From: [redacted]
To: Devices
Cc: [redacted]
Subject: FW: s41JA Notice- Smith and Nephew - Birmingham Hip Resurfacing Head and Acetabular Cup [SEC=UNCLASSIFIED]
Date: Thursday, 14 January 2016 10:11:54 AM
Attachments: image001.png
Finalised Audit Response BHR re MRI 14-01-2016.pdf

Please see attached response to this request.

Regards

smith&nephew
[redacted] | Regulatory Affairs Co-ordinator | Advanced Surgical Devices |
Smith & Nephew Surgical Pty Ltd
85 Waterloo Road
North Ryde NSW 2113
[redacted] |
www.smith-nephew.com

From: [redacted]
Sent: Tuesday, 8 December 2015 1:30 PM
To: [redacted]
Subject: s41JA Notice- Smith and Nephew - Birmingham Hip Resurfacing Head and Acetabular Cup [SEC=UNCLASSIFIED]

Dear [redacted]

I refer to your applications DV-2014-DR-19876-1 BIRMINGHAM Hip Resurfacing Head and DV-2015-DR-03198-1 BIRMINGHAM HIP Resurfacing Acetabular Cup.

I am writing to request additional information under Section 41JA of the Therapeutic Goods Act 1989. Please note that I require your response by **15 January 2016** to continue with your application. If no response is received regarding this request for information the application will lapse (section 41FK(c) of the Act).

Please find attached the notice under section 41JA of the Act requesting further information.

Please note: Directions on how to respond to the s41JA notice is included in the letter attached. Please do not reply or provide any response to this notice to this email account as it will not be actioned. Please direct all enquiries to devices@tga.gov.au

Regards
[redacted]

[redacted]
Departmental Officer
Devices Application & Verification
Devices Authorisation Branch
Phone: 1 800 141 144
Email: [redacted]

Therapeutic Goods Administration
Department of Health
PO Box 100
Woden ACT 2606 Australia
www.tga.gov.au

Smith & Nephew Surgical Pty Ltd. [redacted]
ABN 69 002 496 095 [redacted]
85 Waterloo Road www.smith-nephew.com
North Ryde NSW 2113
Australia

We are smith&nephew

Author's Direct Dial: [redacted]

14 January 2016

[redacted]
Delegate of the Secretary
Department of Health
Medical Devices Branch
Therapeutic Goods Administration
PO Box 100
WODEN ACT 2606

Dear [redacted]

Submission ID: DA-2015-02876-1 and DA-2015-02877-1
Application for Inclusion – DV-2015-DR-19876-1 and DV-2015-DR-03198-1
Applicant's Reference: BIRMINGHAM HIP Resurfacing Femoral Head, and BIRMINGHAM HIP Resurfacing HAP Coated Acetabular Cup

I refer to your letter under s41JA of the Therapeutic Goods Act 1989 (the Act), dated 8 December 2015 and reply as follows. I note that the clinical assessor identified an "issue" which for ease of reference, is replicated hereunder:

> "The copies of the labels provided with the applications do not indicate the MRI status of the Devices. EP 13.2 states that the information required to be provided with a medical device, must be provided on the device itself, or if this is not practicable, on the packaging used for the device, on a leaflet, or in a printed document or other media. EP13.3 item 5 requires any warnings, restrictions or precautions that should be taken in relation to use of the device. Therefore to comply with EP 13.2, the appropriate icon relating to the MRI status for the Device should be provided on the label for the Device (in accordance with ASTM 2503-13 which provides for the standard practice for the marking of medical devices and other items for safety in the magnetic resonance environment)."

In view of the clinical assessor's observations, you are not satisfied on the information before you that the devices comply with s.41FD(d) of the Act, the Essential Principles (EP) and you require further information to substantiate compliance, specifically:

- Copies of the updated labels that indicate the MR Status of the Device in accordance with ASTM 2503-13; **or**
- Evidence on how the manufacturer intends to demonstrate compliance with EP 13.3, item 5 in relation to the MR status of the Devices.

