בס"ד

Smith & Wesson®
Watches
A Division of CampCo Inc.

ANTHONY KIRKWOOD
Materials Safety & Inspection Section A
Division of Industrial & Medical Nuclear Safety
Nuclear Regulatory Commission
Washington DC 20555

Wednesday June 2, 2004

Dear Mr. Kirkwood,

Firstly I wanted to thank you for all of your patience and assistance in this overwhelming process thus far. As you might have heard, my project manager, Paula Petry has gone back to school. Please excuse any repetition as I take over in trying to obtain a license form the NRC.

I refer to your letter dated April 12 2004 requesting our compliance on 2 remaining issues.
#1) Lower the activity to 25 millicuries.
#2) Obtain a license form the sate of California.

The good news is that our engineers were able to lower the activity to 25mi and a report will be mailed to you at once. Our report will verify that the 2 styles of watches we would like to import (#SWW-450 and #SWW-357) will contain a total activity of 0.761 / 0.0206 GBq / Ci

I seem to be having a problem with the California License. I was able to talk to Freida Taylor who was very helpful. However she was not familiar with our class of license and referred me to Edgar Baily. I hope to have some clarity from the California office in the next few days. I only hope that their requirements are similar to yours ensuring a speedy approval.

My questions for you are as follows:
#1) Can you please resubmit our application with the new lower activity specifications?
#2) Can you recommend a consultant who can assist us in applying for a license under 10CFR 32.22 and its engineering safety review?

I understand that this license will require an additional fee and greater review time. Perhaps if we had a professional consultant involved we could avoid wasting your precious time by submitting the paperwork correctly.

I also wanted you to be aware that we have started our international advertising campaign for these watches. The only watches that are currently in the USA are samples for testing marketing and photography. I cherish any relationship between CampCo and the NRC and intend on complying with all of your requirements.

Sincerely

Motti Slodowitz
President / CampCo

4625 W. Jefferson Blvd Los Angeles, CA 90016
Tel: 323.766.2555 Fax: 323.766.2424
www.swwatches.com

בס"ד

Smith & Wesson®
Watches

A Division of CampCo Inc.

Wednesday June 2, 2004
NRC
Washington DC 20555

Dear Mr. Kirkwood,

Enclosed please find:

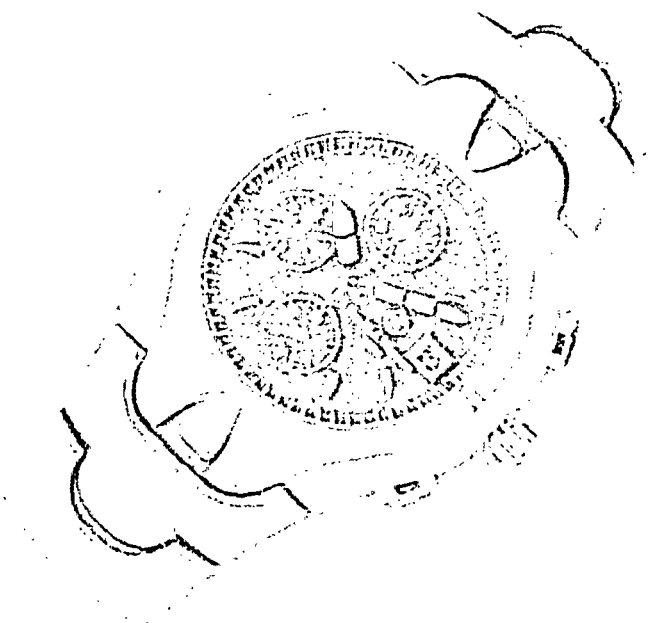
1. A copy of a report that reflects a lower activity of tritium that will be used in our proposed watches.

2. A sample of a watch that has the exact same configuration of tritium tubes as our first proposed style. What is not understood is how the enclosed watch can be under 25 Millicures when the configuration and tube sizes are identical to our original proposed style.

Looking forward to your reply

Sincerely

Motti Slodowitz



4625 W. Jefferson Blvd Los Angeles, CA 90016
Tel: 323.766.2555 · Fax: 323.766.2424
www.swwatches.com

BETAGLOW TECHNOLOGIES (H.K.) LIMITED
比達高科技(香港)有限公司
Unit 01, 8/F., Honour Industrial Centre, 6 Sun Yip Street, Chai wan, Hong Kong
Telephone: (852) 2897 3896 Fax: (852) 2898 3837

TO WHOM IT MAY CONCERN

Activity of tritium in the GTLSs (gaseous tritium light sources) in the following watch models.

Model no.	*Betalight Part No.*	*Quantity*	*Activity/unit GBq / Ci*	*Total activity GBq / Ci*
SWW-450	*263041G*	*1*	*0.074 / 0.0020*	*0.074 / 0.0020*
SWW-357	*263066G*	*1*	*0.111 / 0.0030*	*0.111 / 0.0030*
	263024G	*11*	*0.048 / 0.0013*	*0.528 / 0.0143*
	263024T	*1*	*0.048 / 0.0013*	*0.048 / 0.0013*
				0.761 / 0.0206

For and on behalf of
比達高科技香港有限公司
BETAGLOW TECHNOLOGIES (H.K.) LIMITED

.....
Authorized Signature(s)

