo;
in the underlying supplement.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">The expected characterization of
the securities is not binding on the
IRS or the courts. Thus, it is possible that the IRS would seek to characterize your securities in a
manner that results in tax consequences
to you that are different from those described above or in the accompanying underlying supplement.
Such alternate treatments could include
a requirement that a holder accrue ordinary income over the life of the securities or treat all gain
or loss at maturity as ordinary gain
or loss. For a more detailed discussion of certain alternative characterizations with respect to your
securities and certain other considerations
with respect to your investment in the securities, you should consider the discussion set forth in
&ldquo;Certain U.S. Federal Income
Tax Consequences&rdquo; of the underlying supplement. We are not responsible for any adverse
consequences that you may experience as a
result of any alternative characterization of the securities for U.S. federal income tax or other tax
purposes.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">We will not attempt to ascertain
whether any of the entities whose
stock is included in the Reference Asset would be treated as a passive foreign investment company
(&ldquo;PFIC&rdquo;) or United States
real property holding corporation (&ldquo;USRPHC&rdquo;), both as defined for U.S. federal income tax
purposes. If one or more of the
entities whose stock is included in the Reference Asset were so treated, certain adverse U.S. federal
income tax consequences might apply.
You should refer to information filed with the SEC and other authorities by the entities whose stock
is included in the Reference Asset
and consult your tax advisor regarding the possible consequences to you if one or more of the
entities whose stock is included in the
Reference Asset is or becomes a PFIC or a USRPHC.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">A &ldquo;dividend
equivalent&rdquo; payment is treated as a dividend
from sources within the United States and such payments generally would be subject to a 30% U.S.
withholding tax if paid to a non-U.S.
holder. Under U.S. Treasury Department regulations, payments (including deemed payments) with respect
to equity-linked instruments (&ldquo;ELIs&rdquo;)
that are &ldquo;specified ELIs&rdquo; may be treated as dividend equivalents if such specified ELIs
reference an interest in an &ldquo;underlying
security,&rdquo; which is generally any interest in an entity taxable as a corporation for U.S.
federal income tax purposes if a payment
with respect to such interest could give rise to a U.S. source dividend. However, IRS guidance
provides that withholding on dividend equivalent
payments will not apply to specified ELIs that are not delta-one instruments and that are issued
before January 1, 2023. Based on our
determination that the securities are not &ldquo;delta-one&rdquo; instruments, non-U.S. holders
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should not be subject to withholding on
dividend equivalent payments, if any, under the securities. However, it is possible that the
securities could be treated as deemed reissued
for U.S. federal income tax purposes upon the occurrence of certain events affecting the Reference
Asset or the securities, and following
such occurrence the securities could be treated as subject to withholding on dividend equivalent
payments. Non-U.S. holders that enter,
or have entered, into other transactions in respect of the Reference Asset or the securities should
consult their tax advisors as to the
application of the dividend equivalent withholding tax in the context of the securities and their
other transactions. If any payments
are treated as dividend equivalents subject to withholding, we (or the applicable paying agent) would
be entitled to withhold taxes without
being required to pay any additional amounts with respect to amounts so withheld.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B>You should consult your tax
advisor as to the tax consequences of
such characterization and any possible alternative characterizations of the securities for U.S.
federal income tax purposes. You should
also consult your tax advisor concerning the U.S. federal income tax and other tax consequences of
your investment in the securities in
your particular circumstances, including the application of state, local or other tax laws and the
possible effects of changes in federal
or other tax laws.</B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

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<!-- Field: Page; Sequence: 23; Value: 18 -->
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<TD STYLE="width: 70%"><P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color:
red"><B>Market Linked Securities&mdash;Auto-Callable
                       with Fixed</B></P>

<P STYLE="font: 13.5pt Times New Roman, Times, Serif; margin: 0pt 0; color: red"><B>Percentage
Buffered Downside</B></P>

<P STYLE="margin: 0pt 0; font-size: 10pt"><FONT STYLE="font-family: Times New Roman, Times, Serif;
color: red"><B>Principal at Risk Securities
Linked to the S&amp;P 500&reg;&nbsp;Index due </B></FONT><B><FONT STYLE="color: #FF0000">May&nbsp;7,
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SRC="tm218219d79_424b2img001.jpg" ALT=""></TD>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"><B>CERTAIN
CANADIAN FEDERAL INCOME TAX CONSIDERATIONS</B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0; text-align: center"><B>&nbsp;</B>
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<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">In the opinion of Blake,
Cassels&nbsp;&amp; Graydon LLP, our Canadian
tax counsel, the following summary describes the principal Canadian federal income tax considerations
under the <I>Income Tax Act</I>
(Canada) and the regulations thereto (the &ldquo;Canadian Tax Act&rdquo;) generally applicable at the
date hereof to an investor who acquires
beneficial ownership of a security pursuant to this pricing supplement and who for the purposes of
the Canadian Tax Act and at all relevant
times: (a)&nbsp;is neither resident nor deemed to be resident in Canada; (b)&nbsp;deals at
arm&rsquo;s length with the Issuer and any
transferee resident (or deemed to be resident) in Canada to whom the investor disposes of the
security; (c)&nbsp;does not use or hold
and is not deemed to use or hold the security in, or in the course of, carrying on a business in
Canada; (d)&nbsp;is entitled to receive
all payments (including any interest and principal) made on the security; and (e)&nbsp;is not a, and
deals at arm&rsquo;s length with
any, &ldquo;specified shareholder&rdquo; of the Issuer for purposes of the thin capitalization rules
in the Canadian Tax Act (a &ldquo;Non-Resident
Holder&rdquo;). A &ldquo;specified shareholder&rdquo; for these purposes generally includes a person
who (either alone or together with
persons with whom that person is not dealing at arm&rsquo;s length for the purposes of the Canadian
Tax Act) owns or has the right to
acquire or control or is otherwise deemed to own 25% or more of the Issuer&rsquo;s shares determined
on a votes or fair market value basis.
Special rules which apply to non-resident insurers carrying on business in Canada and elsewhere are
not discussed in this summary.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">This summary is supplemental to
and should be read together with the
description of material Canadian federal income tax considerations relevant to a Non-Resident Holder
owning securities under &ldquo;Material
Income Tax Consequences&mdash;Canadian Taxation&rdquo; in the accompanying prospectus and a Non-
Resident Holder should carefully read
that description as well.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B>This summary is of a general
nature only and is not intended to
be, nor should it be construed to be, legal or tax advice to any particular Non-Resident Holder. Non-
Resident Holders are advised to consult
with their own tax advisors with respect to their particular circumstances.</B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0"><B>&nbsp;</B></P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">Based on Canadian tax
counsel&rsquo;s understanding of the Canada Revenue
Agency&rsquo;s administrative policies, and having regard to the terms of the securities, interest
payable on the securities should not
be considered to be &ldquo;participating debt interest&rdquo; as defined in the Canadian Tax Act and
accordingly, a Non-Resident Holder
should not be subject to Canadian non-resident withholding tax in respect of amounts paid or credited
or deemed to have been paid or credited
by the Issuer on a security as, on account of or in lieu of payment of, or in satisfaction of,
interest.</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">&nbsp;</P>