In response to the above request, it is noted that the Therapeutic Goods Act 1989 provides at s.3 (1) the interpretation for certain words including the word "label" as follows:

> ***label***, in relation to therapeutic goods, means a display of printed information:
> (a) on or attached to the goods; or

[redacted]
Medical Devices Branch
Therapeutic Goods Administration

14 January 20 16

(b) on or attached to a container or primary pack in which the goods are supplied; or
(c) supplied with such a container or pack.

EP 13.3 Item 5 of Schedule 1 Part 2 to the Therapeutic Goods (Medical Devices) Regulations 2002, reads as follows:

13.3 Information to be provided with medical devices – particular requirements
The information mentioned in the following table must be provided with a medical device.

Item	Information to be provided
...	
5	Any warnings, restrictions, or precautions that should be taken, in relation to use of the device

The Instructions for Use (see Attachment 1) which was submitted with the original applications and is supplied with both of the devices which are the subject of your enquiry, contain approximately three-quarters of a page of MRI Safety information (page 6-7). It is impracticable for that information to be provided on the device itself – EP 13.2(1) and it is also impracticable for it to be provided on the packaging used for the device – EP 13.2(2) because of insufficient free space to incorporate the information which needs to be imparted.

In accordance with EP 13.2(3) the information is contained on a leaflet supplied with the device, namely, the Instructions for Use. Therefore, EP 13.3 Item 5 has been met because the information is contained within the Instructions for Use "supplied with such a container or pack".

Please do not hesitate to contact me if you require any further information.

Yours sincerely

[redacted]
Regulatory Affairs Co-ordinator

Enc

BIRMINGHAM HIP® Resurfacing (BHR®) System
Important Medical Information
Warnings and Precautions

DEVICE DESCRIPTION

The BIRMINGHAM HIP Resurfacing (BHR) prosthesis is a metal-on-metal hip resurfacing prosthesis. The device consists of a stemmed femoral head resurfacing component designed for cemented fixation, and a hemispherical acetabular cup designed for cementless, press-fit, fixation. The acetabular cups are configured in one-piece designs. Instrumentation sets are provided as standard; several additional instruments are available as options.

Resurfacing Femoral Head

The resurfacing femoral head is supplied in a range of thirteen sizes, and is manufactured from CoCr alloy. The femoral head central stem is parametric and varies proportionally with the external diameter. There are 6 equally spaced internal recesses intended to provide antirotational locking for the cement mantle.

Acetabular Cups

The standard acetabular component is supplied in a range of twenty six sizes (two for each femoral head size to address the condition of occasional head cup mismatch). For those patients with a deficiency in the superolateral aspect of the acetabulum, the dysplasia cup is available. The dysplasia cup is designed with two superolateral screw holes that accommodate CoCr-alloy dysplasia cup screws. There is a range of thirteen sizes for the dysplasia cup. Acetabular cups have a single layer of integrally-cast CoCr-alloy (ASTM F75 and ISO 5832-4) beads on the outer surface that are coated with hydroxyapatite (HA) (ASTM F1185).

Screws for Acetabular Cups

The dysplasia cup screws are threaded through a threaded lug on the superolateral aspect of the dysplasia cup and lock in situ. The screws also lock into the posterior cortical bone of the ilium. Screws are available in sizes ranging from 24mm to 88mm, in 4mm increments.

Materials

Component	Material
BHR Femoral Heads	cobalt chrome alloy per ASTM F75 and ISO 5832-4
BHR Acetabular Cups	cobalt chrome alloy per ASTM F75 and ISO 5832-4, HA (coating) per ASTM F-1185
Dysplasia screws	CoCr alloy per ASTM F-1537/ISO 5832-12

Sizing and System Compatibility – Acetabular Cups

Each femoral head resurfacing component is compatible with two standard acetabular cup sizes and one dysplasia size (Table 1).