Date : 17th May, 2004

P.3/13

BETAGLOW TECHNOLOGIES (H.K.) LIMITED
比達高科技(香港)有限公司
Unit 01, 8/F., Honour Industrial Centre, 6 Sun Yip Street, Chai wan, Hong Kong
Telephone: (852) 2897 3896 Fax: (852) 2898 3837

INFORMATION ON GASEOUS TRITIUM LIGHT SOURCES

Manufacturer : SRB Technologies (Canada) Incorporated
320-140 Boundary Road
Pembroke, Ontario K8A 6W5
Canada
Tel. : (613) 732 0055
Fax : (613) 732 0056
Web-site : www.betalight.com

Corporate Health Physicist : Mr. K.K.Shane MacDougall

Betalight Activity For Timepiece Applications

Betalight Part No.	*Description*	*Activity GBq. / Ci.*
263020xxxxA	0.63mm dia. x 2.0mm long	0.044 / 0.0012
263024xxxxA	0.63mm dia. x 2.4mm long	0.048 / 0.0013
263041xxxxA	0.63mm dia. x 4.1mm long	0.074 / 0.0020
263066xxxxA	0.63mm dia. x 6.6mm long	0.111 / 0.0030
257024xxxxA	0.75mm dia. x 2.4mm long	0.111 / 0.0030
251024xxxxA	0.95mm dia. x 2.4mm long	0.185 / 0.0050
251030xxxxA	0.95mm dia. x 3.0mm long	0.222 / 0.0060

For and on behalf of
比達高科技有限公司
BETAGLOW TECHNOLOGIES (H.K.) LIMITED

.....
Authorized Signature(s)

Date : 17th May, 2004

P.4/13

Canadian Nuclear Safety Commission
Commission canadienne de sûreté nucléaire

P.O. Box 1046, Station B
Ottawa, Ontario
K1P 5S9

C.P. 1046, Succursale B
Ottawa (Ontario)
K1P 5S9

Fax: (613) 995-5086

Télécopieur : (613) 995-5086

Your file Votre référence

Our file Notre référence
42-1-3-0

NUCLEAR SUBSTANCE PROCESSING FACILITY OPERATING LICENCE

SRB TECHNOLOGIES (CANADA) INCORPORATED

I) **LICENCE NUMBER:** NSPFOL-13.00/2005

II) **LICENSEE:** Pursuant to section 24 of the Nuclear Safety and Control Act, this licence is issued to:

SRB Technologies (Canada) Incorporated
320 - 140 Boundary Road
Pembroke, Ontario
K8A 6W5

III) **LICENCE PERIOD:** This licence is valid from **January 1, 2001** to **December 31, 2005** unless sooner suspended, amended, revoked or replaced.

IV) **LICENSED ACTIVITIES:**

This licence authorizes the licensee to:

(i) manufacture sealed sources consisting of tritium gas sealed in glass tubes, and incorporate these sources into devices in the manner described in the documents listed in Appendix A;

(ii) possess, use, store, and transfer nuclear substances necessary or incidental to (i); and

(iii) import up to 37 terabecquerels of tritium during any two year period;

at the location named in Part II of this licence.

Canada

CERTIFICATE OF REGISTRATION

Quality Management System

SRB Technologies (Canada) Inc.
320-140 Boundary Road
Pembroke
Ontario
Canada
K8A 6W5

Operate a Quality Management System,

which complies with the requirements of

BS EN ISO 9001:2000

for the activities detailed in the scope of registration.

FM 64093

President

Originally Registered: [illegible] Sept 1997

Expiry Date: **6 Jan 2007**

Management Systems

Safety Commission de sûreté nucléaire

P.O. Box 1046, Station B
Ottawa, Ontario
K1P 5S9

C.P. 1046, Succursale B
Ottawa (Ontario)
K1P 5S9

Fax: (613) 995-5086 Télécopieur : (613) 995-5086

Your file Votre référence

Our file Notre référence
346061

11-29-3

EXPORT LICENCE

I) **LICENCE NUMBER: EL-A1-15225.0/2004**

II) **LICENSEE:** Pursuant to sections 24 and 37 of the *Nuclear Safety and Control Act*, this licence is issued to:

SRB Technologies (Canada) Inc.
320-140 Boundary Road
Pembroke, Ontario
K8A 6W5

III) **LICENCE PERIOD:** This licence is valid from **November 24, 2003** to **November 30, 2004**, unless otherwise suspended, amended, revoked or replaced.

IV) **LICENSED ACTIVITY:** This licence authorizes the licensee to export to:

Beta Glow Technologies (HK) Ltd.
6 Sun Yip Street
Chai Wan
Hong Kong

Controlled Nuclear Substances, as identified in Part A.1. of the Schedule to the *Nuclear Non-Proliferation Import and Export Control Regulations*: 370,000 TBq of tritium contained in 500,000 gaseous tritium light sources and gaseous tritium light devices (less than 740 GBq per unit). Maximum 740 GBq per source, maximum 40 TBq per package.

V) **CONDITIONS:**

GENERAL

1.1 This licence authorizes only the activity set out in section IV) unless amended by the Canadian Nuclear Safety Commission or a Designated Officer on its behalf.

