

SUMMARY OF: P920015/S093

MEDTRONIC MODEL 5019 HIGH VOLTAGE SPLITTER/ADAPTOR KIT

EXECUTIVE SUMMARY/BACKGROUND

The purpose of this 180-Day Supplement is to request approval for the High Voltage (HV) Splitter/Adaptor Model 5019 Adaptor Kit. The Medtronic Model 5019 HV Splitter/Adaptor Kit consists of the Model 5019 HV splitter/ adaptor, a torque wrench, an AccuRead analyzer cable interface tool (ACI), and a Model 6719 DF-1 connector port pin plug.

FDA recommended that the adaptor be submitted as a PMA-S (but not a 510(k)) during discussions under I090031 and in a May 3, 2012 teleconference with FDA. This decision was made because the device is intended for use with the high voltage circuit of ICD and CRT-D devices.

The firm was sent a major was sent a Major Deficiency Letter dated October 22, 2012. The firm has adequately addressed all of the deficiencies stated in the FDA letter. There are no outstanding concerns, and I believe the firm has provided reasonable assurance of safety and effectiveness of the High Voltage (HV) Splitter/Adaptor Model 5019 Adaptor Kit. Therefore, I recommend approval of the PMA supplement.

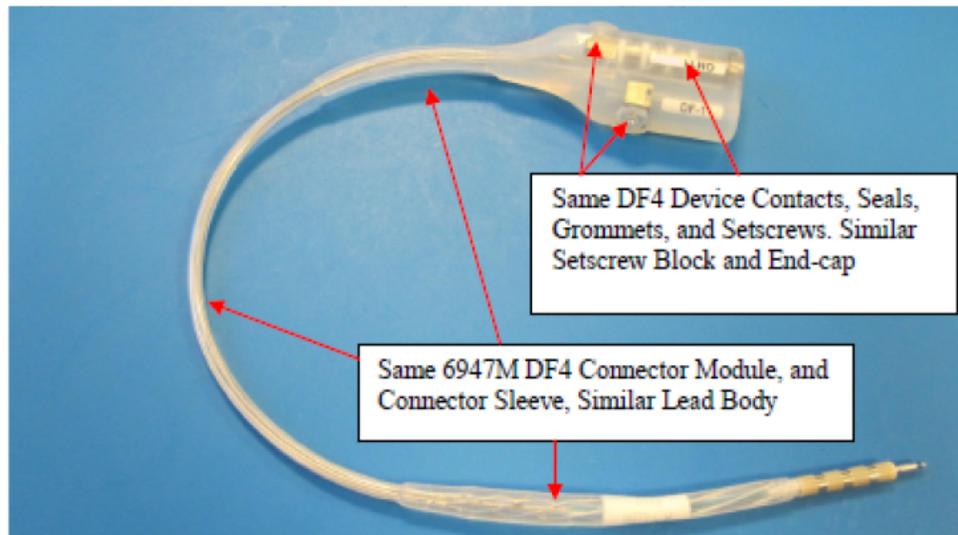
DESCRIPTION OF CHANGES/ REASON FOR SUPPLEMENT

The firm stated that the proposed 5019 adaptor provides the same function as the approved DF-1 version which is the Model 6726. As with the 5019, the 6726 is used when unacceptably high defibrillation thresholds are encountered and an additional unipolar high voltage electrode (new DF-1 lead) is added to the system; while continuing to use the existing pace/sense functions of the original defibrillator lead. Photographs and a comparison chart for 5019 and 6726 is provided below.

	6947M Lead	5019 Adaptor <i>(Subject of this Submission)</i>
Physical Description		
Lead Body Diameter	2.8 mm	Same
Length	40-110 cm	27 cm
Components		
Connector Pin	(b)(4) Trade Secret	(b)(4) Trade Secret
Four Pole Lead Connector Subassembly		Same
Retainer		Same
		Same
Silicone Proximal Connector Components		Same
		Same

	6947M Lead	5019 Adaptor <i>(Subject of this Submission)</i>
Insulation	(b)(4) Trade Secret	(b)(4) Trade Secret
		Same
		Same
		Same
Adhesives		Same
Conductors		Same
		Same
Cable Connectors		Same
	DF4 CRT-D/ICD Connector Module	5019 Adaptor <i>(Subject of this Submission)</i>
	(b)(4) Trade Secret	
DF4 Bore Components		Same
		Same material and set screw dimensions with slightly different shape to accommodate connector boot

*The same distal connector sleeve is used at both ends of the lead body to provide strain relief.