Table 1: BHR Head and Cup Sizing and System Compatibility

BHR Femoral Head Resurfacing Component (identified by head outer diameter)	Mating BHR Standard Cup Sizes (2 cups available per head component size)	Mating BHR Dysplasia Cup Sizes
38mm	44mm or 46mm	46mm
40mm	46mm or 48mm	48mm
42mm	48mm or 50mm	50mm
44mm	50mm or 52mm	52mm
46mm	52mm or 54mm	54mm
48mm	54mm or 56mm	56mm
50mm	56mm or 58mm	58mm
52mm	58mm or 60mm	60mm
54mm	60mm or 62mm	62mm
56mm	62mm or 64mm	64mm
58mm	64mm or 66mm	66mm
60mm	66mm or 68mm	68mm
62mm	68mm or 70mm	70mm

INDICATION FOR USE

The BIRMINGHAM HIP Resurfacing (BHR) System is a single use device intended for hybrid fixation: cemented femoral head component and cementless acetabular component. The BHR System is intended for use in patients requiring primary hip resurfacing arthroplasty due to:

- Non-inflammatory arthritis (degenerative joint disease) such as osteoarthritis, traumatic arthritis, avascular necrosis, or dysplasia/DDH, or
- Inflammatory arthritis such as rheumatoid arthritis.

The BHR System is intended for patients who, due to their relatively younger age or increased activity level, may not be suitable for traditional total hip arthroplasty due to an increased possibility of requiring future ipsilateral hip joint revision.

CONTRAINDICATIONS

- Patients with infection or sepsis
- Patients who are skeletally immature
- Patients with any vascular insufficiency, muscular atrophy, or neuromuscular disease severe enough to compromise implant stability or postoperative recovery
- Patients with bone stock inadequate to support the device including:
  - Patients with severe osteopenia or patients with a family history of severe osteoporosis or severe osteopenia.
  - Patients with osteonecrosis or avascular necrosis (AVN) with >50% involvement of the femoral head (regardless of FICAT Grade).
  - Patients with multiple cysts of the femoral head (>1cm).
  - Note: In cases of questionable bone stock, a DEXA scan may be necessary to assess bone stock status.
- Females of child-bearing age due to unknown effect on the fetus of metal ion release

- Patients with known moderate to severe renal insufficiency
- Patients who are immunosuppressed with diseases such as AIDS or persons receiving high doses of corticosteroids
- Patients who are severely overweight
- Patients with known or suspected metal sensitivity (e.g., jewelry)

WARNINGS AND PRECAUTIONS

- Patients on medications (such as high-dose or chronic aminoglycoside treatment) or with co-morbidities (such as diabetes) that increase the risk of future, significant renal impairment should be advised of the possibility of increase in systemic metal ion concentration. Preoperative and postoperative monitoring of renal function (such creatinine, GFR, BUN) will be necessary for these patients.

- Only physicians who have received appropriate training and are familiar with the implant components, instruments, procedure, clinical applications, adverse events, and risks associated with the BHR System should use this device. Contact Smith & Nephew Orthopaedics Ltd. for the surgical technique manual and procedural training protocol.

- Based on literature reports together with the manufacturer's post-market data, the following were identified as risk factors for early revision:
    - Patients who are female;
    - Patients who receive a smaller component size ($\leq$48mm);
    - Male patients who are aged 65 or older;
    - Patients who receive a device which is incorrectly positioned;
    - Patients who have a diagnosis of avascular necrosis;
    - Patients who have congenital dysplasia; and
    - Patients who are obese

The more risk factors a patient has, the greater the risk of procedure failure requiring a revision of the hip.

Preoperative

- Do NOT use any component of the BHR System with another manufacturer's implant components, because designs and tolerances may be incompatible.
- Do NOT use cobalt chrome BHR System components with any stainless steel components, since corrosion can occur between two dissimilar metals.
- Previous hip surgery such as osteotomy, core decompression, hemi resurfacing, or internal fixation may increase the risk of early failure.
- Examine instruments for wear or damage before use. While rare, intra-operative instrument breakage can occur. Instruments that have experienced excessive use or force may be susceptible to breakage.
- If during pre-operative planning an appropriately sized component cannot be found, this type of prosthesis should not be used.

Intraoperative

- Implants should be accepted only if received by the hospital or surgeon with the factory packaging and labeling intact. If the sterile barrier has been broken, return the component to Smith & Nephew Orthopaedics Ltd.
- Avoid notching the femoral neck, as this may lead to femoral neck fracture.