<P STYLE="font: 10pt Times New Roman, Times, Serif; margin: 0pt 0">Non-Resident Holders should
consult their own tax advisors regarding
the consequences to them of a disposition of the securities to a person with whom they are not
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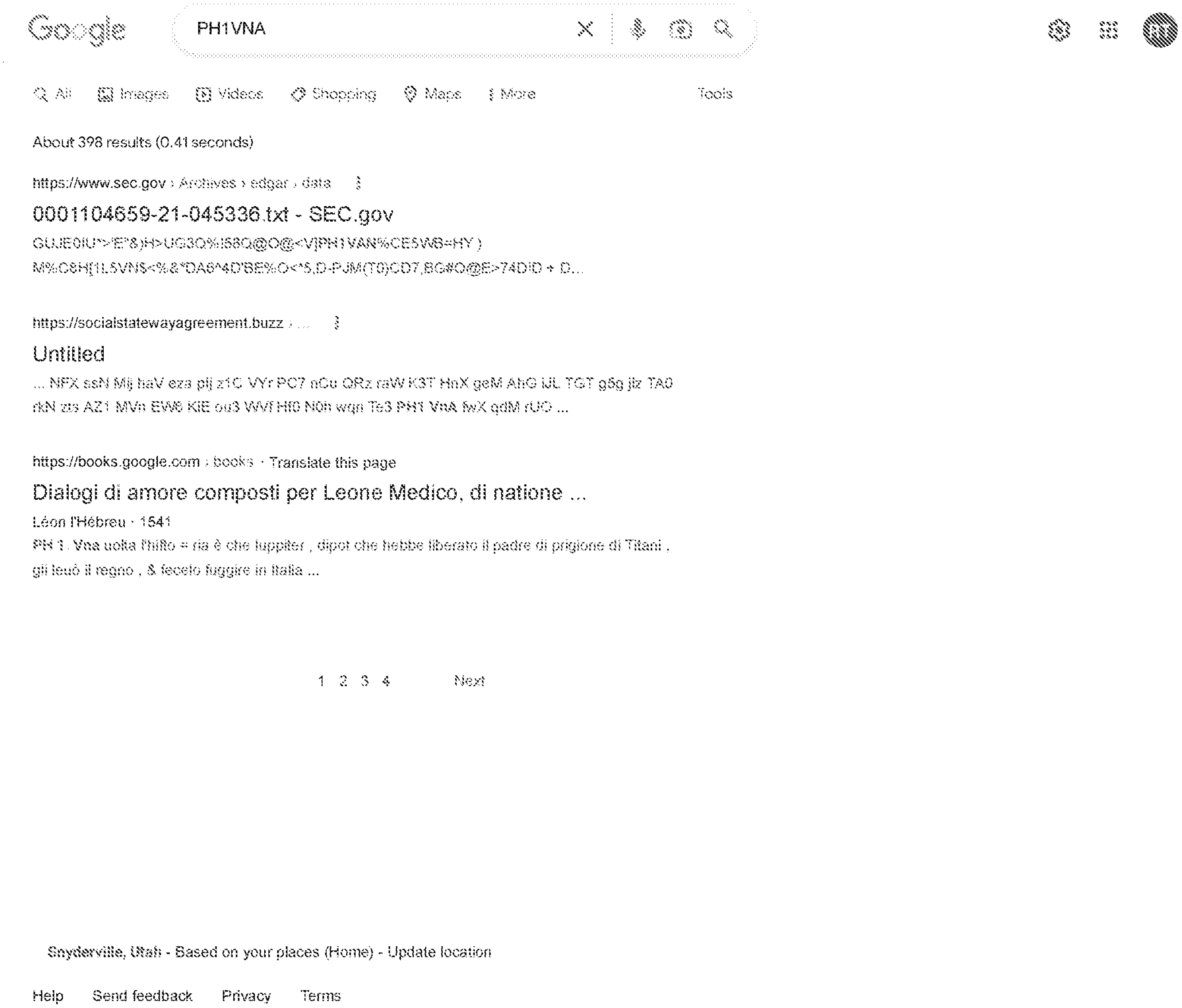
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M%C8H[1L5VN$<%&*DA6^4D'BE%O<^5,D-PJM(T0)CD7,BG#O@E>74D!D + D...

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Léon l'Hébreu · 1541

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	Filing Date	2021-07-02
	First Named Inventor	COETZEE
	Art Unit	
	Examiner Name	
	Attorney Docket Number	8572-US-NP

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/R.T.B/	2	8558083		2013-10-15	BARKER	
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Receipt date: 01/06/2022

INFORMATION DISCLOSURE STATEMENT BY APPLICANT **(Not for submission under 37 CFR 1.99)**	Application Number	17366059
	Filing Date	2021-07-02
	First Named Inventor	COETZEE
	Art Unit	
	Examiner Name	
	Attorney Docket Number	8572-US-NP

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/R.T.B/	1	US Patent Application Serial Number 17/377529 for MAIZE HYBRID X13R124, filed 2021-07-16	
/R.T.B/	2	US Patent Application Serial Number 17/382716 for MAIZE HYBRID X08R655, filed 2021-07-22	

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EXAMINER SIGNATURE

Examiner Signature	/RUSSELL T BOGGS/	Date Considered	11/04/2022

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	17366059
Filing Date	2021-07-02
First Named Inventor	COETZEE
Art Unit	
Examiner Name	
Attorney Docket Number	8572-US-NP

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/lmfitzpatrick/	Date (YYYY-MM-DD)	2021-11-16
Name/Print	LYNDA M. FITZPATRICK	Registration Number	60901