K.P. Wagstaff
Designated Officer on behalf of the
Canadian Nuclear Safety Commission

P.7/13

牌照號碼 Licence No.: 2413

費用 Fee: $2770.0

輻射條例 (第 303 章)
Radiation Ordinance (Chapter 303)

放射性物質牌照
RADIOACTIVE SUBSTANCES LICENCE

根據輻射條例 (第 303 章) 之規定 Under the provisions of the RADIATION ORDINANCE (CAP. 303)

BETAGLOW TECHNOLOGIES (HK) LIMITED
(全名 Name in full)

地址為 of ~~22/F., GREATMANY CENTRE, 109-115 QUEEN'S ROAD EAST, HONG KONG~~
(詳細地址 Address in full)

*UNIT 01, 8/F., HONOUR INDUSTRIAL CENTRE, 6 SUN YIP STREET, CHAI WAN, HONG KONG

茲獲准進行右開事宜 is hereby licenced to IMPORT, CONVEY, STORE, SELL AND ASSEMBLE DEVICES CONTAINING RADIOACTIVE SUBSTANCES SPECIFIED IN CONDITION 1 OF THIS LICENCE

於 at UNIT 01, 8/F., HONOUR INDUSTRIAL CENTRE, 6 SUN YIP STREET,
(認可地址 Approved premises)
CHAI WAN, HONG KONG

其目的如右 for the purpose of SALE TO PERSONS HOLDING VALID LICENCES OR EXEMPTION NOTIFICATIONS FOR THE POSSESSION OF SUCH RADIOACTIVE SUBSTANCES

持牌人必須遵守 Subject to:

(甲) 輻射條例 (第 303 章);
(a) The provisions of the RADIATION ORDINANCE (Cap. 303)
(乙) 輻射 (管制放射性物質) 規例之規定;及
(b) The provisions of the RADIATION (CONTROL OF RADIOACTIVE SUBSTANCES) REGULATIONS: and
(丙) 本牌照附帶規約。
(c) The CONDITIONS attached hereto.

*(C.B. POON)
for Radiation Board

牌照有效期至 This licence is valid until 12 October 2004

2003 年 year 10 月 month 13 日 day
13th day of October 2003

C. B. POON 代行
輻射管理局
for Radiation Board

備註 (如有) REMARKS (if any)

DH1641(Rev)

SKDI

Manor House Lane
Datchet, Berkshire, SL3 9EG
Tel: +44 (0) 1753 592492
Fax: +44 (0) 1753 592692
www.betalight.com

Date: 5 May, 2004

TO WHOM IT MAY CONCERN

Dear Sirs,

Ref: BETALIGHT ACTIVITY FOR TIMEPIECE APPLICATIONS

Gaseous tritium activity levels for GTLS betalights utilised in timepiece applications are as follows.

Betalight Part Number	Description	Activity GBq /Ci
263020XxxxA	0.63mm diameter x 2.0mm long	0.044 / 0.0012
263024XxxxA	0.63mm diameter x 2.4mm long	0.048 / 0.0013
263041XxxxA	0.63mm diameter x 4.1mm long	0.074 / 0.0020
263066XxxxA	0.63mm diameter x 6.6mm long	0.111 / 0.0030
257024XxxxA	0.75mm diameter x 2.4mm long	0.111 / 0.0030
251024XxxxA	0.95mm diameter x 2.4mm long	0.185 / 0.0050
251030XxxxA	0.95mm diameter x 3.0mm long	0.222 / 0.0060

Please do not hesitate to contact the undersigned for further information.

Yours faithfully

Douglas Boyd
Sales Manager

Radiation Safety Data Sheet

Tritium (H-3)

Chemical Symbol: H
Atomic Number: 1
Common Names: Tritium
Atomic Weight: 3

Physical Half-life: 12.35 years

CNSC Exemption Quantity: 1.0e9 Bq
Note: A CNSC license is not required if the amount of radionuclide possessed is less than one Exemption Quantity.

Principal Emissions	Average Energy (MeV)	Maximum Energy (MeV)	Dose Rate @ 1 meter (mSv/h*GBq)	Recommended Shielding
Neutrons				
Gamma/ X-rays				
Beta	0.005685	0.018601		
Alpha				

Progeny: He-3 (stable)

Method of Detection

Wipes counted by liquid scintillation.

Dosimetry

External:
Internal: urinalysis (bioassay)

Personal Protection

Always use the principals of time, distance and shielding to minimize dose.
Consult CNSC licensee for requirements concerning engineering controls, protective equipment, and special storage requirements.

ICRP Data

	Ingestion	Inhalation		
Compound Type	Tritiated water	Tritiated water	Elemental tritium	
Annual Limit on Intake (Bq)	1.0e09	1.0e09	1.0e13	

Emergency

The following is a guide for first responders. Qualified individuals should carry out the following actions, including remediation. In cases where life-threatening injury has resulted, first treat the injury, second deal with personal contamination.

Personal Decontamination Techniques

- Wash well with soap and water, then monitor skin,
- Do not abrade skin, only blot dry,
- Decontamination of clothing and surfaces are described in operating and emergency procedures.

Spill and Leak Control

- Alert persons in the immediate area,

- Confine the problem or emergency (includes the use of absorbent material),
- Clear area,
- Summon assistance.

Emergency Protective Equipment, Minimum Requirements

- Gloves (vinyl preferred, or latex),
- Footwear covers,
- Safety glasses,
- Outer layer or easily removed protective clothing,
- Suitable respirator selected.

CNSC Fact Sheet

Common used form: tritiated gas, tritiated water, tritiated labeled compounds (e.g. streptomycin, cortisone, epinephrine, octadecane and stearic acid), and Nucleic Acid Precursors.

Source: Reactor produced (main source) and naturally occurring.

