

May 4, 2017

VIA EDGAR

John Reynolds
Assistant Director
Office of Beverages, Apparel, and Mining
United States Securities and Exchange Commission
100 F Street, N.E.
Washington, D.C. 20549-3628

Re: Intrexon Corporation
Amendment No. 1 to Registration Statement on Form S-4
Filed April 21, 2017
File No. 333-216808

Dear Mr. Reynolds:

On behalf of Intrexon Corporation, a Virginia corporation (the “**Company**”), this letter sets forth the Company’s response to the comments of the staff (the “**Staff**”) of the U.S. Securities and Exchange Commission (the “**Commission**”) set forth in your letter, dated May 3, 2017 (the “**Staff Letter**”), regarding the Registration Statement on Form S-4 (the “**Registration Statement**”), initially filed by the Company with the Commission on March 17, 2017, as amended by Amendment No. 1 to the Registration Statement (“**Amendment No. 1**”), filed by the Company with the Commission on April 21, 2017. For the convenience of the Staff, the comment from the Staff Letter is restated in italics prior to the response to such comment.

Material U.S. federal income tax consequences of the merger, page 87

1. *We note your disclosure on page 12 and 87 stating that “it is intended, and each of Intrexon and GenVec expect, the merger will qualify as a ‘reorganization’” and on page 88 that “Intrexon and GenVec believe that the merger should satisfy the other technical requirements to qualify as a ‘reorganization’” (emphasis added). We also note your statement that “it will not be possible to make this determination with certainty until after the closing of the merger and the expiration of the 36-month CPR payment period.” Additionally, we note your response to comment 7 and disclosure in the filing that the tax treatment of the merger, including treatment of the CPR’s, is unclear and uncertain. Please reconcile these statements.*

Response: The Company respectfully acknowledges the Staff’s comment. In response to the Staff’s comment, the Company proposes to revise the disclosures on pages 12, 23 and 87 of Amendment No. 1 as indicated on Exhibit A. For the convenience of the Staff, we have provided a marked version of the disclosures that reflect the revisions that would be made as compared to the disclosures that are currently in Amendment No. 1.

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We appreciate the Staff's comments and request that the Staff contact the undersigned at (212) 908-3933 or Corby.Baumann@ThompsonHine.com with any questions or comments regarding this letter.

Sincerely,

/s/ CORBY J. BAUMANN

Corby J. Baumann
of Thompson Hine LLP

cc: Michael Killooy, *United States Securities and Exchange Commission*
David Link, *United States Securities and Exchange Commission*
Randal J. Kirk, *Chief Executive Officer of Intrexon Corporation*
Donald P. Lehr, *Chief Legal Officer of Intrexon Corporation*
Asher Rubin, *Hogan Lovells US LLP*
William I. Intner, *Hogan Lovells US LLP*

EXHIBIT A

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Material U.S. federal income tax consequences of the merger (see page 87)

~~It is intended, and each of~~ Pursuant to the terms of the merger agreement, Intrexon and GenVec ~~expect,~~ agreed not to take any action that would reasonably be expected to prevent or impede the merger ~~will qualify from qualifying~~ as a “reorganization” within the meaning of Section 368(a) of the Code. ~~Moreover, assuming~~ However, the qualification as a reorganization under the Code is dependent on various requirements, including not all of which can be finally determined at this time, most specifically the requirement that the value of Intrexon common stock received by holders of GenVec common stock constitute a certain percentage of the total consideration, including the fair market value of the CPRs received and any cash received, by such holders. The final measurement of this test depends on facts and circumstances that cannot yet be determined; however, Intrexon and GenVec anticipate that sufficient qualifying merger consideration will ultimately be issued such that the control test will be satisfied and that the merger will qualify as a reorganization.

Assuming that the merger is treated as a reorganization and a “closed” transaction, (i) a United States holder will recognize gain, but not loss, with respect to the receipt of merger consideration other than Intrexon voting common stock (e.g., CPRs and cash) and (ii) will recognize no gain or loss with respect to the Intrexon voting common stock received in the merger in exchange for GenVec common stock. ~~Qualification as a reorganization is dependent on various requirements, including the requirement that the value of Intrexon common stock received by holders of GenVec common stock constitute a certain percentage of the total consideration, including the fair market value of the CPRs received and any cash received.~~ If the merger does not qualify as a reorganization, the receipt of the merger consideration by a United States holder in exchange for shares of GenVec common stock will be a taxable transaction for United States federal income tax purposes. The merger agreement does not require that the merger qualify as a tax-free reorganization and does not contemplate that a tax opinion will be required or delivered as a condition to closing.