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	22378	a01h5/10.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2022/10/23 03:17 PM
L3	9085	L1 AND ((zea ADJ mays) OR (z ADJ mays) OR maize OR corn).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/10/23 03:20 PM
L12	15668	L1 AND ((zea ADJ mays) OR (z ADJ mays) OR maize OR corn).ab.	(US-PGPUB; USPAT; DERWENT)	ADJ	ON	ON	2022/10/23 03:29 PM
L13	15886	L12 OR L3	(US-PGPUB; USPAT; DERWENT)	ADJ	ON	ON	2022/10/23 03:29 PM
L56	308	L13 AND (silk adj6 ((light red)))	(US-PGPUB; USPAT)	ADJ	ON	ON	2022/10/30 02:02 PM
L57	36	L56 AND (anther adj6 ((green yellow)))	(US-PGPUB; USPAT)	ADJ	ON	ON	2022/10/30 02:02 PM
L60	24	L57 AND ((brace root) adj8 (weak OR faint))	(US-PGPUB; USPAT; DERWENT)	ADJ	ON	ON	2022/10/30 02:04 PM
L61	6	L60 AND (cob adj6 (pink orange))	(US-PGPUB; USPAT; DERWENT)	ADJ	ON	ON	2022/10/30 02:04 PM
L62	132	L56 AND (anther adj6 ((green OR yellow)))	(US-PGPUB; USPAT)	ADJ	ON	ON	2022/10/31 09:30 AM
L63	36	L56 AND (anther NEAR5 ((green yellow)))	(US-PGPUB; USPAT)	ADJ	ON	ON	2022/10/31 09:30 AM
L64	44	L13 AND (PH1V5T OR PH2F7K)	(US-PGPUB; USPAT)	ADJ	ON	ON	2022/11/01 01:04 PM
L65	1	L64 AND (PH1V5T OR PH2F7K).ti.	(US-PGPUB; USPAT)	ADJ	ON	ON	2022/11/01 01:06 PM
L66	0	PH2F7K.ti.	(US-PGPUB; USPAT)	ADJ	ON	ON	2022/11/01 01:32 PM
L67	107	L56 AND (anther adj6 ((yellow)))	(US-PGPUB; USPAT)	ADJ	ON	ON	2022/11/03 03:24 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 17/366,059	Filing Date 07/02/2021	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $480 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	01/17/2023	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x $480 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/VICTOR BARLOW/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN THE APPLICATION OF:

MICHIEL CB COETZEE

DOCKET NO.: 8572-US-NP APPLICATION NO.: 17/366059

CONFIRMATION NO.: 1295 GROUP ART UNIT: 1663

EXAMINER: BOGGS, RUSSELL T FILED: JULY 02, 2021

FOR: MAIZE INBRED 1PFHC43

RESPONSE TO NON-FINAL OFFICE ACTION

Via EFS-Web

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

This responds to the Office Action dated November 14, 2022. Please charge any fee necessary to enter this paper to Deposit Account 16-1852 (Pioneer Hi-Bred International, Inc.).

Applicants respectfully request the application be amended and receive further consideration in light of the following:

Amendments to the Specification, which begin on page 2.

Amendments to the Claims, which begin on page 3.

Remarks, which begin on page 6.

Amendments to the Specification

Please amend paragraph [321] with the following:

[321] Applicant has made ~~will make~~ a deposit of at least 625 seeds of Maize Variety 1PFHC43 with the Provasoli-Guillard National Center for Marine Algae and Microbiota (NCMA), 60 Bigelow Drive, East Boothbay, ME 04544 USA, with NCMA Accession Number 202212064 ~~XXXX~~. The seeds deposited with the NCMA [[ATCC]] on December 8, 2022 ~~[date]~~ were obtained from the seed of the variety maintained by Pioneer Hi-Bred International, Inc., 7250 NW 62nd Avenue, Johnston, Iowa, 50131 since prior to the filing date of this application. Access to this seed will be available during the pendency of the application to the Commissioner of Patents and Trademarks and persons determined by the Commissioner to be entitled thereto upon request. Upon issuance of any claims in the application, the Applicant will make the deposit available to the public pursuant to 37 C.F.R. §1.808. This deposit of the Maize Variety 1PFHC43 will be maintained in the NCMA depository, which is a public depository, for a period of 30 years, or 5 years after the most recent request, or for the enforceable life of the patent, whichever is longer, and will be replaced if it becomes nonviable during that period. Additionally, Applicant has or will satisfy all of the requirements of 37 C.F.R. §§1.801–1.809, including providing an indication of the viability of the sample upon deposit. Applicant has no authority to waive any restrictions imposed by law on the transfer of biological material or its transportation in commerce. Applicant does not waive any infringement of rights granted under this patent or under the Plant Variety Protection Act (7 USC 2321 et seq.).

Amendments to the Claims

This claim listing replaces all previous listings and prior versions of the claims.

1. (Currently Amended) A seed, plant, plant part, or plant cell of inbred maize variety 1PFHC43, representative seed of the variety having been deposited under NCMA accession number 202212064 ~~XXXX~~.

2. (Currently Amended) The plant part of claim 1, wherein the plant part is an ovule or the plant part is pollen.

3. (Original) An F1 hybrid maize seed produced by crossing the plant or plant part of claim 1 with a different maize plant.

4. (Original) An F1 hybrid maize plant or plant part produced by growing the maize seed of claim 3, wherein the plant part comprises at least one cell of the F1 hybrid maize plant.

5. (Original) A method for producing a second maize plant, the method comprising applying plant breeding techniques to the F1 plant or plant part of claim 4 to produce the second maize plant.

6. (Original) A method for producing a second maize plant or plant part, the method comprising doubling haploid seed generated from a cross of the plant or plant part of claim 4 with an inducer variety, thereby producing the second maize plant or plant part.

7. (Original) A method of making a commodity plant product comprising silage, starch, fat, syrup or protein, the method comprising producing the commodity plant product from the maize plant or plant part of claim 4.

8. (Original) A method of producing a maize seed derived from the variety 1PFHC43, comprising:
   a) crossing the plant of claim 1 with itself or a second plant to produce progeny seed; and
   b) growing the progeny seed to produce a progeny plant and crossing the progeny plant with itself or a different plant to produce maize seed derived from the variety 1PFHC43.

9. (Original) A method for producing nucleic acids, the method comprising isolating nucleic acids from the seed, plant, plant part, or plant cell of claim 1.

10. (Currently Amended) A converted seed, plant, plant part or plant cell of inbred maize variety 1PFHC43, representative seed of the maize variety 1PFHC43 having been deposited under NCMA accession number 202212064 [[XXXX]], wherein the converted seed, plant, plant part or plant cell comprises fewer than six locus conversions ~~a locus conversion~~, and wherein the plant or a plant grown from the converted seed, plant part or plant cell comprises the fewer than six locus conversions ~~locus conversion~~ and otherwise comprises the physiological and morphological characteristics of maize variety 1PFHC43 when grown under the same environmental conditions, and further wherein the fewer than six locus conversion confer a property selected from the group consisting of male sterility, a site for site-specific recombination, abiotic stress tolerance, altered phosphate, altered antioxidants, altered fatty acids, altered essential amino acids, altered carbohydrates, herbicide tolerance, insect resistance and disease resistance.