Examples of use: radioactive tracer in chemical, biochemical and biological research, industrial gauging, and consumer products (e.g. light sources, watches, gas chromatographs).

Radiological Data

- **Half-life:** 12.35 years
- **Maximum range in air:** 6 mm
- **Maximum range in water:** 0.006 mm
- **Mass/Activity:** 2.81e-06 g/GBq (1.04e-04 g/Ci)
- **Specific Activity:** 3.56 e+05 GBq/g (9.61e+03 Ci/g)
- **Bremsstrahlung:** Insignificant
- **Emission:** Beta-; E_{max} = 0.0186MeV, E_{ave} = 0.005683MeV
- **Decay mode:** H-3 (12.35a) → He-3 (stable) + β- + neutrino
- **Radiation Dose Rate:** NA
- **Radio toxicity:** IAEA Class 4- low toxicity
  - Tritium is not a radiation hazard unless it enters the body. Once in the body, tritium water is uniformly distributed in the body water and can then irradiate live tissue. Inhaled tritium gas will irradiate the lungs. Tritiated water is 10,000 times more radio toxic than tritium gas. Tritium thymidine will be concentrated in the nuclii of DNA synthesizing cells and may result in chromosome damage.
- **Other Considerations:**
  - Tritiated water can be absorbed through the surface of the skin, leading to an internal exposure. Gaseous tritium is a fire and explosion hazard in high concentrations when exposed to heat or flame and can react with oxidizing materials.
- **Safety Precautions:**
  - Protective clothing: Lab coat, PVC gloves preferred or latex gloves, mainly for surface contaminated areas. For high airborne tritium (TBq levels), a plastic suit and respirator may be required.
- **First Aid:**
  - Ingestion: elimination rates may be increased by increasing liquid consumption, or, for serious uptakes, dialysis. Treatment should be initiated as soon as possible following time of intake.
  - Inhalation: elimination rates may be increased by increasing liquid consumption, or, for serious uptakes, dialysis. Treatment should be initiated as soon as possible following time of intake.
  - Skin Contact: elimination rates may be increased by increasing liquid consumption, or, for serious uptakes, dialysis. Treatment should be initiated as soon as possible following time of intake.
- **Control:**
  - Urinalysis by liquid scintillation: detection limit = 100 Bq/L
  - Skin Decontamination: tritiated water is absorbed into skin tissue. Wash skin immediately for 5 – 10 minutes with soap and water. If necessary, for full body exposure, a shower should be taken as soon as possible after skin contact.

- Spills: clean up tritiated water spills with a wet cloth or mop to dilute and absorb the tritiated water. Spills may also be absorbed on material such as clay and vermiculite.
- Disposal: dispose of as required by the competent authority, CNSC, in Canada.
- Shielding: No shielding is required as tritium has a very low energy beta emission that cannot even penetrate the dead layer of skin.

- **Recommended Limits:**
  - For ingestion: ALI = 1.0e9 Bq
  - For inhalation: ALI = 1.0e9 Bq (type F); 1.0e13 Bq (type M)
    - DAC = 4.0e5 Bq/m3 (type F); 5.0e9 Bq/m3 (type M)
- **Maximum release concentration (atmospheric release): 37 kBq/m3**
- **Maximum release concentration (waterborne release): 1000GBq/a**
- **Maximum release concentration (solid waste): 37 MBq/kg**
- **Exemption quantity: 1.0e9 Bq**

RSDS issue date: November 4, 2002
Company: SRB Technologies (Canada) Inc.
Prepared by: K.K. Shane MacDougall, Corporate Health Physicist, RSO

SRB Technologies (UK) Limited

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Datchet, Berkshire. SL3 9EG
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Fax: +44 (0) 1753 592692
www.betalight.com

Date: 7/11/2003

Mr Anthony Chan
Betaglow Technologies (Hong Kong) Ltd
Unit 1, 8th Floor
Honour Industrial Centre
6 Sun Yip Street
Chai Wan
Hong Kong

Dear Mr Chan,

Ref: THE ISSUE OF HTO IN GASEOUS TRITIUM LIGHT SOURCES (GTLS)

The percentage of HTO in a GTLS is determined by the tritium product that is dispensed therein and the process that is used to introduce the phosphorescent coating to the internal surface of the glass capsule.

We do have analysis certificates from our tritium supplier showing better than 99.5% tritium (T2) and the remaining being deuterium (DT) and protium (HT) The quantity of HTO in the dispensed tritium is less than is detectable. In addition, interaction with depleted uranium during dispensing further purifies the tritium providing an extremely pure tritium content to the GTLS.

The procedure used in applying the phosphorescent coating to the interior of the glass capsule is such that we are able to eliminate most, if not all, of the moisture content during the process. The method used is an industry sensitive procedure that is protected.

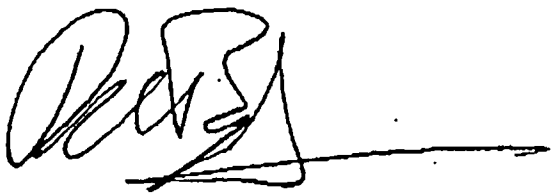
There are some excellent documents available that describe the issue of HTO in GTLS. There is an AEAT document where GTLS that were manufactured in the 1980s were tested and found to have an elevated quantity of HTO. The procedures used in this era were quite elementary in nature compared to those employed at our facility today.