Two “minor” design changes said to improve manufacturability of the 5019 adaptor were presented in the manufacturing section. They are said to reduce scrap without affecting safety or efficacy and they do not impact compliance with ISO-27186.

LEAD REVIEWER COMMENTS: *The comparisons of the 5019 lead adaptor to the approved 6947M lead (male DF-4 connector and lead body) and ICD ports (female DF-1 and DF-4 connectors) was very helpful. The difference with the male connector is a squared off pin which was not a concern. The difference with the lead body is the (b)(4) Trade Secret but this was not a concern since (b)(4) Trade Secret is only a manufacturing aid to assemble the much longer 6947M lead. The female connector molding at the distal end is the part of the adaptor with the most changes compared to existing devices. It is helpful to understand that the internal port*

components and set screws are similar or identical to those used on ICDs. The testing of this region will be reviewed to assure that the adaptor as built will meet the functional requirements. There are no questions regarding the similarity and differences of the 5019 adaptor to other devices. The two minor design changes proposed to aid manufacturing and reduce loss are minor with regard to tolerance stacking and I agree they do not impact conformance with ISO-27186 and are not likely to impact safety and effectiveness pending satisfactory completion of testing which will be reviewed below.

INDICATIONS FOR USE

The HV splitter/adaptor kit is intended for use when two high voltage leads, one with a DF-1 connector and one with a high voltage four-pole in-line connector, need to be adapted into a single connector. Alternatively, the splitter/adaptor is intended for use when the SVC coil on a lead needs to be disabled.

DEVICE DESCRIPTION

The Model 5019 four-pole connector adaptor is a silicone adaptor with a male in-line four-pole connector at the proximal end and a female four-pole connector/DF-1 female cavity combination at the distal end. The adaptor disables the SVC coil in the Medtronic four-pole connector system and allows for the addition of a unipolar defibrillation lead with a DF-1 connector to use in place of the SVC electrode. The 5019 lead adaptor comes in only one length that is 27 cm long. The port configuration for 5019 is as follows:

Proximal DF-4	Male LLHH	Meets ISO-27186
Distal DF-4	Female LLH0	Meets ISO-27186
Distal DF-1	Female H (unipolar)	Meets ISO-11318

The firm states that distal DF-4 bore and setscrew design are similar to that used on the Consulta/Secrura/Maximo II DF4 ICDs approved under P010031/S176 (January 9, 2012). The firm also states that the proposed 5019 adaptor provides the same function as the approved DF-1 version which is the Model 6726.



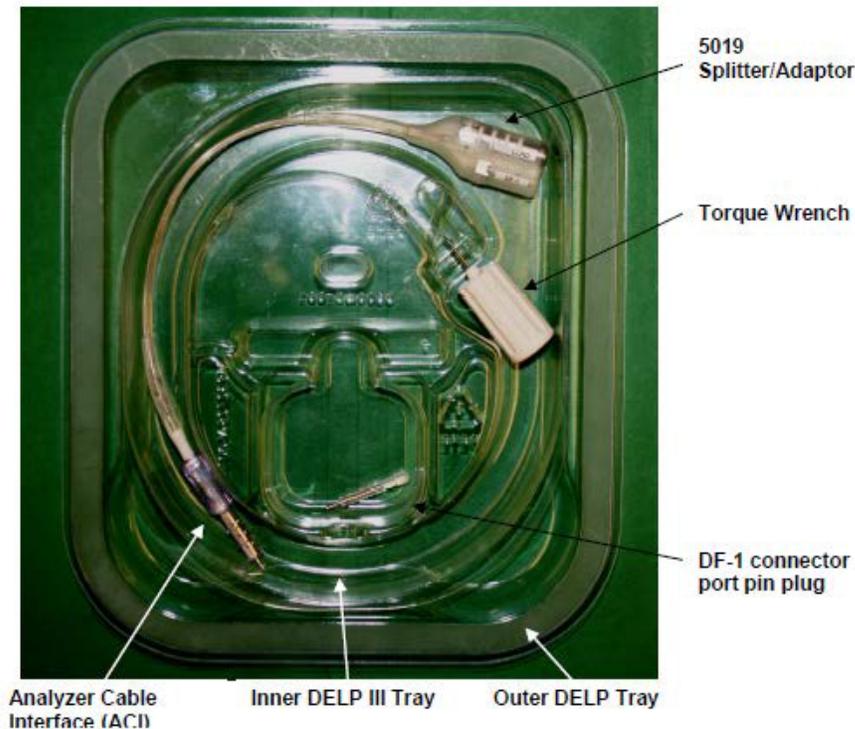
Proposed Model 5019 Splitter/Adaptor Model 6726 Approved Splitter/Adapter