11. (Currently Amended) The converted seed, plant, plant part or plant cell of claim 10, wherein the fewer than six locus conversions confer ~~locus conversion confers~~ a property selected from the group consisting of ~~male sterility, site-specific recombination, abiotic stress tolerance, altered phosphate, altered antioxidants, altered fatty acids, altered essential amino acids, altered carbohydrates,~~ herbicide tolerance, insect resistance and disease resistance.

12. (Original) A maize seed produced by crossing the plant or plant part of claim 10 with a different maize plant.

13. (Original) A hybrid maize plant or plant part produced by growing the seed of claim 12, wherein the plant part comprises at least one cell of the hybrid maize plant.

14. (Original) A method for producing a second maize plant, the method comprising applying plant breeding techniques to the plant or plant part of claim 13 to produce the second maize plant.

15. (Original) A method for producing a second maize plant or plant part, the method comprising doubling haploid seed generated from a cross of the plant or

plant part of claim 13 with an inducer variety, thereby producing the second maize plant or plant part.

16. (Original) A method of making a commodity plant product comprising silage, starch, fat, syrup or protein, the method comprising producing the commodity plant product from the maize plant or plant part of claim 13.

17. (Original) A method for producing nucleic acids, the method comprising isolating nucleic acids from the seed, plant, plant part, or plant cell of claim 10.

18. (Currently Amended) An F1 hybrid seed produced by crossing a plant or plant part of inbred maize variety 1PFHC43, representative seed of the inbred maize variety 1PFHC43 having been deposited under NCMA accession number 202212064 [[XXXX]] with a different maize plant, wherein inbred maize variety 1PFHC43 further comprises a transgene and otherwise comprises all of the physiological and morphological characteristics of maize variety 1PFHC43 when grown under the same environmental conditions, wherein the transgene [[that]] is inherited by the F1 hybrid seed, wherein the transgene was introduced into inbred maize variety 1PFHC43 by backcrossing or genetic transformation.

19. (Original) A method of producing progeny seed, the method comprising crossing a plant grown from the seed of claim 18 with itself or a second plant to produce progeny seed.

20. (Original) A method of making a commodity plant product comprising silage, starch, fat, syrup or protein, the method comprising producing the commodity plant product from the maize plant or plant part of claim 18.

REMARKS

Claims 1-20 are pending and subject to examination. Applicant has amended the specification and claims 1, 10, and 18 to insert the deposit information. Additionally, Applicant has amended claims 2, 10, 11, and 18. Applicant submits that no new matter is added by way of amendments to the specification and claims. It is submitted that these amendments render the rejections moot.

Objection to the Specification

The Examiner has objected to the Specification because in the "Deposit" section there are placeholders – "[date] and XXXX" for the accession numbers and the date of the deposit. Applicant has amended paragraph [321] under the heading "DEPOSITS" by inserting the deposit accession number and date of deposit. Accordingly, withdrawal of this objection is respectfully requested.

Objection to the Claims

The Examiner has objected to claims 1, 2, 10 and 18 for informalities. Claims 1, 10 and 18 are objected to for having "XXXX" as a place-holder for the deposit number. Applicant has amended claims 1, 10 and 18 to include the deposit accession number. Claim 2 is objected to regarding the plurality of what is being claimed. Applicant has amended claim 2. Accordingly, withdrawal of this objection is respectfully requested.

Rejection under 35 USC § 112, indefinite

The Examiner has rejected claims 1-20 under 35 U.S.C. § 112(b) as allegedly being indefinite because claims 1, 8, 10 and 18 recite the limitation "1PFHC43" in reference to maize plants without referencing a perfected deposit. Applicant has amended claims 1, 10, and 18 to recite the deposit accession number.

The Examiner has also rejected claim 18. Applicant respectfully disagrees and submits that the claim is clear that the deposit does not have the referenced transgene. Nonetheless, in order to advance prosecution, and not acquiescence to the rejection, Applicant has amended claim 18.

Accordingly, withdrawal of this rejection is respectfully requested.

Rejection under 35 USC § 112, enablement

The Examiner has rejected claims 1-20 under 35 U.S.C. § 112(a) for allegedly failing to comply with the enablement requirement.

Applicant has deposited at least 625 seeds of inbred maize variety 1PFHC43 under the provisions of 37 C.F.R. § 1.804. Applicant has amended the specification to insert the NCMA deposit accession number and date of deposit and has amended claims 1, 10, and 18 to recite the deposit accession number. A copy of the deposit receipt and viability statement from NCMA is enclosed. The deposit will be available to the Commissioner during the pendency of this application. Additionally, Applicant provides assurance that:

a) during the pendency of this application, access to the invention will be afforded to the Commissioner upon request;
b) all restrictions upon availability to the public will be irrevocably removed upon granting of the patent in accordance with 37 C.F.R. § 1.808(a)(2);
c) the deposit will be maintained in a public depository for a period of thirty years, or five years after the last request for the enforceable life of the patent, whichever is longer;
d) a test of the viability of the biological material at the time of deposit was performed; and
e) the deposit will be replaced if it should ever become inviable.

Additionally, Applicant will satisfy all the requirements of 37 C.F.R. §§1.801-1.809, including providing herewith an indication of the viability of the samples. Accordingly, withdrawal of this rejection is respectfully requested.

Rejection under 35 USC § 112, written description

The Examiner has rejected claims 10 and 12-20 under 35 U.S.C. § 112(a) for allegedly failing to comply with the written description requirement for the reasons set forth on pages 7-9 of the Office Action. The Examiner asserts that "… claim 10 reads on the deposited seed with an unlimited number of locus conversions ..." Office action, page 7. Applicant respectfully disagrees.

Amended claim 10 recites: "A converted seed, plant, plant part or plant cell of inbred maize variety 1PFHC43 , representative seed of the maize variety 1PFHC43 having been deposited under NCMA accession number 202212064, wherein the converted seed, plant, plant part or plant cell comprises fewer than six locus conversions, and wherein the plant or a plant grown from the converted seed, plant part or plant cell comprises the fewer than six locus conversions and otherwise comprises the physiological and morphological characteristics of maize variety 1PFHC43 when grown under the same environmental conditions, and further wherein the fewer than six locus conversion confer a property selected from the group consisting of male sterility, a site for site-specific recombination, abiotic stress tolerance, altered phosphate, altered antioxidants, altered fatty acids, altered essential amino acids, altered carbohydrates, herbicide tolerance, insect resistance and disease resistance."