In a study performed by AEAT in the UK, it was shown that the tritium in hydrate form, HTO, was very difficult to extract from GTLS. In fact, they could not retrieve much of the HTO even at extremely elevated temperatures. Therefore, it is safe to assume that most, if not all, of the HTO portion of the contents of a GTLS remains within the capsule and does not pose a significant risk of exposure or uptake for tritium. Information corroborating these statements can be found in the following documents:

- IAEA Technical Reports Series No. 24, Safe Handling of Tritium, 1991
- USDOE, Tritium Radioluminescent Devices, Health and Safety Manual, June 1995
- Department of the Environment, HMIP – Commissioned Research Characteristics of Redundant GTLD, DOE Reference No. DoE/HMIP/RR/92/060

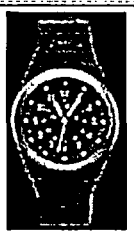
I trust that this information is of assistance in clarifying this issue.

Yours sincerely



Douglas Boyd
Sales Manager

Swiss-Link Inc.™
U.S. Military Watches



P 5900 506 33 01 (without date)- P 5900 506 33 11 (with date)

<< Click image for enlarged view and product details.

P 6500 405 33 01 (without date) - P 6500 400 33 01 (with date)

<< Click image for enlarged view and product details.

P 6502 420 32 01 (with date) - P 6502 425 32 01 (without date)

<< Click image for enlarged view and product details.

P 6506 430 32 01 (with date) - P 6506 435 32 01 (without date)

<< Click image for enlarged view and product details.

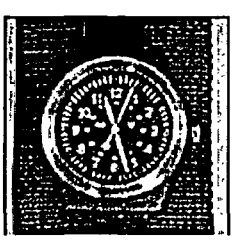
To learn more about these fantastic timepieces, please continue reading.

Swiss Made U.S. Military Issue Watches

Unique technology for unique watches: H3-watches are the easiest in the world to read in low light conditions and even in total darkness. Thanks to its research, the Swiss company MB-Microtec AG has succeeded in manufacturing a self activated light source that is 100 times brighter then any previous available. The light emitting devices require no battery power or any other form of charging, and never need servicing or maintenance. H-3 watches are equipped with a tritium light source. These tiny, airtight vials, sealed under high pressure, are resistant to water, oil and the most corrosive materials. A minute quantity of tritium lights up the dye.

These merits have made H-3 watches an absolute must in the emergency, safety, and protection sectors as well as in the armed forces, but they are also ideal for fans of adventure and sport. H-3 watches are top quality Swiss watches, extremely robust, and proverbially reliable. A choice of fashionable colors and timeless, striking designs complete this outstanding timepiece.

Permanent Light Technology in Militärarmbanduhren



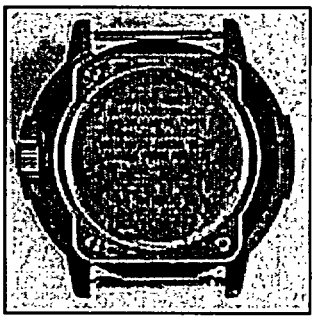
Excellent readability in the dark - proven in action in the first gulf war Since 1989 the American army has specified the use of tritium gas light sources for military watches destined for troops, in order to ensure that they can be read in the dark. Among the best-known and popular models are the SandY 490 Type 1 and the SandY P 650 Navigator. Their unsurpassed lighting system is based on permanent light technology. The light sources for these watches are produced in

Switzerland; mb-microtec is the only company in the world which manufactures these light elements in miniature format. But still, quite a few obstacles had to be overcome before the first watches could be supplied to customers.

SandY 490 Type1

The security officer on duty in the New Cumberland Army Depot, Pennsylvania, could hardly believe his eyes when he saw the measurements being registered on 12 April 1988. The Geiger counter in one of the storage halls had reported considerably increased radioactivity. The cause of the contamination was quickly found: the SandY 184 military watches in the hall were emitting an unusually high dose of radioactivity. The hands and markings on the dial were coated with traditional tritium phosphorescent paint. In the case of some watches, one hundred times the 50 dpm registered in the past and considered safe were measured. The large stock of watches in New Cumberland was therefore a security and health risk. The security officer immediately informed the relevant military department in the Department of Defense.

The solution:



Thomas Chleboski, Head of the Standardization and Specifications section in the army, acted immediately and deleted the supplier Stocker & Yale from the Qualified Product List QPL-46374, the list which states which companies are qualified to supply wrist watches to the U.S. Army.

The news was quite a shock for Jim Bickman, President and CEO of Stocker & Yale in Beverly, Massachusetts, as his company had profited from several lucrative orders for SandY 184 in the previous four years. But Bickman had an idea as to how a real solution could finally be found to the problem of radioactivity in watches. For several years his company had been supplying the army with compasses where a small glass tube filled with tritium gas was used for illumination. The tritium gas light sources produced by the Swiss company mb-microtec in Niederwangen with the help of a special laser were proven not to release any radioactive material whatsoever. Could this groundbreaking lighting technology not also be used for watches? However, in order to make this possible, the Mil-W-4637 specification relating to the manufacture of military wrist watches would have to be changed. "So I decided to convince the relevant departments in the U.S. Army to create new specifications for the production of military watches. I wrote a draft version of this modified product specification myself," remembers Jim Bickman. That was the hour in which a completely new generation of military wrist watches was born.