- Avoid placing the femoral component in varus. Varus placement of the femoral component has been associated with femoral neck fracture.
- When performing a hip resurfacing procedure with the BHR acetabular cup, the cup must be used ONLY with a BHR Femoral Head. If the surgeon abandons the BHR resurfacing procedure in favor of a total hip replacement, the BHR cup must not be used.
- Do NOT re-use an implant. All implants are intended for single-use only.
- Use the recommended instruments and the recommended surgical technique.
- Improper selection, placement, positioning, and fixation of the implant components may result in early implant failure.
- Malalignment of the components and/or soft tissue imbalance may cause excessive wear and early implant failure.
- Associated trials and templates should be used for verification of component size. If an appropriate component size cannot be found during pre-operative planning, do not use this type of implant.
- Complete pre-closure cleaning of the implant site (complete removal of bone chips, bone fragments, metallic debris, etc.) is critical to prevent wear of the articular surfaces.
- Using instruments other than the associated BHR instruments may result in inaccurate placement.

Hydroxyapatite-Coated Acetabular Implants

- Do NOT allow the HA-coated, porous-surfaced acetabular component to contact any substance other than the device packaging, clean gloves, or the patient's tissue.
- Do NOT use cement with these HA-coated, porous-surfaced implants.
- Take care to achieve a stable press fit. The HA-coated, porous surface is not intended to compensate for inadequate implant fixation.

Postoperative

- Excessive physical activity levels, excessive patient weight, and trauma to the joint replacement may cause early failure of the implant.
- Loosening of components may increase production of wear particles and accelerate damage to the bone, making successful revision surgery more difficult.

Patient Education

- Warn the patient of the surgical risks, possible adverse effects, and possible operative complications that can occur with joint arthroplasty.
- Warn the patient of the limitations of artificial joint replacement devices.
- Caution the patient to protect the joint replacement from unreasonable stresses and to follow the treating physician's instructions. In particular, warn the patient to strictly avoid high impact activities such as running and jumping during the first post-operative year while the bone is healing.
- Warn the patient that artificial joint replacement devices can wear out over time, and may require replacement.

POTENTIAL ADVERSE EFFECTS OF THE DEVICE ON HEALTH

Reported Device Related Adverse Effects

The most commonly reported BHR device related adverse events are:

- femoral neck fracture
- femoral head collapse
- infection
- avascular necrosis
- dislocation

- component migration/loosening, and
- impingement

Potential Adverse Effects

The following adverse effects may occur in association with hip replacement surgery including the BHR System:

- Cardiovascular complications including venous thrombosis, pulmonary embolism, or myocardial infarction
- Sudden, pronounced, intraoperative blood pressure decrease due to the use of bone cement
- Hematoma or damage to blood vessels resulting in large blood loss
- Delayed wound healing
- Superficial or deep infection. Infections may occur months to years after surgery and these infections are difficult to treat and may require reoperation with removal surgery and later replacement at another time
- Temporary or permanent nerve damage resulting in functional and/or sensory deficits in the affected limb
- Metal sensitivity reactions or allergic reactions or metallosis
- Dislocation or subluxation leading to post-operative joint instability (which may be caused by malpositioning of the implants, or muscle or fibrous tissue laxity)
- Component loosening or migration due to trauma, loss of fixation, malalignment, or bone resorption
- Limb length discrepancy
- Increased hip pain and/or reduced hip function
- Fatigue fracture of the implants as a result of excessive loading, malalignment, or trauma
- Osteolysis and/or other peri-prosthetic bone loss
- Unintended bone perforation or fracture occurring either intra-operatively or post-operatively as a result of trauma, excessive loading, osteolysis, or osteoporosis
- Periarticular calcification or ossification
- Wear or deformation of the articular surface as a result of excessive loading or implant malalignment
- Temporary or permanent device related noise such as clicking or squeaking
- Inflammatory tissue response to high levels of wear debris resulting in peri-prosthetic aseptic lymphocyte dominated vasculitis associated lesions (ALVAL), fluid collections, or soft tissue masses (Pseudotumors)

Any of these adverse effects may require medical or surgical intervention. Rarely, these adverse effects may lead to death.