Applicant respectfully submits that the claims are adequately supported by the seed deposit and the specification as filed. For example, support for the amendment is found at least in the originally filed claims and at page 17, lines 8-14, page 30, lines 7-20 and page 31, lines 19-25. "Courts have recognized the necessity and desirability of permitting an applicant for a patent to supplement the written disclosure in an application with a deposit of biological material which is essential to meet some requirement of the statute with respect to the claimed invention." MPEP § 2402. Applicant has made a deposit of seeds in accordance with the relevant statutory requirements and accordingly claims reciting the deposited seed are adequately described.

The Examiner has also rejected claim 18. Applicant respectfully disagrees. Nonetheless, in order to advance prosecution, and not acquiescence to the rejection, Applicant has amended claim 18.

Applicant respectfully submits that claims 10 and 18, as amended, and those depending therefrom, are adequately described in the specification. Accordingly, Applicant respectfully requests that the written description rejection be withdrawn.

Request for Information under 37 CFR § 1.105

The Examiner made a request for information regarding the starting materials and methods used to produce maize variety 1PFHC43. The response to this request can be found attached to the end of this document.

Conclusion

In view of the above amendments and remarks, it is submitted that the claims satisfy the provisions of 35 U.S.C. § 112. Reconsideration of this application and a notice of allowance are respectfully requested. The Examiner is also encouraged to telephone the undersigned agent if there are any questions regarding this Amendment or the application.

Respectfully submitted,

/Krista K. Hill/
KRISTA K. HILL
Attorney/Agent for Applicant(s)
Registration No.: 69,965
Telephone: 515-535-8248
Facsimile: 515-535-6883

Request for Information under 37 C.F.R. §1.105

The Examiner has made a Request for Information under 37 C.F.R. §1.105 for the following reasons:

Applicant is claiming a seed of plant variety "1PFHC43", but the instant specification is silent about some of the starting materials and methods were used to produce plant variety "1PFHC43". The requested information is required to make a meaningful and complete search of the prior art.

Response to this requirement, if known, please provide answers to each of the following interrogatories eliciting factual information regarding the parental line / variety PH1VNA:

Please supply the breeding methodology and history regarding the development of the instant variety.

a) Such information should include all the designations/denominations used for the original parental lines.

   Response: Inbred maize 1PFHC43 originated from a cross between proprietary inbred line PH1VNA and inbred line PH1D84.

b) Information should also include information pertaining to the public availability of the original parental lines.

   Response: Parental line PH1VNA has not been made publicly available. Parental line PH1D84 was patented as Maize Inbred PH1D84 in U.S. Patent No. 8,759,636.

c) The breeding method used should be set forth, such as whether single seed descent, bulk method, backcross method, or some other method was used.

   Response: Inbred 1PFHC43 was developed by producing a doubled haploid from the F1 plants, selfing and using pedigree selection amongst the D1 lines, and selfing and bulking from the subsequent generations.

d) The filial generation in which the instant plant was chosen should be set forth.

Response: The instant plant was chosen using pedigree selection amongst the D1 lines, and selfing and bulking from the subsequent generations.

e) Information pertaining to the homozygosity or heterozygosity of the parents as well as the instant plant should be set forth.
Response: Both parents used in the original nursery cross are homozygous, uniform and stable. Inbred 1PFHC43 is substantially homozygous.

f) Are there any patent applications or patents in which sibs of the instant plant are claimed? If so, please set forth their serial numbers as well as the names of the sibs.
Response: There are no patents or pending applications for parent inbred line PH1VNA. Parental line PH1D84 was patented as Maize Inbred PH1D84 in U.S. Patent No. 8,759,636.

In view of the above remarks, Applicant respectfully submits that this submission is in compliance with the requirements of 37 C.F.R. § 1.105.

Respectfully submitted,

/Krista K. Hill/
KRISTA K. HILL
Attorney/Agent for Applicant(s)
Registration No.: 69,965
Telephone: 515-535-8248
Facsimile: 515-535-6883

Bigelow | National Center for Marine Algae & Microbiota

PAT-009.003

BUDAPEST TREATY ON THE INTERNATIONAL RECOGNITION OF THE DEPOSIT OF MICROORGANISMS FOR THE PURPOSE OF PATENT PROCEDURE (BP9)

INTERNATIONAL FORM

FOR OFFICE USE ONLY
○ Olivia Barberi
○ Kristin Heidenreich
● Sara Woodruff
○ Other

TO
Provasoli-Guillard National Center for Marine Algae and Microbiota
Bigelow Laboratory for Ocean Science
60 Bigelow Drive
East Boothbay, ME 04544

VIABILITY STATEMENT issued pursuant to Rule 10.2 by the INTERNATIONAL DEPOSITARY AUTHORITY identified don the following page

I. DEPOSITOR	II. IDENTIFICATION OF THE MICROORGANISM
Name: Pioneer Hi-Bred International, Inc. Address: 7250 NW 62nd Avenue, P.O. Box 552 Johnston, IA 50131-0552	Accession number given by the International Depositary Authority: 202212064 Date of the deposit or the transfer[1]: 12-08-2022

III. VIABILITY STATEMENT

The viability of the microorganism identified under II above was tested on 12-20-2022 [2]. On that date, the said microorganism was

☑ viable ☐ no longer viable

IV. CONDITIONS UNDER WHICH THE VIABILITY TEST HAS BEEN PERFORMED[4]

Standard rolled paper towel, 24 degrees C; 100% germination.

V. INTERNATIONAL DEPOSITARY AUTHORITY

Provasoli-Guillard National Center for Marine Algae and Microbiota
Bigelow Laboratory for Ocean Science
60 Bigelow Drive
East Boothbay, ME 04544

Signature(s) of person(s) having the power to represent the International Depositary Authority or of authorized official(s):

Michael W. Lomas Digitally signed by Michael W. Lomas Date: 2022.12.21 16:01:19 -05'00'

Signature

Michael W. Lomas

Print Name

December 21, 2022

Date

---

[1] Indicate the date of the original deposit or, where a new deposit or transfer has been made, the most recent relevant date (date of the new deposit or date of the transfer).

[2] In the cases referred to in Rule 10.2(a)(ii) and (iii), refer to the most recent viability test.