Intensive cooperation between America and Switzerland:

mb-microtec, the only manufacturer of these tiny tritium light elements in the world, also signaled great interest in launching such a watch. The two companies, who had been business partners for many years, quickly reached agreement: huge efforts should be made to produce some prototypes of watches using the new system. These sample watches were produced in Switzerland, where all SandY watches had been produced since 1984 by general contractor Montres Constructa S.A., Bettlach. Another member of the well-established team was the company Terna S.A. Fabrica Orologi in Mendrisio, where the individual components such as plastic casing, movement, dial, hands etc. were assembled.

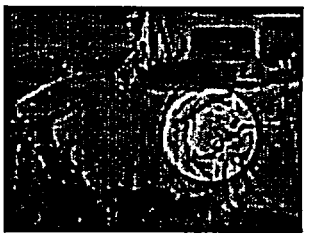
Use of Tritium gas light sources:


Deutsche Soldaten mit H3

On May 31, 1989 the new Mil-W-46374E officially entered into force in the U.S.A. This standard not only brought about the change from tritium illuminated paint to light sources with gaseous tritium (so-called Tritium vials). In connection with the use of the new light system, the dial and the hands of the military watch were completely redesigned. New on the dial was also the symbol for radioactivity as well as the marking H3. Very strict requirements had to be fulfilled with regard to the tritium gas enclosed in the glass tube, the light elements were not allowed to contain more than 25 millicuries of H3. And no radioactivity whatsoever might be measured on the surface of the watch.

The light system consisted of sealed glass tubes filled with tritium, whose inside wall was coated with a fluorescing substance. Today, this light system, which cannot be bettered in terms of brightness is also called Permanent Light Technology (PLT) or TRASER.

Development of prototypes for qualification tests:



According to new regulations, military watches should in future be provided with tritium gas lighting elements. But a few months had to pass until this stage was reached. Before a supplier is even allowed to tender for a military order, he has to submit qualification samples of finished watches, which are then subjected to a series of extremely rigorous tests by the Department of Defense. Only when these tests have been successfully completed is the product included in the Qualified Product List. Therefore development of such qualification samples is work done on trust, without any guarantee that an order will follow. However, Stocker & Yale and their Swiss partners were confident that they would achieve the qualification.

In the second half of 1989 therefore, work proceeded apace in Switzerland on the development of the necessary qualification samples of watch models SandY 490 Type 1, Type 2 and SandY 590 Type 3, which had to fulfill both the strict requirements of the U.S. Nuclear Regulatory Commission (NRC) and also the new military specification. Finally, the prototypes were successfully tested in 1990 and accepted in 1991 as military equipment by the Department of Defense.

Types 1 and 2 are models with a plastic housing and mechanical movements which had to be accurate up to a few seconds per day. Type 1 also had to have at least 15 jewels. Type 3 was a battery-driven quartz watch with much greater accuracy, only allowing deviations of a few seconds a month.

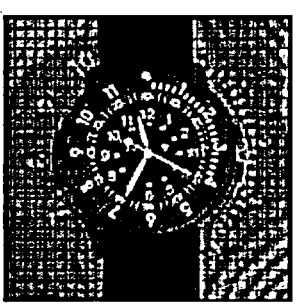
The start of a marathon:

But the competition was close behind. The Marathon Watch Company Ltd. in Canada was also seeking qualification for one its products within the framework of the Mil-W-46374E specification. In the same way as Stocker & Yale, Marathon had already been supplying the U.S. Army for many years. The Canadians also had their military watches manufactured in Switzerland: at the beginning by Gallet S.A. and later in their own company in La Chaux-de-Fonds. In autumn 1989 Gallet ordered tritium light devices for Marathon watches from mb-microtec and inquired what adhesive was most suitable for fixing to the hands. However, the delivery was only received in February 1990, as Gallet did not yet have approval for the processing of light devices with gaseous tritium.

The first gulf war suddenly created demand:

The first gulf war broke out in January 1991, and the U.S. army suddenly needed larger numbers of watches for the troops stationed in the gulf. Which of the qualified manufacturers was in a position to supply the new military watches first and in the necessary quantities? There followed a neck-and-neck race between Stocker & Yale and its Canadian competitor Marathon. Marathon crossed the finishing line first and gained the first order for 60,000 watches manufactured according to the new production specification. Marathon offered earlier delivery than its American competitor. "It is not easy to win orders for watches. But is a disgrace to lose them. I tried to fight the decision and pointed out that the delivery date was not realistic", commented Jim Bickman. But in vain. Marathon managed to retain the order and to implement it at the beginning of April. The first Marathon 348 Mil-W-46374E Type 2 cost the army around 50 U.S. Dollar each. Naturally, the light elements for these first watches supplied to the troops came from mb-microtec. Somewhat later, Bickman's company received an order for the high-quality, olive-colored SandY 490 Type 1.

Navigator - the watch for special units:



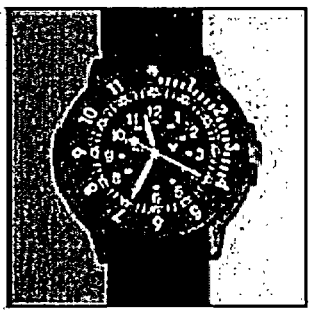
P6500 Navigator/Analog

In October 1991 the manufacturing specification for military watches was again updated by the authorities. Mil-W-46374F now allowed production of a watch model Type 6. A wrist watch of this type had to fulfill additional requirements with regard to altitude, magnetic field protection as well as salt spray and perspiration resistance. In addition, the watch had to withstand the low air pressure at 35,000 feet for at least 60 minutes without sustaining any damage. Its magnetic protection rating was raised from 15.5 to 125+/-1 Gauss. This means that the antimagnetic watch will not cause mines to detonate. Stocker & Yale qualified with the SandY P 650 Type 6 Navigator, a quartz watch with a black plastic housing and rotating GMT lunette. Marathon Watch brought the Marathon 211 Navigator, also with plastic housing, onto the approved army product list.