Accessories:

The Model 5019 lead adaptor will be marketed as part of a kit with three accessories:

1. Analyzer cable interface (seated on lead connector end, same as 6947M)
2. Torque Wrench (same as 6726 adaptor)
3. DF-1 connector port pin plug (same as 6726 adaptor)

The three accessories packaged with the 5019 lead (shown on next page) adaptor are all approved with other devices. There are no specific concerns. The functional use of the torque wrench will need to be evaluated based upon the testing of the set-screw. The packaging configuration represents no concerns.



PRECLINICAL/BENCH

BIOCOMPATIBILITY/MATERIALS

The firm provided the following documents to support biocompatibility of the subject device:

- 5019 Biocompatibility Certification BL0023134 v2
Includes the table provided above as well as a certification of its accuracy.
- 5019 Biological Evaluation Plan P-000172 v1
Documents evaluation of the testing required for each material (note- not the final device).
- 5019 Biological Evaluation Report R-000172 v2
Documents testing itself or rationale for lack of testing for those evaluations identified as necessary in the Biological Evaluation Plan.

LEAD REVIEWER COMMENTS: The firm was contacted via email on July 31, 2012 to confirm the similarities of the subject device to predecessor devices. After further discussion, the issue was clarified on August 13, 2012 with the following statement provided by the firm:

“Your statement is correct that the only difference in the 2 materials/components is geometry. They are not the same parts but are the same material, processing and sterilization exposure and no other chemicals have been added. All other tissue contacting parts are the exact same parts that are used to manufacture the 6947M lead.”

Further, the two different geometries were clarified as noted below in an email sent August 6, 2012 from the firm:

- The housing end-cap used on the distal end of the 5019 adaptor is made up of the same (b)(4) Trade Secret as the connector pin crimp core of the Models 4193 and 4194. Biocompatibility testing was conducted on material exposed to cleaning and EtO sterilization, just as the components used to build the 5019 were. The biocompatibility testing was not conducted on final product. The (b)(4) Trade Secret material has been used to manufacture 4193 leads since May 2002 and on 4194 leads since August 2004.
- The (b)(4) Trade Secret used to mold the top and bottom female connector housing and DF-1 tubing is the same as that used for the Model 6726 adaptor, discussed in the 5019 submission. The material used for these components is exposed to cleaning and EtO sterilization, just as the components of the 6726 and 5019 adaptors are. The connector housing geometry is not identical, but similar in shape. The biocompatibility testing was not conducted on final product but the conditions it was subjected to are similar to what the 5019 adaptor is exposed to. The 6726 adaptor has been marketed since June 2001.

Since the firm clearly indicates that all of the materials used in the subject device are identical (with the exception of two geometrical differences) to the noted predecessors, there are no concerns with the biocompatibility of the subject device. This decision is based on the following:

- The predecessor devices are identical or more stringent regarding biocompatibility tests that would be required based on exposure time and location.
- There have been no reported issues regarding the use of the subject materials in the approved devices referenced as predecessors.
- I would expect the only test to be impacted by a change in geometry to be in vivo thrombogenicity, which evaluates thrombus formation; this is not an issue for the subject device because it does not contact circulating blood.

Also, the evaluation of the materials each independently is helpful, but if there were new materials used, would be insufficient since FDA is concerned with the performance of the final device and any interactions of a new material with those already used in a similar method/design. This is not a concern here, because all materials are identical to those previously used in approved device (without issue).

ANIMAL STUDIES

Refer to the Clinical Studies section of this memo.

