Transparency Memorandum

DATE: March 23, 2011

FROM: [redacted], Scientific Reviewer
FDA/CDRH/ODE/DCD/PDLB

SUBJECT: P950037/S091 – Lead Review
Evia/Entovis/Estellla/Ecuro/Effecta Pulse Generators
Biotronik, Inc.

CONTACT: Jon Brumbaugh
Vice President, Regulatory Affairs and Compliance
Biotronik, Inc.
Lake Oswego, OR 97035
Phone: [redacted]
Fax: [redacted]
Email: [redacted]

TO: The Record

RECOMMENDATION: **APPROVAL**

_____

[redacted] Lead Reviewer, PDLB Date

_____

[redacted], PDLB Date

EXECUTIVE SUMMARY

This PMA supplement was submitted to gain approval for a change in the Integrated Circuits (ICs) within the Evia/Entovis/Estella/Ecuro/Effecta line of pulse generators. The change is to two ICs described as (b) (4). Pacing and impedance measurement functionality are integrated into a single mixed-mode integrated (IC), designated as (b) (4). The pacemaker timer, wand telemetry, statistics are connected with the (b) (4) (b) (4)).

Biotronik explains that in order to ensure a constant supply of ICs and reduce the manufacturing cost they are updating the (b) (4) and (b) (4) to replace the current version. The submission states that all changes are fully backward compatible, and that no other hardware or software changes are required. They also state that the proposed IC's meet all the specifications of the current ICs and that they are obtained from the same supplier.

BACKGROUND

The following is the lead review of a premarket approval (PMA) application supplements for the Evia/Entovis/Estellla/Ecuro/Effecta Pulse Generators (P950037/S091). The application was received on December 14, 2010. An initial phone conversation was requested on January 26, 2011 to discuss Biotronik sending the test procedures for each of the tests provided in the submission. The original submission only included the results of the testing along with descriptive questions for pass/fail criteria. The additional documents sent included the purpose of the test, validation equipment and setup, test descriptions, test conditions, test specifications, and documentation. This additional information appropriately addressed concerns about the testing protocol.

After reviewing the testing protocols additional questions were submitted to Biotronik. Biotronik replied by answering the questions in an additional document and during a conference call held on March 3, 2011. During the conference call it was discovered that Appendix 4 of the submission had mislabeled charts and scans. The updated Appendix 4 was submitted and is adequate.

Biotronik requested to supply an Amendment to the submission to include the Estella/Ecuro/Effecta line of pulse generators which were approved under P950037/S92, dated February 11, 2011. The Estella/Ecuro/Effecta lines of pulse generators are identical in hardware to the Evia/Entovis family of pulse generators but have features eliminated via software.

was the primary reviewer for the Estella/Ecuro/Effecta line of pulse generators. Since the hardware is exactly the same between the two lines of products, an amendment (S950037/S91/A001) was accepted to allow the hardware changes to propagate to Estella/Ecuro/Effecta line.

INDICATIONS FOR USE

The Indications for Use have not changed and are included here for documentation purposes.

Rate-adaptive pacing with the Evia/Entovis pulse generators is indicated for patients exhibiting chronotropic incompetence and who would benefit from increased pacing rates concurrent with physical activity.

Generally accepted indications for long-term cardiac pacing include, but are not limited to: sick sinus syndrome (i.e. bradycardia-tachycardia syndrome, sinus arrest, sinus bradycardia), sino-atrial (SA) block, second- and third- degree AV block, and carotid sinus syndrome.

Patients who demonstrate hemodynamic benefit through maintenance of AV synchrony should be considered for one of the dual chamber or atrial pacing modes. Dual chamber modes are specifically indicated for treatment of conduction disorders that require both restoration of rate and AV synchrony such as AV nodal disease, diminished cardiac output or congestive heart failure associated with conduction disturbances, and tachyarrhythmias that are suppressed by chronic pacing.