But also the Type 1, 2 and 3 - SandY 490 and SandY 590 - continued to be manufactured under the new specification. As from 1991 Stocker & Yale were able to secure smaller orders from the army; first for 500 SandY 590 Type 3 and later for larger volumes of up to 10,000 watches per order. Finally in 1994 came the first order for 14,000 SandY P 650 Type 6 Navigators, which were supplied to American troops the following year. It then became part of the standard equipment of special units such as the Army Rangers, Army Special Forces ("Green Berets"), Navy SEALs (Sea, Air, Land), and EOD (Explosives Ordinance Demolition) Teams. In 1999 and 2000 further orders were placed for this classic watch. The Navigator was and is very popular with the troops and is also one of the most desirable collector's items for those who collect military memorabilia. It is particularly popular with collectors who like to actually wear the watches themselves. The Swiss company Traser-Watches has relaunched the classic Navigator his year: the MIL-W-46374F Wrist Watch Navigator P 6500.

Over 1 Million SandY military watches in use:
In November 1999 the new "Performance" specification of the MIL-PRF-46374G standard was issued. since then, tritium light devices are no longer an absolute requirement with regard to good recognition of the time in the dark. Orders from the Departments of Defense have clearly decreased since then. In 2000 Stocker & Yale withdrew from the military watch and compass business and sold this division of the company to Cammenga & Associates, Inc. Between 1980 and 2000 Bickman's company won many tenders for the U.S. army and supplied around 1 million watches. And at the same time around 500,000 timepieces were sold on the civilian market.

The SandY 490 Type 1 was the first military watch from Stocker & Yale which was supplied with Permanent Light Technology.



The SandY P 650 Type 6 Navigator – the "King" of military watches. Its nighttime illumination cannot be bettered.

The Navigator is generally worn by special units such as the Army Rangers, Army Special Forces ("Green Berets"), Navy SEALs (Sea, Air, Land), and EOD (Explosives Ordinance Demolition) Teams.

Benefits of Permanent Light Technology:
Use of tritium gas light sources offers a series of further benefits in addition to optimal insulation of the radioactive material. The light sources are self-illuminating, in other words they neither need battery current nor charging by means of daylight. Their luminance is almost one hundred times that of watches with traditional tritium phosphorescent paint. For the eye of the wearer, the extraordinary brightness of this light system will certainly be maintained for ten years. The hands and markings are extremely bright at night, so bright in fact that the soldier in the field should wear a cover bracelet over the watch in order to avoid being identified as a target. The light system consists of sealed, tritium-filled glass tubes, whose inside wall is coated with a phosphorescent substance. The electrons emitted by the small quantity of gas in the tube excite the this substance. Green is the favored color, as the human eye is most sensitive around these wavelengths. Today the terms Permanent Light Technology (PLT) or Traser are used to describe this ultimate lighting system.

For Prices and Ordering: Call USA 530-872-4988 • Fax USA 530-872-4989
E-mail info@swisslink.com

BETAGLOW TECHNOLOGIES (H.K.) LIMITED
比達高科技(香港)有限公司

Radioactivity of Gaseous Tritium Light Source

THIS WAS TO ORIGINAL REPORT. THIS CONFIGRATION IS THE SAME AS THE ENCLOSED WATCH.

	PART NO..	ACTIVITY(Ci)	NOS.	FOR	TOTAL ACTIVITY (Ci)
1.	263020G0060A 0.65mm DIA x 2mm	0.0019	1	SECOND HAND	0.0019
2.	263041G0060A 0.65mm DIA x 4 mm	0.00314	1	HOUR HAND	0.00314
3.	263066G0060A 0.65mm DIA x 6.5mm	0.00462	1	MINUTE HAND	0.00462
4.	251024G0100A 0.95mm DIA x 2.5mm	0.00828	11	DIAL	0.0911

Total activity per watch piece is 0.10076Ci/3.72 GBq

For and on behalf of
比達高科技香港有限公司
BETAGLOW TECHNOLOGIES (H.K.) LIMITED

.....
Authorized Signature(s)

Polarbest Development Limited

Flat B&D, 10/F., Chinabest Internatonal Centre, 8 Kwai On Road, Kwai Chung, N.T. HONG KONG.

Tel.: (852) 2796 3595 Fax.: (852) 2796 0712

1) 10 CFR 32.14(b)(1) requires details of chemical and physical form and maximum quantity of by product material in each product.

We have provided the following information. Please see the attachment...

-Radiation Safety Date Sheet

-Calculation of GBq. In each product

Radiation Safety Data Sheet

Tritium (H-3)

Chemical Symbol: H
Common Names: Tritium
Atomic Number: 1
Atomic Weight: 3

Physical Half-life: 12.35 years

CNSC Exemption Quantity: 1.0e9 Bq
Note: A CNSC license is not required if the amount of radionuclide possessed is less than one Exemption Quantity.