ELECTRICAL SAFETY/MECHANICAL SAFETY

Bench Testing:

The Model 5019 adaptor design verification plan was presented starting on page 170 under BL0022199. The firm presents or references information on specifications, validation testing, and verification testing and associated documentation. The firm documents that 29 samples will be used to provide 95% confidence of at least 90% yield.

The following tests will be analyzed using attribute data:

- Dielectric Strength
- Electrical Impedance
- Hypot
- Tensile Loading
- Intermittency
- Post Tensile Testing DC Resistance
- Current Carrying
- Retention Force
- Indicator Band
- Grommet Burst
- Adaptor/Lead Non-Destructive Pull Test

The following tests will be analyzed using variable data:

- DC Resistance
- Pin to Receptacle Tensile Strength
- Dry/Wet Insertion and Withdrawal

LEAD REVIEWER COMMENTS: There appeared to be some tests missing for the female connector end of the adaptor as described in the review below.

The firm documents on page 1-174 that the following tests do not need to be repeated as they were already performed and passed for the identical parts on the Model 6947M lead.

- Lead Body Flex
- Connector Flex
- Deformation Due to Pin Contact Forces
- Deformation Due to Ring Contact Forces

LEAD REVIEWER COMMENTS: I agree that these tests do not need to be repeated for the Model 5019 adaptor. The tests performed for design verification are included in the report for shelf life testing as the results served both purposes. The test protocol was presented starting on page 1-360 under BL0022700V2. The test results were presented starting on page 1-356 under BL0022078 and the list of testing performed is copied below. Detailed information about the test methods, sample sizes (22), and acceptance criteria were provided. Fit and high voltage functionality were evaluated per the methods described in ISO-27186. Tensile testing was performed both for the grip zone and overall composite. Flex testing of the male connector was not necessary since the connector and lead body are identical to what was tested and approved for the 6947M lead. Results were all successful.

Fatigue evaluation was not identified in this section but was found later in the submission and is reviewed in a section below. In the review of the bench testing section for the Model 5019 adaptor, testing specific to the set-screws and seals for the distal connector cavities was not located. Evaluation of this region is critical for proper function of the adaptor. No evaluation or testing to consider abrasion resistance was found. FDA sent these concerns in a deficiency letter dated October 22, 2012. The firm responded to the concerns in an amendment, dated December 21, 2012. The firm has adequately addressed all of FDA concerns by providing the appropriate and acceptable evaluations of the set-screws seals, and abrasion resistance.

Fatigue Testing:

Fatigue evaluation for the 5019 adaptor was presented in a separate section of the submission starting on page 1-245. The firm accepted the flex fatigue performance of the proximal male connector by similarity to the approved 6947M lead. The firm provided testing of the distal female connector region to (b)(4) Trade Secret samples with no failures showing 90% confidence. The firm preconditioned the distal female connector with severe acute bend.

LEAD REVIEWER COMMENTS: Fatigue performance of the male proximal connector is acceptable by similarity to the 6947M lead. The middle cable region of the adaptor does not require additional fatigue testing since it is identical to the 6947M lead other than the (b)(4) Trade Secret and it is a shorter length not expected to experience high fatigue cycles. The preconditioning presented for the distal female connector appeared robust and appropriate. The firm studied the chronic use conditions to establish the curvature for acute bending in the pocket. The firm provided an acceptable justification for the testing orientation. The fatigue performance was found to be acceptable with no fractures as a result of testing described for the distal female connector block. The fatigue testing was robust and acceptable.

PACKAGING

The 5019 packaging uses the same configuration as the Model 6947M lead as described on page 1-22.

Package Component	Description	Predecessor
Inner Tray	(b)(4) Trade Secret	Same as 6947M lead
Inner Tray Cover	(b)(4) Trade Secret	Same as 6947M lead
Outer Tray	(b)(4) Trade Secret	Same as 6947M lead
Outer Tray Lid	(b)(4) Trade Secret	Same as 6947M lead

* The Sterile barrier system consists of the (b)(4) Trade Secret outer tray sealed to the (b)(4) Trade Secret Tyvek lid.