For a more complete discussion of the tax consequences of the merger, see the section entitled “Material U.S. federal income tax consequences of the merger.” **Tax matters are very complicated, and the tax consequences of the merger to a particular GenVec shareholder will depend in part on such shareholder’s circumstances. Accordingly, you are urged to consult your own tax advisor for a full understanding of the tax consequences of the merger to you, including the applicability and effect of federal, state, local and foreign income and other tax laws.**

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The U.S. federal income tax treatment of the merger depends, in part, upon the aggregate amount of the consideration received by the holders of the GenVec common stock and the aggregate amount of such consideration that is paid in cash (rather than shares of Intrexon common stock).

Pursuant to the terms of the merger agreement, Intrexon and GenVec agreed not to take any action that would reasonably be expected to prevent or impede the merger from qualifying as a “reorganization” within the meaning of Section 368(a) of the Code. However, the qualification of the merger as a reorganization depends on compliance with numerous technical requirements of these provisions of the Code not all of which can be finally determined at this time, most specifically whether holders of GenVec common stock will receive a sufficient amount of Intrexon voting common stock to satisfy the “control test” set forth in Section 368(a)(2)(E) of the Code.

Under the contingent payment rights agreement, the holders of the GenVec common stock are entitled to receive 50% of the amounts actually received by GenVec under the NVS License Agreement during the 36-month period following the signing of the merger agreement. Accordingly, at the effective time of the merger, the aggregate amount of consideration to be received by the holders of the GenVec common stock will not be known (and will not be determinable) because the aggregate amount (if any) paid to the holders of the GenVec common stock will not be known until after the expiration of the 36-month period following the signing of the merger agreement.

In addition, the contingent payment rights agreement provides that the CPRs are to be paid in cash unless any such payment would prevent the transactions contemplated by the merger agreement from being treated as a tax free reorganization, in which case Intrexon would issue shares of its common stock in lieu of payment in cash of such amounts determined to be payable under the contingent payment rights agreement. But, the contingent payments rights agreement also limits the number of Intrexon common shares that may be issued in connection with the reorganization. Once this limit is met, all additional payments under the contingent rights agreement will be made in cash. As a result, the actual amount of consideration to be received by the holders of the GenVec common stock and the amount of such consideration that is paid in cash is not currently known (and will not be known) until following the expiration of the 36-month period.

Tax matters are very complicated, and the tax consequences of the merger to a particular GenVec shareholder will depend in part on such shareholder’s circumstances. Accordingly, you are urged to consult your own tax advisor for a full understanding of the tax consequences of the merger to you, including the applicability and effect of federal, state, local and foreign income and other tax laws.

Due to these uncertainties, the tax treatment of the merger is unclear and uncertain.

Moreover, the U.S. federal income tax treatment of the contingent payment rights is unclear.

~~Although Intrexon and GenVec intend to treat the merger as a reorganization under Section 368(a) of the Code, the~~ The tax treatment of CPRs could impact whether or not the merger will qualify as a reorganization under Section 368(a) of the Code. In that regard, there is no legal authority directly addressing the U.S. federal income tax classification of a CPR or the treatment of payments that may be received pursuant to a CPR. Accordingly, the impact of CPRs on the tax treatment of the merger and the amount, timing and character of any gain, income or loss with respect to the CPRs are uncertain. Due to the legal and factual uncertainties regarding the tax treatment of CPRs, GenVec shareholders are urged to consult their own tax advisers to determine the timing and characterization of income, gain or loss resulting from receipt of payments (if any) pursuant to the CPRs. See the section entitled “Material U.S. federal income tax consequences of the merger.”

Tax matters are very complicated, and the tax consequences of the merger to a particular GenVec shareholder will depend in part on such shareholder's circumstances. Accordingly, you are urged to consult your own tax advisor for a full understanding of the tax consequences of the merger to you, including the applicability and effect of federal, state, local and foreign income and other tax laws.