[3] Mark with a cross the applicable box

[4] Fill in if the information has been requested and if the results of the test were negative.

Bigelow | National Center for Marine Algae & Microbiota

PAT-008.003

BUDAPEST TREATY ON THE INTERNATIONAL RECOGNITION OF THE DEPOSIT OF MICROORGANISMS FOR THE PURPOSE OF PATENT PROCEDURE (BP4)

INTERNATIONAL FORM

FOR OFFICE USE ONLY
○ Olivia Barberi
○ Kristin Heidenreich
● Sara Woodruff
○ Other

TO

Provasoli-Guillard National Center for Marine Algae and Microbiota
Bigelow Laboratory for Ocean Science
60 Bigelow Drive
East Boothbay, ME 04544

RECEIPT IN THE CASE OF AN ORIGINAL DEPOSIT issued pursuant to Rule 7.1 by the INTERNATIONAL DEPOSITARY AUTHORITY identified at the bottom of the page

I. IDENTIFICATION OF THE MICROORGANISM

Identification reference given by the DEPOSITOR: 1PFHC43	Accession number given by the INTERNATIONAL DEPOSITARY AUTHORITY: 202212064

II. SCIENTIFIC DESCRIPTION AND/OR PROPOSED TAXONOMIC DESIGNATION

The microorganism identified under I above was accompanied by (mark with a cross where applicable):

☐ a scientific description
☑ a proposed taxonomic designation

III. RECEIPT AND ACCEPTANCE

This International Depositary Authority accepts the microorganism identified under I above, which was received by it on 12-08-2022 (date of the original deposit).[1]

IV. RECEIPT OF REQUEST FOR CONVERSION

The microorganism under I above was received by this International Depositary Authority on (date of the original deposit) and a request to convert the original deposit to a deposit under the Budapest Treaty was received by it on (date of receipt of request for conversion).

V. INTERNATIONAL DEPOSITARY AUTHORITY

Provasoli-Guillard National Center for Marine Algae and Microbiota Bigelow Laboratory for Ocean Science 60 Bigelow Drive East Boothbay, ME 04544	Signature of person having the power to represent the International Depositary Authority or of authorized official: Michael W. Lomas Digitally signed by Michael W. Lomas Date: 2022.12.21 15:49:51 -05'00' *Signature* Michael W. Lomas *Print Name* December 21, 2022 *Date*

---

[1] Where Rule 6.4(d) applies, such date is the date on which the status of international depositary authority was acquired.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/366,059	**01/17/2023 02:40:08 PM ET**	**8572-US-NP**

Title of Invention

MAIZE INBRED 1PFHC43

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1295	FILED BY	Molly Minkler
PATENT CENTER #	61446251	FILING DATE	07/02/2021
CUSTOMER #	27310	FIRST NAMED INVENTOR	MICHIEL CB COETZEE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Krista Hill

Documents

TOTAL DOCUMENTS: 7

DOCUMENT		PAGES	DESCRIPTION	SIZE (KB)
20230117_8572-US-NP_Resp Non Final OA.pdf		11	-	145 KB
20230117_8572-US-NP_Resp Non Final OA-A....pdf	(1-1)	1	Amendment/Request for Reconsideration-After Non-Final Rejection	104 KB
20230117_8572-US-NP_Resp Non Final OA-SPEC.pdf	(2-2)	1	Specification	90 KB
20230117_8572-US-NP_Resp Non Final OA-CLM.pdf	(3-5)	3	Claims	98 KB

20230117_8572-US-NP_Resp Non Final OA-REM.pdf	(6-9)	4	Applicant Arguments/Remarks Made in an Amendment	102 KB
20230117_8572-US-NP_Resp Non Final OA-C105.pdf	(10-11)	2	Response to Rule 105 Communication	92 KB
20221208_8572-US-NP_1PFHC43_NCMA Viability Statement_BP9.pdf		1	Examination support document	206 KB
20221208_8572-US-NP_1PFHC43_NCMA Certificate of Deposit_BP4.pdf		1	Examination support document	579 KB

Warning: The PDF file has been signed with a digital signature and the legal effect of the document will be based on the contents of the file not the digital signature.

Digest

DOCUMENT	**MESSAGE DIGEST(SHA-512)**
20230117_8572-US-NP_Resp Non Final OA.pdf	26D621D1E0E5A5048AB665B14EF804BE32BD4C3B3E3B4A43C3EC8867B9B43B7F5F36671E1F58C192D9AFAD24D390F557384AB190439815922F614773F8E362DF
20230117_8572-US-NP_Resp Non Final OA-A....pdf	9C2A4A6970D21933EF85C85E6557D72FE5EC2349BED729C6C32E322DDA719533463C62B87FE841490E76828D903CDAEDAB85AA63A6E221CE71269F3BD57E200C
20230117_8572-US-NP_Resp Non Final OA-SPEC.pdf	E644EA3333090F96655798680EE354F0BF37D2234CB01AD6A8B5397E5847C33E74599D7314F6CBA1038C45BC89621BD12AD8171C76514C9A6FF12487AE067087
20230117_8572-US-NP_Resp Non Final OA-CLM.pdf	44F2BF61762F699E69ACA71980991CF37AAA7AC51D11DD33ECF48EB801E81D66F82E15F702F2B16348C2539E8F42A7A0E6E

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20230117_8572-US-NP_Resp Non Final OA-C105.pdf	AE098D72DB44681F05DCE2CECABB85B07B9EB21CBBB199A63237A30661CA4A3FD42AF29F467CA8E719CD51B03D41B644626B732D420364D7459C80D160580316
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20221208_8572-US-NP_1PFHC43_NCMA Certificate of Deposit_BP4.pdf	385AEA3456089A1A1081D6DEDB2B997F67CA1B9253F75D235FE8FE2DBFD29C0ECB90BD2FBC7481B00B59B7301F5CD68A8204E5C1CC5E566720991A4666A22924

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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NOTICE OF ALLOWANCE AND FEE(S) DUE

27310 7590 02/08/2023
PIONEER HI-BRED INTERNATIONAL, INC.
7250 NW 62ND AVENUE
PO BOX 552
JOHNSTON, IA 50131-0552

EXAMINER	
BOGGS, RUSSELL T	
ART UNIT	**PAPER NUMBER**
1663	

DATE MAILED: 02/08/2023

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/366,059	07/02/2021	MICHIEL CB COETZEE	8572-US-NP	1295

TITLE OF INVENTION: MAIZE INBRED 1PFHC43

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	05/08/2023

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to:
Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