LEAD REVIEWER COMMENTS: There are no concerns regarding the packaging which is all approved and identical to what is used for the 6947M lead. The configuration used for the adaptor shown in a previous section raises no concerns. The shelf life of the package will be previously established. The shelf life of the lead adaptor will need to be demonstrated.

SHELF LIFE

The Model 5019 packaging is identical to the packaging for the Model 6947M lead which already has an established 2 year shelf life. The firm requested a 2 year shelf life for the Model 5019 kit. The Model 5019 connector and lead body already have a 2 year shelf life per the identical parts being used on the Model 6947M lead. The firm stated that the distal cavity connector region uses materials which are all used on other products with 24 month shelf life. In addition, the firm conducted 2 year accelerated aging shelf life testing of the Model 5019 adaptor. After accelerated aging, functional testing was performed on 22 samples with all specifications met.

LEAD REVIEWER COMMENTS: FDA agrees that the packaging and accessories are identical to approved packaging and accessories with 2 year shelf life so that is appropriate for this submission. The Model 5019 lead adaptor also needs to be evaluated for 2 year shelf life. The identical nature of the connector and lead body to the 6947M lead that has a

2 year shelf life leaves the only questionable component to be the distal cavity end of the adaptor. The firm performed function testing of the 5019 adaptor after accelerated 2 year aging and documented that all the components of that assembly are approved for 2 year shelf lives with other devices. The testing appeared appropriate and acceptable to justify a 2 year shelf life for the Model 5019 lead adaptor. Since the adaptor is a permanent implant, it is appropriate to request a plan for real-time shelf life testing for device functionality. Satisfactory results of future real-time shelf life testing can be reported via the annual report. This requirement was sent to the firm as a deficiency to full approval. The firm agreed to perform confirmatory real-time shelf-life testing and will provide the results in the next annual report after FDA approval and the testing is completed. The requested 2 year Shelf Life Test Plan was included in the submission. I have reviewed the 2 year Shelf Life Test Plan and find it to be adequate. The firm will test a minimum of twenty-two (22) samples that will provide at least 90% confidence of at least a 90% yield for successful tests generating attribute data. The value for 95% confidence of a 95% yield will be calculated from the data collected from these samples for tests generating variables data. The following test will be performed after the samples have been stored at ambient conditions for a minimum of 24 months. The following tests will be performed following the 24 month storage:

The following tests were analyzed using attribute data:

- Dielectric Strength
- Electrical Impedance
- Hypot
- Tensile Loading
- Intermittency
- Post Tensile Testing DC Resistance
- Current Carrying
- Retention Force
- Indicator Band
- Grommet Burst
- Adaptor/Lead Non-Destructive Pull Test

The following tests will be analyzed using variable data:

- DC Resistance
- Pin to Receptacle Tensile Strength
- Dry/Wet Insertion and Withdrawal

All samples will be built by trained personnel at Greatbatch Medical, Inc., using approved documented processes. All lead samples will be sterilized by Greatbatch Medical, Inc. in a 100% EtO system and aerated to the maximum aeration time for four (4) cycles. There are no further concerns with the 2 year Shelf life Protocol.

STERILIZATION

The firm presents details of device sterilization starting on page 1-116. A sterilization assessment was performed and the 5019 adaptor was qualified in a cycle which meets requirements of ISO-11135-1 and samples were tested and found in compliance of ISO-10993-7.

- Bioburden Testing
- Bacterial Endotoxin (LAL) Testing
- Partial Cycle Lethality Study –Maximum Load Density Resistance Comparison
- External PCD 2.6 Device and Internal Mini BIs PCD Challenge Testing
- Product Sterility Testing
- Bacteriostasis/Fungistasis Testing

- Ethylene Oxide (EO) Residual, Ethylene Chlorohydrin (ECH) and Tolerable Contact Limit (TCL) Testing
- Product Integrity Testing (via Design Verification activities)
- Partial and Full Cycle Physical Performance

LEAD REVIEWER COMMENTS: The assessment is reasonable and FDA agrees that the Model 5019 adaptor will have a lower burden than that of finished defibrillator leads. The testing is appropriate to qualify the Model 5019 kit into the existing cycle and validation testing is appropriate and acceptable.