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Exchange of GenVec common stock for Intrexon voting common stock, cash in lieu of fractional shares, and CPRs

~~It is intended, and each of~~ Pursuant to the terms of the merger agreement, Intrexon and GenVec ~~expect that the merger will qualify~~ agreed not to take any action that would reasonably be expected to prevent or impede the merger from qualifying as a "reorganization" within the meaning of Section 368(a) of the Code. ~~The~~ However, the qualification of the merger as a reorganization depends on compliance with numerous technical requirements of these provisions of the Code, ~~including not all of which can be finally determined at this time, most specifically~~ whether holders of GenVec common stock will receive a sufficient amount of Intrexon voting common stock to satisfy the "control test" set forth in Section 368(a)(2)(E) of the Code, ~~and whether after the merger the surviving corporation is regarded as holding substantially all of the assets of GenVec and the merged subsidiary, which is referred to as the substantially all test.~~ The final measurement of this test depends on facts and circumstances that cannot yet be determined; however, Intrexon and GenVec anticipate that sufficient qualifying merger consideration will ultimately be issued such that the control test will be satisfied and that the merger will qualify as a reorganization.

The merger agreement does not require that the merger qualify as a tax-free reorganization and does not contemplate that a tax opinion will be required or delivered as a condition to closing.

Due to the legal and factual uncertainties regarding the tax treatment of CPRs, GenVec shareholders are urged to consult their own tax advisers to determine the timing and characterization of income, gain or loss resulting from receipt of payments (if any) pursuant to the CPRs.

As more fully discussed below, assuming that the merger is treated as a reorganization and a "closed" transaction, (i) a United States holder will recognize gain, but not loss, with respect to the receipt of merger consideration other than Intrexon voting common stock (e.g., CPRs and cash) and (ii) will recognize no gain or loss with respect to the Intrexon voting common stock received in the merger in exchange for GenVec common stock. If the merger does not qualify as a reorganization, the receipt of the merger consideration by a United States holder in exchange for shares of GenVec common stock will be a taxable transaction for United States federal income tax purposes.

The control test requires that, in the transaction, the holders of GenVec stock exchange, for an amount of Intrexon voting stock, stock possessing “control” of GenVec. For purposes of Section 368(a)(2)(E) of the Code, “control” is defined as ownership of stock possessing at least 80% of the total combined voting power of all classes of stock entitled to vote and at least 80% of the total number of shares of all other classes of stock of the corporation. Satisfaction of the control test will depend on the value, as of the closing of the merger, of the Intrexon voting common stock received by holders of GenVec common stock in exchange for GenVec common stock relative to the value of the consideration other than Intrexon voting common stock (including the fair market value of the CPRs and cash consideration paid to GenVec shareholders receiving appraisal rights) received by holders of GenVec common stock in exchange for shares of GenVec common stock in connection with the merger. At this time, neither Intrexon nor GenVec is able to ascertain with certainty whether the value of the Intrexon voting common stock to be received by holders of GenVec common stock in connection with the merger will be sufficient to satisfy the control test. Accordingly, although Intrexon and GenVec have structured the merger, including the CPRs, with the intent that the control test will be satisfied, due to uncertainties surrounding the amount of cash issued to shareholders exercising appraisal rights and limitations on the total number of Intrexon shares that may be issued in the merger, they anticipate that it will not be possible to make this determination with certainty until after the closing of the merger and the expiration of the 36-month CPR payment period.

Intrexon and GenVec ~~believe~~ anticipate that the merger should satisfy the other technical requirements to qualify as a “reorganization” within the meaning of Section 368(a)(2)(E) of the Code, including the “continuity of interest” requirement, the “continuity of business enterprise” requirement, the “substantially all” requirement, and the requirement that the merger must be undertaken for reasons pertaining to the continuance of the business of a corporation that is a party to the transaction. However, Intrexon and GenVec have not sought and will not seek any ruling from the IRS regarding any matter affecting the merger or any of the United States federal income tax consequences discussed herein, and have not sought and will not seek any opinion from their respective legal counsel regarding the qualification of the merger as a “reorganization” within the meaning of Section 368(a) of the Code. Thus, there can be no assurance that the IRS will ultimately conclude that the merger does meet the “control” test or any of the other requirements for qualification as a “reorganization” within the meaning of Section 368(a) of the Code or that any of the other statements made herein would not be challenged by the IRS and, if so challenged, sustained upon review in a court.