STERILISATION

- Implant components are supplied sterile to a Sterility Assurance Level (SAL) of 10^{-6}. Metal components are sterilized to a minimum of 25 kiloGrays of gamma irradiation. All components are supplied in protective packaging. Inspect packages for punctures or other damage prior to surgery.
- Instruments used to implant the device system are supplied non-sterile and must be sterilized prior to use using one of the following validated, recommended methods:
    - **Prevacuum Flash Cycle**: 4 pulses (Maximum = 26.0 psig (2.8 bars) & Minimum = 10.0 inHg (339 millibars)) with a minimum exposure time of 4 minutes at 270°F to 275°F (132°C to 135°C), followed by a 1 minute purge

    - **High Temperature Gravity Cycle**: 270°F to 275°F (132°C to 135°C) with a minimum exposure time of 10 minutes, followed by a 1 minute purge and at least 15 minutes of vacuum drying.
    - **Prevacuum Cycle**: 4 pulses (Maximum = 26.0 psig (2.8 bars) & Minimum = 10.0 inHg (339 millibars)) with a minimum exposure time of 4 minutes at 270°F to 275°F (132°C to 135°C), followed by a 1 minute purge and at least 15 minutes of vacuum drying.
- DO NOT RESTERILIZE implant components. Contact your local Smith & Nephew Sales Representative regarding procedures to return components to Smith & Nephew Orthopaedics Ltd..

The product is not labeled "pyrogen free".

The BHR femoral head and BHR acetabular cup components are packaged in a dual sterile barrier blister tray to maintain sterility. The products have a five (5) year sterile shelf-life where the sterile barrier is not broken.

MRI SAFETY INFORMATION

Smith & Nephew, Inc. BIRMINGHAM HIP™ Resurfacing (BHR) System implants are manufactured from a non-ferromagnetic material, cobalt-chromium-molybdenum alloy. Smith & Nephew has performed non-clinical Magnetic Resonance Imaging (MRI) studies on BHR implants which are determined to be MR Conditional in accordance to ASTM F2503-08, Standard Practice for Marking Devices and Other Items for Safety in the Magnetic Resonance Environment. MR Conditional refers to an item that has been demonstrated to pose no known hazards in a specified MR environment with specified conditions of use.

MR Information

Non-clinical testing has demonstrated the BHR System is MR Conditional. It can be scanned safely under the following conditions:

- Static magnetic field of 1.5-Tesla (1.5T) and 3.0-Tesla (3.0T)
- Spatial gradient field of 3,000 Gauss/cm (30.0 Tesla/m) or less
- Maximum whole body specific absorption rate (SAR) of 2.0 W/kg for 15 minutes of continuous scanning
- Normal operating mode of the MR system. The effects of MRI procedures using MR systems and conditions above these have not been determined

MR Heating

Non-clinical testing was performed according to ASTM F2182-09 and yielded the following:

1.5 Tesla

The BHR System produced a temperature rise of less than 7.5 °C at a maximum whole body averaged specific absorption rate (SAR) of 2.1 W/kg, as assessed by calorimetry for 15 minutes of continuous MR scanning in a *(field strength – 1.5T) (model - Intera) (manufacture – Philips Medical Systems (PMS)) (software version – Release 12.6.1.4 (11/5/2012))* MR scanner.

3.0 Tesla

The BHR System produced a temperature rise of less than 4.4 °C at a maximum whole body averaged specific absorption rate (SAR) of 2.3 W/kg, as assessed by calorimetry for 15 minutes of continuous

MR scanning in a *(field strength - 3T) (model - Signal Hdxt) (manufacturer - General Electric (GE) Medical Systems) (software version- 15.0_M4_0910.a)* MR scanner.

Image Artifacts

MR image quality may be compromised if the area of interest is relatively close to the position of the device. Distortion extended as much as 10.2 cm from the implant in image distortion tests performed according to ASTM F2119-07 in a 3.0 T MR system. Therefore, it may be necessary to optimize MR imaging parameters for the presence of these implants.

INFORMATION

For further information, please contact Smith & Nephew Orthopaedics Ltd., Customer Service: +44 (0) 845 056 8333

Smith & Nephew Orthopaedics Ltd.
Spa Park
Harrison Way, Leamington Spa, Warwickshire CV31 3HJ
United Kingdom

81036947 Rev. E 11/14