CONTRAINDICATIONS

The contraindications have not changed and are included here for documentation purposes.

Use of Evia and Entovis pulse generators are contraindicated for the following patients:

- Unipolar pacing is contraindicated for patients with an implanted cardioverter-defibrillator (ICD) because it may cause unwanted delivery or inhibition of ICD therapy.
- Single chamber atrial pacing is contraindicated for patients with impaired AV nodal conduction.
- Dual chamber and single chamber atrial pacing is contraindicated for patients with chronic refractory atrial tachyarrhythmias.

DETAILED DESCRIPTION OF CHANGES

This PMA Supplement proposes an update to the integrated circuits (ICs) for use in the currently marketed Evia/Entovis (P950037/S72, dated May 7, 2006) and Estella/Ecuro/Effecta (P950037/S92, dated February 11, 2011). Currently the Evia/Entovis family of has a "Unified Platform (UP)" which was designed for use with future products. Biotronik's Unified Platform uses the (b) (4) and (b) (4) integrated circuits (ICs) in Evia/Entovis/Estella/Ecuro/Effecta's electronic modules.

In order for BIOTRONIK to ensure a constant supply of IC's and reduce the manufacturing cost they are updating the and (b) (4) IC's to replace the current version. The submission states that all changes are fully backward compatible, and that no other hardware or software changes are required. They also state that the proposed IC's meet all the specifications of the current ICs and that they are obtained from the same supplier. The hardware enhancements made to the IC are not utilized in the Evia/Entovis/Estella/Ecuro/Effecta line of the pulse generators because the software and firmware have not changed. The changes were made to ensure compatibility with future products. Since the software and firmware have not changed, non eof the new enhanced features are accessible. The changes were implemented because the ICs were being moved to a new process.

BIOCOMPATIBILITY/MATERIALS

The proposed changes only pertain to the Integrated Circuits which are located within the hermetically sealed housing. There are no changes to patient contacting materials and therefore no biocompatibility review was necessary.

VERIFICATION AND VALIDATION TESTING

The verification and validation testing that was conducted by Biotronik encompassed their full set of hardware testing. The results in the submission stated that all tests passed with acceptable results. The range of testing was determined as their complete hardware verification and validation set and it encompass the features of the ICs in question. All questions that were raised during the review of the submission were addressed by Biotronik sufficiently.

The changes made to the ICs are not utilized in the Evia/Entovis/Estella/Ecuro/Effecta line of pulse generators. The changes are geared towards future products. The changes to the ICs do not change any of the functionality of the current generation of the pulse generators since the hardware changes are not implemented in the software or firmware for the

Evia/Entovis/Estella/Ecuro/Effecta line of pulse generators. They are being included here for compatibility with future products. The changes were made because the ICs are moving to a new process. As such the testing of the new ICs was limited to a set of tests that encompass the of the current feature set. The tests were done to ensure that the changes made to the hardware do not break the current function of the pulse generators. I believe that the testing does ensure that the pulse generators operate correctly, and that the tests selected are appropriate to demonstrate that the hardware changes are valid.

MECHANICAL SAFETY

There are no changes to the mechanical safety of the device and therefore no mechanical safety review was necessary.

PACKAGING, SHELF LIFE, AND STERILIZATION

According to the submission there are no changes to the shelf life or the sterile packaging. They have stated that the packaging controls and materials used with the updated IC's are identical to the previously released family of pulse generators which were approved under P950037/S72 dated May 7, 2010. This is acceptable.

SOFTWARE

There are no changes to the software of the device and therefore no software review was necessary.

LABELING

There are no changes to the labeling of the device and therefore no labeling review was necessary.

ANIMAL STUDIES

There were no animal studies presented or required.

CLINICAL DATA

There was no pre-clinical information presented or required.

RECOMMENDATION

Based on all of the information submitted and the interactions with the sponsor, I recommend that the sponsor receive an **approval** letter.