Principal Emissions	Average Energy (MeV)	Maximum Energy (MeV)	Dose Rate @ 1 meter (mSv/h*GBq)	Recommended Shielding
Neutrons				
Gamma/X-rays				
Beta	0.005685	0.018601		
Alpha				

Progeny: He-3 (stable)

Method of Detection

Wipes counted by liquid scintillation.

Dosimetry

External:
Internal: urinalysis (bioassay)

Personal Protection

Always use the principals of time, distance and shielding to minimize dose.
Consult CNSC licensee for requirements concerning engineering controls, protective equipment, and special storage requirements.

ICRP Data

	Ingestion	Inhalation		
Compound Type	Tritiated water	Tritiated water	Elemental tritium	
Annual Limit on Intake (Bq)	1.0e09	1.0e09	1.0e13	

Emergency

The following is a guide for first responders. Qualified individuals should carry out the following actions, including remediation. In cases where life-threatening injury has resulted, first treat the injury, second deal with personal contamination.

Personal Decontamination Techniques

- Wash well with soap and water, then monitor skin,
- Do not abrade skin, only blot dry,
- Decontamination of clothing and surfaces are described in operating and emergency procedures.

Spill and Leak Control

- Alert persons in the immediate area,

- Confine the problem or emergency (includes the use of absorbent material),
- Clear area,
- Summon assistance.

Emergency Protective Equipment, Minimum Requirements

- Gloves (vinyl preferred, or latex),
- Footwear covers,
- Safety glasses,
- Outer layer or easily removed protective clothing,
- Suitable respirator selected.

CNSC Fact Sheet

Common used form: tritiated gas, tritiated water, tritiated labeled compounds (e.g. streptomycin, cortisone, epinephrine, octadecane and stearic acid), and Nucleic Acid Precursors.

Source: Reactor produced (main source) and naturally occurring.

Examples of use: radioactive tracer in chemical, biochemical and biological research, industrial gauging, and consumer products (e.g. light sources, watches, gas chromatographs).

Radiological Data

- **Half-life:** 12.35 years
- **Maximum range in air:** 6 mm
- **Maximum range in water:** 0.006 mm
- **Mass/Activity:** 2.81e-06 g/GBq (1.04e-04 g/Ci)
- **Specific Activity:** 3.56 e+05 GBq/g (9.61e+03 Ci/g)
- **Bremsstrahlung:** insignificant
- **Emission:** Beta-; E_{max} = 0.0186MeV, E_{ave} = 0.005683MeV
- **Decay mode:** H-3 (12.35a) → He-3 (stable) + β- + neutrino
- **Radiation Dose Rate:** NA
- **Radio toxicity:** IAEA Class 4- low toxicity
  - Tritium is not a radiation hazard unless it enters the body. Once in the body, tritium water is uniformly distributed in the body water and can then irradiate live tissue. Inhaled tritium gas will irradiate the lungs. Tritiated water is 10,000 times more radio toxic than tritium gas. Tritium thymidine will be concentrated in the nuclii of DNA synthesizing cells and may result in chromosome damage.
- **Other Considerations:**
  - Tritiated water can be absorbed through the surface of the skin, leading to an internal exposure. Gaseous tritium is a fire and explosion hazard in high concentrations when exposed to heat or flame and can react with oxidizing materials.
- **Safety Precautions:**
  - Protective clothing: Lab coat, PVC gloves preferred or latex gloves, mainly for surface contaminated areas. For high airborne tritium (TBq levels), a plastic suit and respirator may be required.
- **First Aid:**
  - Ingestion: elimination rates may be increased by increasing liquid consumption, or, for serious uptakes, dialysis. Treatment should be initiated as soon as possible following time of intake.
  - Inhalation: elimination rates may be increased by increasing liquid consumption, or, for serious uptakes, dialysis. Treatment should be initiated as soon as possible following time of intake.
  - Skin Contact: elimination rates may be increased by increasing liquid consumption, or, for serious uptakes, dialysis. Treatment should be initiated as soon as possible following time of intake.
- **Control:**
  - Urinalysis by liquid scintillation: detection limit = 100 Bq/L
  - Skin Decontamination: tritiated water is absorbed into skin tissue. Wash skin immediately for 5 – 10 minutes with soap and water. If necessary, for full body exposure, a shower should be taken as soon as possible after skin contact.

- Spills: clean up tritiated water spills with a wet cloth or mop to dilute and absorb the tritiated water. Spills may also be absorbed on material such as clay and vermiculite.
- Disposal: dispose of as required by the competent authority, CNSC, in Canada.
- Shielding: No shielding is required as tritium has a very low energy beta emission that cannot even penetrate the dead layer of skin.

- **Recommended Limits:**
  - For ingestion: ALI = 1.0e9 Bq
  - For inhalation: ALI = 1.0e9 Bq (type F); 1.0e8 Bq (type M)
    - DAC = 4.0e5 Bq/m3 (type F); 5.0e9 Bq/m3 (type M)
- **Maximum release concentration (atmospheric release): 37 kBq/m3**
- **Maximum release concentration (waterborne release): 1000GBq/a**
- **Maximum release concentration (solid waste): 37 MBq/kg**
- **Exemption quantity: 1.0e9 Bq**

RSDS issue date: November 4, 2002
Company: SRB Technologies (Canada) Inc.
Prepared by: K.K. Shane MacDougall, Corporate Health Physicist, RSO