

Belgrade, Montana 59714

(Name and address of agent for service)

(406) 388-0480

(Telephone number, including area code, of agent for service)

Copies to:

Jill Gilpin

VP & Legal Counsel

664 Cruiser Lane

Belgrade, Montana 59714

(406) 388-0480

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer Accelerated filer

Non-accelerated filer (Do not check if a smaller reporting company.) Smaller reporting company

CALCULATION OF REGISTRATION FEE

Title of securities to be registered	Amount to be Registered (1)	Proposed maximum offering price per share	Proposed maximum aggregate offering price(2)	Amount of registration fee
Common Stock, par value \$0.000001 per share	3,000,000(2)	\$0.85 (3)	\$2,550,000 (3)	\$347.82

Pursuant to Rule 416 under the Securities Act of 1933, as amended (the “Securities Act”), this registration statement also covers any additional shares of the common stock of Bacterin International Holdings, Inc. (the “Company”), par value \$0.000001 (the “Common Stock”), that become issuable under the Amended and Restated Bacterin International Equity Incentive Plan (the “Amended and Restated Plan”) by reason of any stock dividend, stock split, recapitalization or other similar transaction.

The Company previously registered 6,000,000 shares of Common Stock that may be issued under the Bacterin International Equity Incentive Plan (the “Plan”). This filing is made to register an additional 3,000,000 shares that may be issued under the Amended and Restated Plan.

Estimated pursuant to Rules 457(c) and 457(h) under the Securities Act solely for the purpose of calculating the registration fee, based on the average of the high and low prices per share of Common Stock as reported by the NYSE MKT on March 25, 2013 (which is within five business days of the filing hereof).

EXPLANATORY NOTE

This registration statement is being filed pursuant to General Instruction E to Form S-8 to register 3,000,000 additional shares of Common Stock which may be issued under the Amended and Restated Plan following the amendment of the Plan to increase the number of authorized shares from 6,000,000 to 9,000,000. The contents of the Registration Statement on Form S-8 (File No. 333-172891) previously filed by the Company on March 17, 2011 to register 6,000,000 shares of Common Stock which may be issued under the Plan are hereby incorporated by reference into this Registration Statement in accordance with General Instruction E to Form S-8.

PART II**INFORMATION REQUIRED IN THE REGISTRATION STATEMENT**

Item 3. Incorporation of Documents by Reference.

The following documents filed with the Commission are incorporated herein by reference:

1. The Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2012 (the "Annual Report"), filed with the Commission on March 27, 2013.
2. All other reports filed pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended (the "Exchange Act") since the end of the fiscal year covered by the Annual Report.

3. The description of the Company's common stock contained in the Registration Statement on Form 8-A filed with the Commission on November 5, 2010, as amended by Form 8-A/A, filed on March 4, 2011 pursuant to Section 12 of the Exchange Act.

All documents filed by the Company pursuant to Sections 13(a), 13(c), 14 and 15(d) of the Exchange Act after the date of this Registration Statement, and prior to the filing of a post-effective amendment which indicates that all shares of Common Stock offered hereby have been sold or which deregisters all shares of Common Stock then remaining unsold, shall be deemed to be incorporated by reference in this Registration Statement and to be a part hereof from the date of filing of such documents; *provided, however*, that documents or information deemed to have been furnished and not filed in accordance with the rules of the Commission shall not be deemed incorporated by reference into this Registration Statement.

Any statement contained in a document incorporated or deemed to be incorporated by reference herein shall be deemed to be modified or superseded for purposes of this Registration Statement to the extent that a statement contained in this Registration Statement, or in any other subsequently filed document which also is or is deemed to be incorporated by reference in this Registration Statement, modifies or supersedes such statement. Any such statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this Registration Statement.

Item 8. Exhibits.

The exhibits listed under the caption “Exhibits Index” of this Registration Statement are incorporated by reference herein.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, as amended, the Company certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-8 and has duly caused this Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Belgrade, State of Montana, on this 27th day of March, 2013.

BACTERININTERNATIONAL
HOLDINGS, INC.

By: /s/ John Gandolfo
Name: John Gandolfo
Title: Chief Financial Officer

POWER OF ATTORNEY

We, the undersigned officers and directors of the Company, hereby severally constitute and appoint Guy Cook and John Gandolfo, and each of them individually, our true and lawful attorneys-in-fact with full power to them, and each of them singly, to sign for us and in our names in the capacities indicated below, to the Registration Statement on Form S-8 filed herewith and any and all subsequent amendments to said Registration Statement, and generally to do all such things in our names and behalf in our capacities as officers and directors to enable the Company to comply with all requirements of the Commission, hereby ratifying and confirming our signatures as they may be signed by

said attorneys-in-fact, or any of them, to said Registration Statement and any and all amendments thereto.

Pursuant to the requirements of the Securities Act of 1933, as amended, this Registration Statement has been signed below by the following persons in the capacities indicated on March 27, 2013:

Signature	Title
/s/ Guy S. Cook Guy S. Cook	Chief Executive Officer, President and Chairman of the Board of Directors (Principal Executive Officer)
/s/ John Gandolfo John Gandolfo	Chief Financial Officer and Chief Accounting Officer (Principal Financial and Accounting Officer)
/s/ Kent Swanson Kent Swanson	Director
/s/ Mitchell Godfrey Mitchell Godfrey	Director
/s/ Michael Lopach Michael Lopach	Director
/s/ Jon Wickwire Jon Wickwire	Director
/s/ John Deedrick John Deedrick	Director

EXHIBIT INDEX

Exhibit Number	Description
4.1	Form of Common Stock Certificate (incorporated by reference to Exhibit 4.2 to the Company's Form S-3 Registration Statement filed with the SEC on July 11, 2011)
5.1	Opinion of Counsel*
10.1	Amended and Restated Bacterin International Equity Incentive Plan (incorporated by reference to Appendix B of the Company's Proxy Statement filed with the SEC on June 11, 2011)
23.1	Consent of EKS&H LLLP*
23.2	Consent of Counsel (included in Exhibit 5.1)
24.1	Power of Attorney (included in the signature pages of this Registration Statement)

* Filed herewith