27310 7590 02/08/2023
PIONEER HI-BRED INTERNATIONAL, INC.
7250 NW 62ND AVENUE
PO BOX 552
JOHNSTON, IA 50131-0552

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)

(Signature)

(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/366,059	07/02/2021	MICHIEL CB COETZEE	8572-US-NP	1295

TITLE OF INVENTION: MAIZE INBRED 1PFHC43

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	05/08/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
BOGGS, RUSSELL T	1663	800-320100

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1____________________

2____________________

3____________________

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies ____________

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☐ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. ________

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature ____________________ Date ____________________

Typed or printed name ____________________ Registration No. ____________________

PTOL-85 Part B (08-18) Approved for use through 01/31/2020 OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/366,059	07/02/2021	MICHIEL CB COETZEE	8572-US-NP	1295

27310 7590 02/08/2023
PIONEER HI-BRED INTERNATIONAL, INC.
7250 NW 62ND AVENUE
PO BOX 552
JOHNSTON, IA 50131-0552

EXAMINER	
BOGGS, RUSSELL T	
ART UNIT	**PAPER NUMBER**
1663	

DATE MAILED: 02/08/2023

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 02/11)

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 17/366,059	Applicant(s) COETZEE, MICHIEL CB	
	Examiner RUSSELL T BOGGS	**Art Unit** 1663	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.☑ This communication is responsive to the response filed on 17 January 2023.
  ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ______.

2.☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ______; the restriction requirement and election have been incorporated into this action.

3.☑ The allowed claim(s) is/are 1-20 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4.☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a) ☐All b) ☐ Some* c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ______ .
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: ______ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5.☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
  ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ______ .

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6.☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1.☐ Notice of References Cited (PTO-892)
2.☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date ______.
3.☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material ______.
4.☐ Interview Summary (PTO-413), Paper No./Mail Date. ______.
5. ☐ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other ______.

/RUSSELL T BOGGS/
Examiner, Art Unit 1663

U.S. Patent and Trademark Office
PTOL-37 (Rev. 08-13) **Notice of Allowability** Part of Paper No./Mail Date 20230127

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first-inventor-to-file provisions of the AIA.

Examiner's Statement of Reasons for Allowance

The following is an examiner's statement of reasons for allowance.

With the response filed on 17 January 2023, Applicant overcame all objections and rejections made of record by the Office action posted 14 November 2022.

With this response, Applicant filed a response to the request for information under 37 C.F.R. § 1.105. A parent is covered by a patent. The other parent is a proprietary line that is not publicly available. This parentage is free of the prior art.

Also, the results of a viability test for the deposited seeds was received.

The invention is a novel maize inbred and the claimed 1PFHC43 inbred is free of the prior art of record. See, e.g. the discussion on page 9 of the above-referenced Office action.

Further, the scope of the claimed invention in, e.g. claim 10, is limited to five or fewer locus conversions.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RUSSELL T BOGGS whose telephone number is

(571)272-2805. The examiner can normally be reached Monday - Friday, 0800 to 1830 Mtn.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amjad Abraham can be reached on 571-270-0708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/RUSSELL T BOGGS/
Examiner, Art Unit 1663

Issue Classification	**Application/Control No.** 17/366,059	**Applicant(s)/Patent Under Reexamination** COETZEE, MICHIEL CB
	Examiner RUSSELL T BOGGS	**Art Unit** 1663

CPC						
Symbol					**Type**	**Version**
A01H	/	6	/	4684	F	2018-05-01
A01H	/	5	/	10	I	2013-01-01

CPC Combination Sets								
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 20	
/RUSSELL T BOGGS/ Examiner, Art Unit 1663 (Primary Examiner)	27 January 2023 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure none

U.S. Patent and Trademark Office

Part of Paper No.: 20230127

Issue Classification	**Application/Control No.** 17/366,059	**Applicant(s)/Patent Under Reexamination** COETZEE, MICHIEL CB
	Examiner RUSSELL T BOGGS	**Art Unit** 1663

INTERNATIONAL CLASSIFICATION				
CLAIMED				
A01H6/46	/	6	/	46
A01H5/10	/	5	/	10

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 20	
/RUSSELL T BOGGS/ Examiner, Art Unit 1663 (Primary Examiner)	27 January 2023 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure none

U.S. Patent and Trademark Office

Part of Paper No.: 20230127

Issue Classification	**Application/Control No.** 17/366,059	**Applicant(s)/Patent Under Reexamination** COETZEE, MICHIEL CB
	Examiner RUSSELL T BOGGS	**Art Unit** 1663

☑ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	10	10	19	19										
2	2	11	11	20	20										
3	3	12	12												
4	4	13	13												
5	5	14	14												
6	6	15	15												
7	7	16	16												
8	8	17	17												
9	9	18	18												

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 20	
/RUSSELL T BOGGS/ Examiner, Art Unit 1663 (Primary Examiner)	27 January 2023 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure none

Search Notes	**Application/Control No.** 17/366,059	**Applicant(s)/Patent Under Reexamination** COETZEE, MICHIEL CB
	Examiner RUSSELL T BOGGS	**Art Unit** 1663

CPC - Searched*		
Symbol	**Date**	**Examiner**

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	**Date**	**Examiner**
inventor search in PE2E	11/04/2022	RTB
PE2E search as per attached for phenotypes	11/04/2022	RTB
PE2E search as per attached for parents	11/04/2022	RTB
NPL search as per attached	11/05/2022	RTB

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
A01H	5/10	01/27/2023	RTB

/RUSSELL T BOGGS/ Examiner, Art Unit 1663	

Bibliographic Data

Application No: 17/366,059

Foreign Priority claimed: ○ Yes ● No

35 USC 119 (a-d) conditions met: ☐ Yes ☐ No ☐ Met After Allowance

Verified and Acknowledged: /RUSSELL T BOGGS/

Examiner's Signature

Initials

Title: MAIZE INBRED 1PFHC43

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
07/02/2021	800	1663	8572-US-NP
RULE			