SOFTWARE

Not Applicable

MANUFACTURING

Manufacturing information was provided on page 1-24 of the submission. The Model 5019 adaptor is manufactured at the same facility as the 6947M lead since they share many of the same components. However the 5019 adaptor has final assembly and packaging at GreatBatch Medical which is not the same as for the 6947M lead.

The firm did not specify what final assembly steps are performed at Greatbatch nor how the process for the 5019 adaptor compares with that of the approved Model 6726 adaptor.

LEAD REVIEWER COMMENTS: The concerns stated above were sent in a deficiency let to the firm, dated October 22, 2012. The firm adequately identified the manufacturing steps for Model 5019 that are performed at Greatbatch Medical. The 6726 Adaptor is solely manufactured, packaged and sterilized at Medtronic. The 6726 and 5019 adaptors have similar process steps in terms of stringing of tubing; silicone bonding of tubing, connector sleeves, and grip sleeves; and installation and bonding of grommet assemblies but do not share the same sequence of manufacturing due to the differences in design. Greatbatch Medical packages the Model 5019 Adaptor for Medtronic but does not package the Model 6947M lead or any other Medtronic products that utilize this DELP III package system. Model 5019 uses the same package as the Model 6947M lead. Medtronic tested the Model 5019 adaptor packaging using the same test procedures that were used to test the Model 6947M lead. There are no further concerns.

LABELING

The labeling information included the package labels and technical manual starting on page 1-432. The global package labeling sheet included the inner box label, outer box label, and side labels. The 11 page technical manual was presented on page 1-433.

LEAD REVIEWER COMMENTS: The 5019 adaptor was clearly labeled with respect to the connector compatibilities at each end. The accessories were also clearly indicated by illustration and text. The standard information such as no reuse, sterile, serial number, expiration date, etc were all appropriate and consistent with pacemaker leads and expected information for adaptors.

The technical manual was reviewed. The list of symbols is complete and acceptable. Figure 2 in the manual could have used additional text regarding proper use of the torque wrench and care of the septum (grommet). The descriptions, warnings and precautions are acceptable. The instructions for use are largely acceptable but could use some additional information about proper use of the torque wrench and care of the grommet. The specification list in Section 7 is missing the female connectors. The firm was sent the above concerns in an FDA deficiency letter dated October 22, 2012. The firm submitted an amendment to address the concerns of the FDA. The firm indicated that the manual depicts how to hold the torque wrench when tightening the set screws. The image provided in the manual provides adequate instruction on how to insert the torque wrench.

The firm provided an inadequate response to the deficiency regarding the specification table. They stated the connector type listed in the specifications table lists the maximum connector acceptable for the four pole inline connector, which is LLHH. The connector at the female end of the 5019 adaptor contains a DF-1 female connector and a four-pole inline female connector. The four pole inline connector can accept either an LLHH or an LLHO four-pole inline connector, which is explained in the description section of the manual. FDA agrees that the description section clearly outlines the specifications of the HV Splitter/Adapter; however FDA believes that the Table in Section 7 should fully outline the specifications of the device and mirror the description. An email was sent to the firm, January 30, 2013 recommending the firm to update the specification table. The firm responded adequately, February 5, 2013, with an updated specification table in Section 7 of the manual that fully outlines and characterizes the HV Splitter/Adapter.

FDA agreed with the firm that some of the damage to the grommets may not be able to be seen by the naked eye in a clinical setting. FDA's concern was with gross damage to the grommets after removal of the torque wrench. An email was sent to the firm January 30, 2013 to clarify FDA's concern. The firm responded to the FDA email February 5, 2013. The firm provided as part of the CAPA activities in the response to this concern, Medtronic has conducted extensive review of all devices returned with grommet-related issues as input for grommet improvements. From this review they have found grommet damage related to punch out from the set screw wrench is only detected under magnification. Gross issues such as missing or "dislodged" grommets have not been observed in products that share the same grommet assembly. A conversation was held with the branch's Medical Officer regarding the inspection of the grommet and he felt that the update was not necessary for the labeling. Based on a review of the response from the firm and the discussion with the Medical Officer, I have no further concerns.

CLINICAL DATA

A physician handling study, completed in August 2008, provided customer input on the design of the M-4 Connector System (which included the 5019 adaptor), labeling and customer training information. The Physician Handling Study included in this submission was previously submitted with the 6947M lead and DF4 devices in the December 3, 2009 submission. The study was conducted with 8 physicians in a clinical setting using a swine that already had the RV, RA and LV leads previously placed by a veterinarian to ensure focus on the device placement and lead/adaptor connections into the device header, using all the DF4 implant tools. The physicians were given 2-4 minutes of training with the aid of a tip card. The following handling characteristics were studied:

- Verify that the DF4 System, 5019 adaptor, accessories were easy and intuitive to use
- Confirm DF4 System implant procedure as defined by instructions for use
- Provide data for field training strategy

The physicians successfully interrogated the M-4 device, impedances were recorded to verify proper connections with the lead and adaptor and the ACI tool was used for these connections. The handling study was successful and met all the pre-specified objectives. The physicians stated that the tools were easy to use and the training was acceptable. Feedback on the visibility of the color band will be used to improve customer training materials. The full Study Report was provided for FDA review.

LEAD REVIEWER COMMENTS: The Medical Officer noted:

- *Non-GLP using swine.*
- *The sessions lasted 35 minutes.*
- *A swine implant with leads already in place was used.*
- *2-4 minutes of training using a "tip card" was performed.*

The following handling characteristics were studied:

- Overall use of the AccuRead™ Tool
- Lead and device insertion/lead tip visibility
- Lead and device withdrawal

The team began by providing an introduction to the 6947M system and discussing objectives for the day. The implanters were shown a tip card and then trained for 2-4 minutes on the proper use of the new implant tools and Model 5019 HV splitter. The tip card can be found in Appendix 1. After the training session, the implanter and team simulated an implant of a Medtronic 6947M active fixation lead and a Model 5076 low voltage lead in an animal model. The implanters used the AccuRead™ Tool to verify electrical connections and connected both leads to the device. The device was interrogated and the impedances were recorded to verify that the lead was connected properly to the device. Next the implanter simulated the addition of a subcutaneous defibrillation lead by using the Model 5019 HV splitter.

Results, per the firm's report, for the 5019 splitter:

- The implanters then connected the 6947M to the Model 5019 HV splitter and verified that the 6947M was fully seated in the splitter. Six implanters were able to verify that the 6947M was fully seated in the splitter. This information was not recorded for 2 implanters. Next the implanters connected the 6996SQ subcutaneous defibrillation lead to the splitter. All implanters were able to verify that it was fully seated. Dr. Kowal's information was not recorded.
- Next the implanters were asked to check impedance on the Splitter using the ACI. All of the implanters, except Dr. Hsia, said that they would not do this step and would instead directly connect the splitter to the device without checking the impedance. Therefore, they did not follow this step. Dr. Hsia correctly attached the ACI to the Splitter.
- All of the implanters correctly inserted the 5019 splitter into the device header. The RV pacing impedance was recorded to ensure a proper connection and it ranged from 532-589 ohms. This was an acceptable range.
- All of the implanters stated that the training that they received was acceptable and would be an acceptable amount of training for market release of the IS-4 system. All of the implanters stated that the system was intuitive, except for Dr. Martin who said it was not initially intuitive, but very easy to learn.
- Comments for the Splitter:
 - Adaptor length was perceived as too long for some physicians
 - Cannot Y-adapt for SVC, it would be nice to have an adapter that allows the SVC to remain electrically active

LEAD REVIEWER COMMENTS: The Medical Officer states that the handling study supports reasonable assurance of safety and effectiveness and that – from a clinical perspective – he has no concerns.

CONCLUSION

This review team identified three (3) major and seven (7) minor deficiencies during the initial review of the submission. The firm had not adequately evaluated the distal end multi-bore connector region of the adaptor. Even though the region is comparable to the model 6726, it is a new design and requires full validation testing. Similarly, the set screw and grommet needed to be fully evaluated and tested for use in this new adaptor. The firm was sent a major was sent a Major Deficiency Letter dated October 22, 2012.

The firm has adequately addressed all of the deficiencies stated in the FDA letter and deficiencies discussed through interactive review. There are no outstanding concerns, and I believe the firm has provided reasonable assurance of safety and effectiveness of the High Voltage (HV) Splitter/Adaptor Model 5019 Adaptor Kit. Therefore, I recommend approval of the PMA supplement.