APPLICANTS

PIONEER HI-BRED INTERNATIONAL, INC., Johnston, IA,

INVENTORS

MICHIEL CB COETZEE, INDIANAPOLIS, IN, UNITED STATES

CONTINUING DATA

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

07/16/2021

STATE OR COUNTRY

UNITED STATES

ADDRESS

PIONEER HI-BRED INTERNATIONAL, INC.
7250 NW 62ND AVENUE
PO BOX 552
JOHNSTON, IA 50131-0552
UNITED STATES

FILING FEE RECEIVED

$1,820

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L68	22407	a01h5/10.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2022/11/03 03:26 PM
L69	9095	L68 AND ((zea ADJ mays) OR (z ADJ mays) OR maize OR corn).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/11/03 03:28 PM
L70	8888	L68 AND ((zea ADJ mays) OR (z ADJ mays) OR maize OR corn).ab.	(US-PGPUB; USPAT)	OR	ON	ON	2022/11/03 03:28 PM
L71	9107	L69 OR L70	(US-PGPUB; USPAT)	OR	ON	ON	2022/11/03 03:29 PM
L72	2496	L71 AND (silk adj6((light red)))	(US-PGPUB; USPAT)	OR	ON	ON	2022/11/03 03:30 PM
L73	1177	L72 AND (anther adj6 ((yellow)))	(US-PGPUB; USPAT)	OR	ON	ON	2022/11/03 03:31 PM
L74	872	L73 AND ((brace root) adj8 (weak OR faint))	(US-PGPUB; USPAT)	OR	ON	ON	2022/11/03 03:32 PM
L75	100	L74 AND (cob adj6 (pink orange))	(US-PGPUB; USPAT)	ADJ	ON	ON	2022/11/03 03:34 PM
L76	0	L71 AND "1" PFHC43	(US-PGPUB; USPAT)	ADJ	ON	ON	2022/11/04 06:58 PM
L77	0	L71 AND PH1VNA	(US-PGPUB; USPAT)	ADJ	ON	ON	2022/11/04 07:00 PM
L78	8	L71 AND PH1 D84	(US-PGPUB; USPAT)	ADJ	ON	ON	2022/11/04 07:00 PM
L79	0	L71 AND 1PFHC43	(US-PGPUB; USPAT)	ADJ	ON	ON	2022/11/04 07:01 PM
L80	26	L71 AND PH1D84	(US-PGPUB; USPAT)	ADJ	ON	ON	2022/11/04 07:20 PM
L81	0	L80 AND 1pfhc43	(US-PGPUB; USPAT)	ADJ	ON	ON	2022/11/04 07:21 PM
L82	1	L71 AND PH1D84.ti.	(US-PGPUB; USPAT)	ADJ	ON	ON	2022/11/04 07:22 PM
L84	1	"8895819".did.	(US-PGPUB; USPAT)	ADJ	ON	ON	2022/11/04 07:39 PM
L85	0	L68 AND ph1vna	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/27 01:44 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	22673	a01h5/10.cpc.	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/01/27 01:44 PM
N2	9226	N1 AND ((zea ADJ mays) OR (z ADJ	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/01/27 01:45 PM

		mays) OR maize OR corn).clm.					
N3	9014	N1 AND ((zea ADJ mays) OR (z ADJ mays) OR maize OR corn).ab.	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/01/27 01:45 PM
N4	9238	N2 OR N3	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/01/27 01:45 PM
N6	325	(silk adj6((light red))) AND N4	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/01/27 01:47 PM
N7	115	N6 AND (anther adj6 ((yellow)))	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/01/27 01:48 PM
N8	84	N7 AND ((brace root) adj8 (weak OR faint))	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/01/27 01:48 PM
N9	25	N8 AND (cob adj6 (pink orange))	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/01/27 01:49 PM
N10	14	N9 AND (flint dent)	(US-PGPUB; USPAT)	ADJ	ON	ON	2023/01/27 01:55 PM

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/366,059	**04/21/2023 11:56:14 AM ET**	**8572-US-NP**

Title of Invention

MAIZE INBRED 1PFHC43

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1295	FILED BY	Tamara McGrew
PATENT CENTER #	61961996	AUTHORIZED BY	Guy Watkins
CUSTOMER #	27310	FILING DATE	07/02/2021
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	MICHIEL CB COETZEE

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
DA / 161852	E20234KB59025961	Tamara McGrew

PRE-AUTHORIZED ACCOUNT	PRE-AUTHORIZED CATEGORY
161852	37 CFR 1.20 (Post Issuance fees); 37 CFR 1.21 (Miscellaneous fees and charges)

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1501	UTILITY ISSUE FEE	1200.00	1	1200.00
			TOTAL AMOUNT:	$1,200.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/366,059	**04/21/2023 11:56:14 AM ET**	**8572-US-NP**

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PATENT CENTER #	61961996	FILING DATE	07/02/2021
CUSTOMER #	27310	FIRST NAMED INVENTOR	MICHIEL CB COETZEE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Guy Watkins

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
20230421_8572-US-NP_Issue Fee Transmittal.pdf	2	Issue Fee Payment (PTO-85B)	163 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
20230421_8572-US-NP_Issue Fee Transmittal.pdf	A42036F4FDE8A3BFC244E63446EDAF66560713B8E6ED263F4 76B58124A0ECCAE80A90530F961603A1EC8E30A4759FB34086 9F0FF481255A2F90C30EA90DEB680

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PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885
or VIA EFS-WEB

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

PIONEER HI-BRED INTERNATIONAL, INC.
7250 NW 62nd Avenue
PO Box 552
Johnston, IA 50131-1014

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/366059	07/02/2021	Michiel Cb Coetzee	8572-US-NP	1295

TITLE OF INVENTION:
MAIZE INBRED 1PFHC43

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
Non-Provisional	No	$1,200.00	$0.00	$0.00	$1,200.00	05/08/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
Boggs, Russell T	1663	800-320100

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 ________
2 ________
3 ________

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE
PIONEER HI-BRED INTERNATIONAL, INC.

(B) RESIDENCE: (CITY and STATE OR COUNTRY)
IA US

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☑ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☑ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies ________

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 16-1852 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /Guy R. Watkins/
Date April 10, 2023

Typed or printed name GUY R. WATKINS
Registration No. 74,066

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at https://patentcenter.uspto.gov/. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

The USPTO is implementing electronic patent issuance with a transition period, during which period the USPTO will mail a ceremonial paper copy of the electronic patent grant to the correspondence address of record. Additional copies of the patent (i.e., certified and presentation copies) may be ordered for a fee from the USPTO's Certified Copy Center at https://certifiedcopycenter.uspto.gov/index.html. The Certified Copy Center may be reached at (800)972-6382.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(application filed on or after May 29, 2000)

The Patent Term Adjustment is 73 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

IR103 (Rev. 10/09)

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PIONEER HI-BRED INTERNATIONAL, INC., Johnston, IA

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EGRANT NOTIFICATION

Your electronic patent grant (eGrant) is now available, which can be accessed via Patent Center at https://patentcenter.uspto.gov

The electronic patent grant is the official patent grant under 35 U.S.C. 153. For more information, please visit https://www.uspto.gov/electronicgrants